From one of the world's bestselling authors of computer books

Tim Hartnell's

SECOND GIANT BOOK OF COMPUTER GAMES

OVER 40 ALL-NEW GAMES

TIM HARTNELL'S

Second
Giant Book
of
Computer
Games

TIM HARTNELL'S
Second
Giant Book
of
Computer
Games

Tim Hartnell

Ballantine Books • New York

CONTENTS

FOREWORD

Welcome to my second giant book of computer games.

Writing and playing computer games is lots of fun in its own right, but it is even more enjoyable when you share the pleasure with other people—rather than just with your trusty computer.

The response I received to the first book in this series, *Tim Hartnell's Giant Book of Computer Games* (Ballantine Books, 1984), was therefore particularly welcome. It's great to know just how much enjoyment that book has given others.

In the first book I mentioned that I was in the process of preparing a follow-up work, and invited readers to send me their best original programs for consideration. The response was amazing. It looks as though the world is full of talented computer game programmers—many who read the first book. Not only have the ideas suggested by readers helped to shape this new book, but several programs in this second collection were written, at least in part, by these readers. (I've modified these games, sometimes quite extensively, so that they'll be as easy as possible to type into your computer and get running.)

Let's turn now to the programs in this book. In contrast to the first book, where I included a number of relatively generic game programs, in this work I've tried to give you a collection of games you will never have seen before. From taking over the Roman Empire to running the country from the Oval Office, you'll discover the wide (and fascinating) range of activities that now qualify as computer games.

Computers have now taken their place in a significant percentage of American homes—they are no longer novelties. As more and more machines come into use, the expectations of those who have the computers increase. These higher expectations have led to more complex and clever software, more exciting and imaginative games. The same higher standard now applies to books about computers—especially books of computer game programs. You deserve a collection of games which will lead you into new areas, into fresh fields for exploration.

Here they come . . . a bumper crop of games to keep you and your computer out of mischief in the coming months.

Good game-playing,

Tim Hartnell
London, 1984
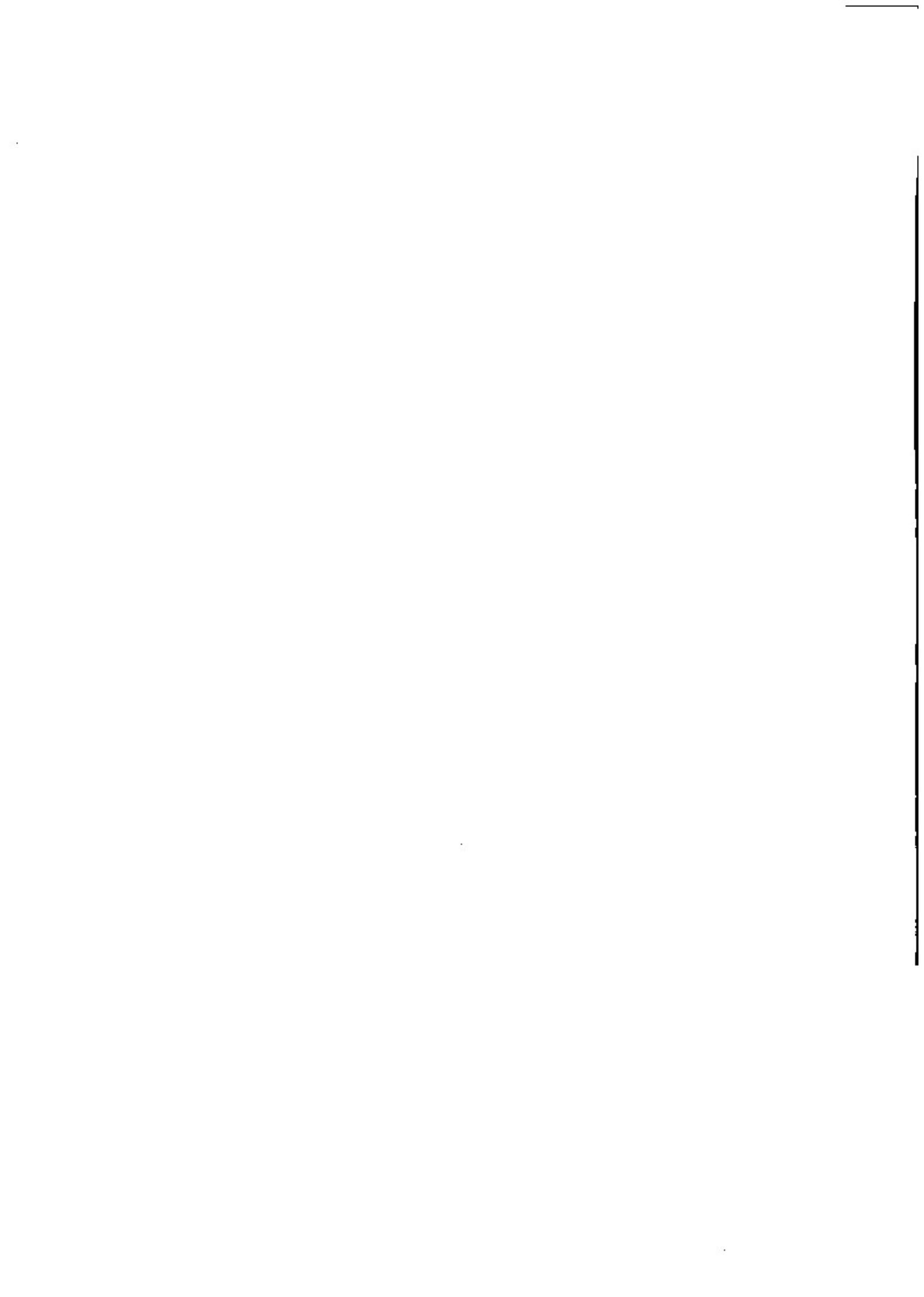
Getting the Programs Running on Your System
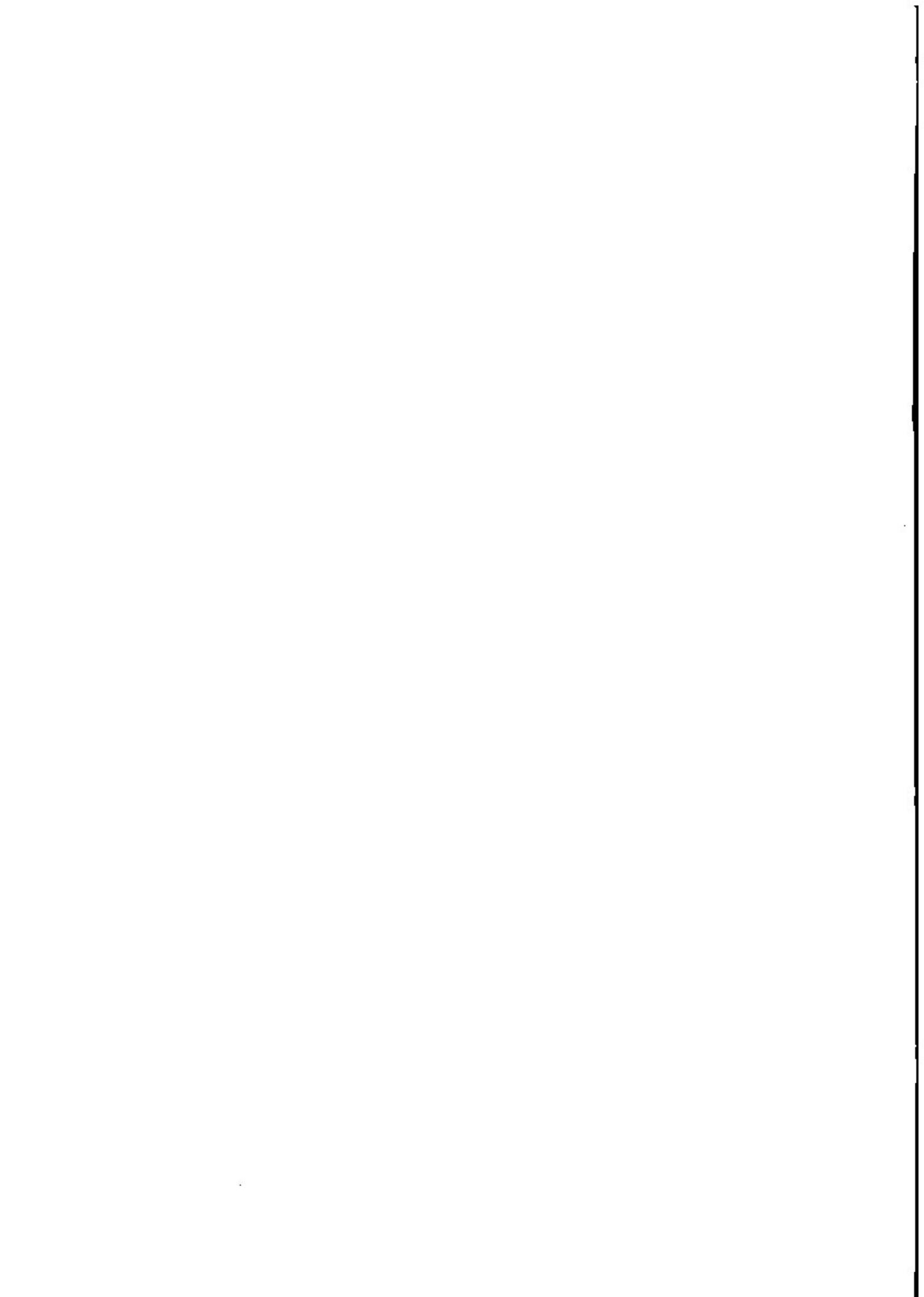
I wrote the programs in this book on an IBM PC, but since many of you own or use different kinds of microcomputers, I've deliberately used only those parts of BASIC that will run on most microcomputers without changes—I haven't used PEEKs or POKEs, special graphic character sets, or commands like SOUND and PLAY that only work on certain machines. The programs in this book are fully compatible with Microsoft™ BASIC, MSX BASIC, and most other BASICs.

Of course, you'll probably want to modify and adapt the display parts of the programs to get the most out of your system—adding sound and color, plus your own system's graphics, wherever you can.

Some of the BASIC statements used in the programs may have to be changed slightly to run on your system. Don't be intimidated by the length of this section—I've included these notes on adapting programs so that you can get the games running as quickly as possible. You'll probably find, in fact, that as you enter the programs you'll begin to make the small changes needed to accommodate the special features of your own system automatically.

Line Length

I've assumed that you have access to the READ and DATA commands, and that your screen is about 40 characters wide. If you have a computer like the VIC-20 with a screen which is not quite that wide, you'll find that it is fairly easy to adapt the program output to the narrower screen. Most of the output consists of PRINT statements which can be shortened to fit on your computer's screen. For example, if you have trouble getting statements to print out on one line, try changing the value of X in the TAB(X) part of PRINT statements.

Although many computers allow program line lengths of 255 characters or more, I have limited the line lengths in these programs to 80 characters, so that you can type them in, more or less as they appear here, on the Commodore 64 and the VIC-20. I've also avoided the IF/THEN/ELSE construction that these two Commodore computers can't use.

Random Numbers

I've used a fairly standard method of generating random numbers. If I need random integers in the range between, say, 1 and 10, I use the command

A = INT(RND(1) * 10) + 1. When I want a random number between one and zero, I use A = RND(1). If your system can't use this kind of random number statement, you'll have to substitute the form of the RND command that *will* run on your computer. For example, either A = RND(10), A = INT(RND(0) * 10) + 1, or A = INT(RND(1) * 10) + 1 may work. If you're not sure how to make this change, look up RND or "random numbers" in your system's BASIC manual.

My computer's BASIC generates the same sequence of random numbers each time a program is run. In order to get a more or less genuinely randomly distributed set of numbers, I have to *seed* the random number generator. I've done this in two ways:

I've either put the program in a loop, increasing a variable each time the program runs through the loop, using INKEY$ to detect when a key is pressed, and then seeding the random number generator with the value of the variable (with a statement like RANDOMIZE N); or I've used the rather terrifying-looking statement RANDOMIZE VAL (RIGHT$(TIME$,2)) to make the "seconds" part of the time reported by my computer's built-in clock the seed for the random number generator.

Delete the long line that includes TIME$ if you do not have to seed your computer's random number generator—if your computer does *not* produce the same sequence of random numbers every time you run the program—or replace it with the method of seeding described in your computer's manual. If you can't figure out how this works, and if your computer will not accept the long line that includes TIME$, leave the line out completely. The program will run perfectly well without it.

If your computer doesn't use the BASIC statement DEFINT (often used in the line after RANDOMIZE as DEFINT A–Z), leave that line out completely as well.

PRINT Statements

Although some of the output within quote marks in PRINT statements is in lower-case letters, all of the programs expect input in upper-case letters. If your system doesn't have lower-case letters, simply put the material in PRINT statements in upper-case letters. It's been put in lower-case because I think it looks better, but it has nothing to do with the actual running of the program.

INPUT Statements

The other thing you're likely to have to change is the use of INKEY$ when the program expects a single character input. If your computer can't use INKEY$, you'll need to change these statements (throughout) to the input statement that works on your system. When you see A$ = INKEY$ in

a program, you can change it to either INPUT A$ or GET A$ (again, see your BASIC manual). The program should run without further changes. Use CALL KEY when working in TI Extended BASIC.

Note that some BASICs (such as Atari BASIC) do not let you include a string within an INPUT statement (as in INPUT "string"; A$). Replace this with PRINT "string" followed by a separate INPUT statement.

READing Arrays

Some BASICs cannot READ array values directly, as in READ A(7) or READ A$(7). You'll have to replace these statements with lines which put data in the array indirectly. First read the data into a variable. The appropriate array element can then be set equal to the variable, as in READ X:A(7) = X or READ X $:A$(7) = X$.

Printing the Board

Many of the programs reprint the board, or playing field, after each turn. For simplicity, I've preceded these "reprints" with a CLS command (which clears the screen). Some systems use a different command to clear the screen, so I'll expect you to make that replacement whenever you come to it. Use PRINT "CLR" on the Commodore machines and Atari computers, HOME on Apples, and CALL CLEAR when working with TI Extended BASIC.

You'll find that the output of a program can often be improved by replacing the CLS (or "clear screen") statement with a "home" command (whatever that is on your system). If your system's BASIC allows you to reset the cursor to the top of the screen without clearing the screen first (with a command like PRINT AT 0,0, PRINT @ 0, or LOCATE 1,1), replace the CLS statement at the start of the "reprint board" section of the program with that command. The program will then reprint the board "on top of itself" each time around without clearing the screen. This can give the impression that the pieces are *moving*—from turn to turn—on a stationary board.

String-handling

String-handling can cause a few problems, so I've deliberately kept it to a minimum in the programs in this book. If your computer does not support the standard LEFT$, MID$, and RIGHT$ string-handling commands, consult your BASIC manual for the correct replacements. For example, the standard MID$(A$(2,3)) can be replaced with SEG$(A$,2,3) in TI Extended BASIC, with A$(2 TO 5) on Timex/Sinclair computers, and with A$(2,5) in Atari BASIC.

Delay Loops

Many of the programs include a delay loop (usually in the form FOR I = 1 TO 500:NEXT I). The actual delay these loops will produce depends on the speed of your system. You should adjust these dummy loops (which are usually held in subroutines at the end of programs so that they can be used throughout the program) so that the program's displays of instructions, the playing board, the game in play, and the score are clear and easy to follow.

Variables

In several cases I've used complete words (such as SCORE) as variable names. However, most versions of BASIC use only the first two letters of a variable name. If your system won't accept variable names longer than two letters, enter just the first two letters (such as SC for SCORE). If it will accept a full variable name, but only recognizes the first two letters, you should include the full name in your programs. You will find that this makes the program much easier to understand.

Functions

A number of the programs in this book use the BASIC statement DEF FN to define specific functions which are then "called" from different parts of the program. This can be very handy when you need to calculate or recalculate a numerical value at many different places throughout a program. For example, in the lengthy program GHOSTHUNTER, which depends rather heavily on the use of random numbers to determine the various outcomes, DEF FN replaces a complicated process for calculating the random numbers which are used throughout the program.

Most BASICs include some form of DEF FN, the most notable exception being Atari BASIC. If you are working in a BASIC that doesn't include functions, you can replace these program sections in several different ways. Functions can usually be replaced with subroutines, or, if the expression or calculation that you need to define as a function is short enough, you can simply replace each use of the function by retyping the whole expression.

General Instructions

These changes should cover most of the adaptations you'll have to make to get the programs running on your computer.

Please be sure to type the programs in carefully. Remember that the instructions you give to a computer must be exactly correct—or the machine won't be able to run your program. If you have trouble getting a program to

8

run, first proofread your typed-in version against the listing given in this book.

Adapting or improving a program can be an excellent education in the mechanics of BASIC programming. The manual for the BASIC that came with your computer is an indispensable tool. Check the manual to see what's wrong with any program lines that won't work—or that result in error messages. Make sure to use the exact forms of the commands as given in the manual.

Talking to someone who has a lot of programming experience—especially if it's with the computer you're using—can be a tremendous help in solving any problems you might encounter. One of the wide range of books that explain introductory BASIC programming—including several devoted exclusively to describing the differences between the BASICs that work on different microcomputers—could also help.

Memory

It is impossible to predict exactly how much memory the programs will take up on your system, because the way memory is organized and the "working space" needed by the program is different on different systems. The majority of the programs in this book will fit well within 8K of memory—most take up less than 4K. ROMAN EMPIRE, which takes up about 11K, and GHOSTHUNTER, which takes up just over 16K, are the exceptions.

If you have trouble getting a program into your system because of a shortage of memory, cut out as many REM statements as possible (check to make sure that no GOSUB or GOTO calls refer to the lines you want to delete) and try to shorten the PRINT statements.
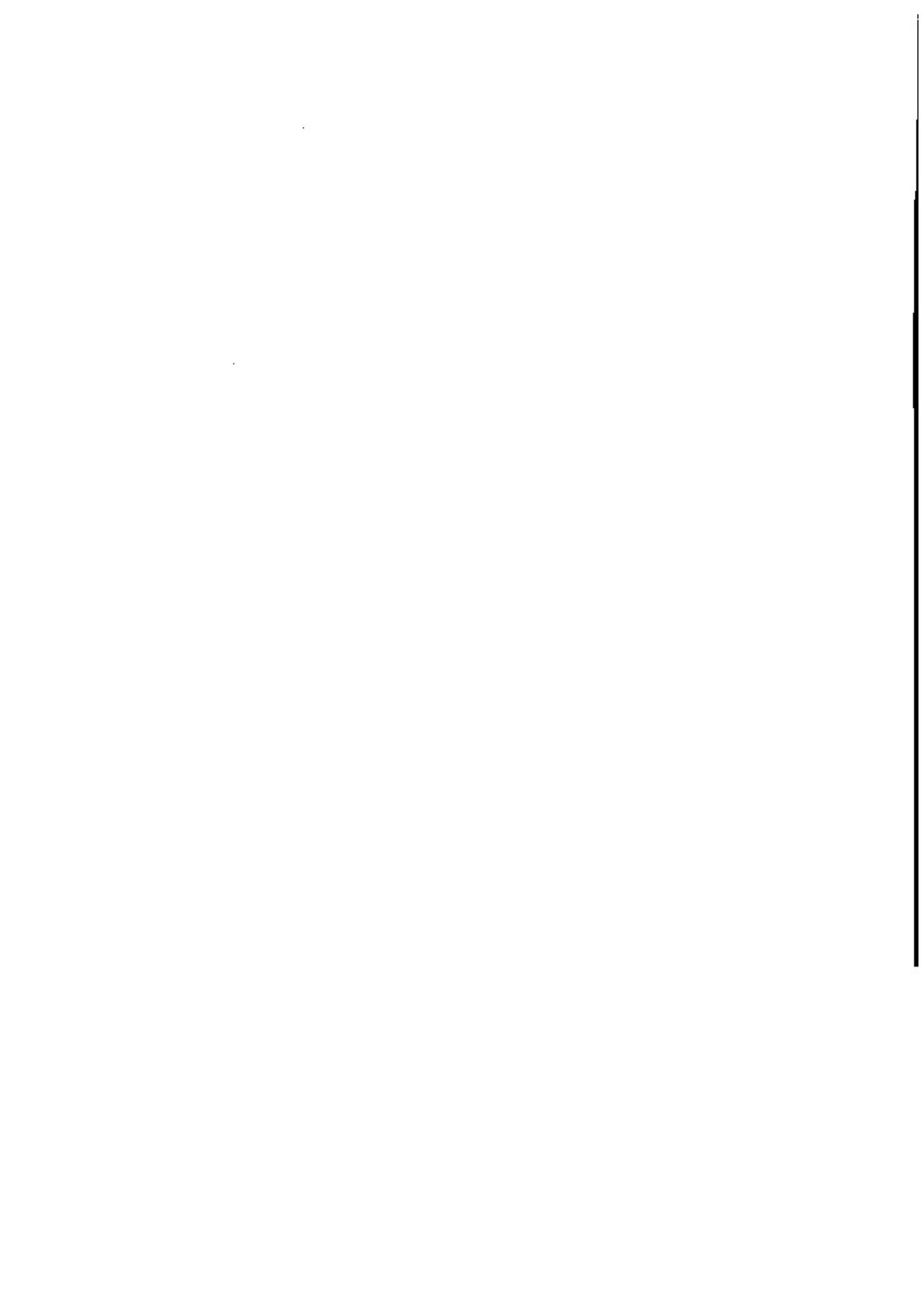
Action
and
Excitement
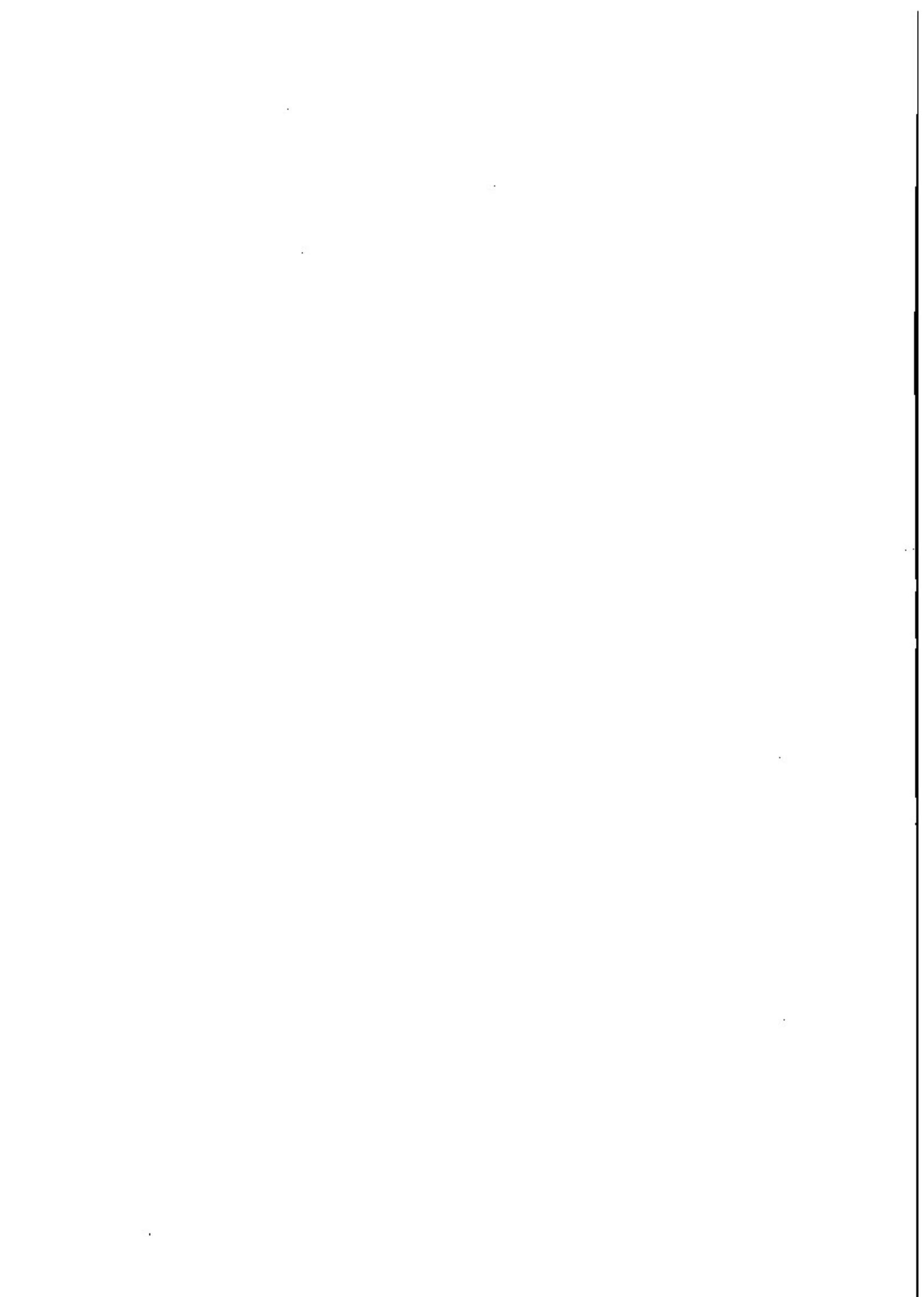
This is where the action is. This part of the book contains eleven exciting games to tax your brain and your reflexes. We'll start with a maze program which generates a new maze every time you run it. From there, it's on to real-time decision-making, as you try to land your parachute on a bobbing raft out on the ocean. Your brain really has to earn its keep in the next game, JUMPING FALLOUT, as digits tumble down through holes in a grid.

RETRO-ACTION is a reflex-tester with a twist—it's you against another human being, with your computer providing the tests, and monitoring (and occasionally commenting rather rudely on) your performance. The computer is more polite in HUTT RACER, which allows you to drive a racing car down a twisting, turning road while trying to avoid the other cars in your way. You'll get your chance to make the universe safe for humankind in EN-GULF, clear a path for oil tankers through a heavily mined canal in MINESWEEPER, and capture a bank bandit in New York in CAR THIR-TEEN.

To round out this collection of action games, you take part in one of the decisive battles of the War of Independence in GENERAL MORGAN'S MI-LITIA, shoot a few arrows into your computer's screen with BULLS-EYE, and earn a buck or two on the side as a cabbie in TAXI.

THE BIG MAZE

In this remarkable program, from London programmer Tony Pearson, you (represented by the letter "I") move through a maze, heading for the exit (represented by "X"). You can request a view of the maze from above at any time. The program will draw a map showing you where you are, where you've been, and where you want to go.

The challenging aspect of the maze comes into play when, instead of looking at the entire maze from above, you stay "within" it, and look (or move) in a particular direction. You'll see a view of the maze for a short distance in the direction you requested. It may take a few runs of the program before you are able to visualize the maze, but it's well worth the trouble—this is a fascinating program to run.

When you start you'll be told how to enter your moves:

```
ENTER 'N', 'S', 'E' OR 'W' TO LOOK IN
THAT DIRECTION. FOLLOW IT, NEXT MOVE,
WITH 'M' TO MOVE IN THAT DIRECTION...
ENTER 'V' TO VIEW THE MAP, OR
'R' TO MOVE RANDOMLY TO A NEW POSITION
                ?
```

If you enter a "V" (to view the map), you'll see the entire maze from above. You are the "I" and the exit is the "X":

```
* * * * * * * * * * * * * * * * * * * *
*       *     *  **  *      *   *
** **    ** *  **    ****
*                              *
** **    *** ****  *  **
*          *              **
** **  ***       *****  **
*    *I           *  *        *
** **   **     **    ****
*     *       *             **
** **  *** ***    *  **
*   *  **    *              *
** **  **  ***    *  **
*        *                 **
** **  ** ****   *  **
X        *     *         *
** **  **    **   *  **
*              *     *  *
** ***  **    **   *  **
*  *      *              *
* * * * * * * * * * * * * * * * * * * *
```

<div align="center">? N</div>

For this move I've entered "N," which means I want to head North.
The next thing I'll see is a view of the maze for a few lines to the North (verify
this by comparing it to the complete map):

```
          ? N
DIRECTION:  NORTH

*

*  *
*I
```

If I now enter "M" (for move), I'll move in the direction I'm facing
(which in this case is north):

```
          ? M
DIRECTION:  NORTH
*

*

*I*
```

```
                    ? M
       DIRECTION:  NORTH
         *
       *


       *
        I
                    ? M
       DIRECTION:  NORTH
       ***
         *
       *

       *I
                        ?
```

After this series of moves to the north I ask for the full view again, and see where I've been plotted out as dots:

```
                        ?  V


       ***********************
       *       *     *  **  *     *  *
       **  **    **  *  **     ****
       *                         *
       **  **  I  ***  ****   *  **
       *       .    *             **
       **  **  . ***     *****  **
       *      * .        *  *         *
       **  **     **     **    ****
       *     *        *         **
       **  **  ***  ***    *  **
       *   *  **     *            *
       **  **    **    ***    *  **
       *         *              **
       **  **    **  ****   *  **
       X         *      *        *
       **  **    **    **    *  **
       *                *      *  *
       **  ***  **     **   *  **
       *  *        *            *
       ***********************
```

I keep on working my way through the maze:

```
*********************
*     *   * ** *   * *
** **   ** * **   ****
*  . . . .           *
** ** .  *** ****  * **
*  . .    *        **
** ** .***    ***** **
*  . *.     * *     *
** ** .  **   ** ****
*  . *       *     **
** ** .  *** ***   * **
*  .* **    *       *
** ** .  **   ***  * **
*  .     *         **
** ** .  ** ****  * **
X  I     *     *     *
** **   **   **  * **
*            *   * *
** *** **   **  * **
*  *     *         *
*********************
```

```
           ?  W
```

And, eventually, make it to the exit:

```
**
*  *
```

```
           ?  M
     YOU'RE OUT AFTER 23 MOVES...
```

This run took 23 moves. Sometimes it can be even more difficult, as you'll see from the next run, in which it took me more than 40 moves to reach the exit:

```
*****************************
*    *       ****         **
** **  **   .**   *  **
****          .......      *
** **  ..**  *.**  .*  **
*    *    .         *  *
** **  .**   .**  .I   X
*    *.         .      **
*****  .**   .***  *  **
*    *    .       *      *
** **  .***  .**   *  **
*    *   ....*.*   *   **
*****   **,..**   *  **
*    *     *  **.*      *
** **  **   .***  *  **
*    *         *  .  *  *  *
** ** ***  *  *** *  **
*    *  *   **      *   *
** **  **    **   *  **
***               **    *
*****************************

        ?

DIRECTION: EAST

*X*
   *
*
  I
            ? M
DIRECTION: EAST

*X*
   *
*I
            ? M
DIRECTION: EAST

*X*
 I*
            ? M
   YOU'RE OUT AFTER 45 MOVES...
```

When you are ready to be "a-mazed," the listing that follows will give you the key:

```
10  REM THE 3-D MAZE
20  CLS
30  RANDOMIZE VAL(RIGHT$(TIME$,2))
40  DIM A$(30)
50  D=1
60  A$(5)="        ********************":REM
        20 *
70  FOR F=6 TO 24 STEP 2
80  A$(F)="        *                    *"
90  A$(F+1)="      ** **   **     **   * **"
100 NEXT F
110 A$(25)="        ********************":R
EM   AS EARLIER LINE
120 FOR F=1 TO 70
130 N=INT(RND(1)*20)+6
140 N1=INT(RND(1)*20)+6
150 A$(N)=MID$(A$(N),1,N1-1)+"*"+MID$(A$
(N),N1+1,25-N1)
160 NEXT F
170 N1=INT(RND(1)*2)+1
180 ON N1 GOSUB 1090,1130
190 X=INT(RND(1)*4)+9
200 Y=INT(RND(1)*4)+9
210 IF MID$(A$(X),Y,1)="*" THEN 190
220 A$(X)=MID$(A$(X),1,Y-1)+"I"+MID$(A$(
X),Y+1,25-Y)
230 MO=0
240 PRINT "ENTER 'N', 'S', 'E' OR 'W' TO
 LOOK IN"
250 PRINT "THAT DIRECTION. FOLLOW IT, NE
XT MOVE,"
260 PRINT "WITH 'M' TO MOVE IN THAT DIRE
CTION..."
270 PRINT "ENTER 'V' TO VIEW THE MAP, OR
"
280 PRINT "'R' TO MOVE RANDOMLY TO A NEW
 POSITION"
290 INPUT "                ";R$
300 IF R$="V" THEN D=5
310 IF R$="R" THEN D=6
320 IF R$="M" THEN D=0
```

```
330 IF R$="N" THEN D=4
340 IF R$="E" THEN D=1
350 IF R$="W" THEN D=3
360 IF R$="S" THEN D=2
370 IF D>0 THEN D1=D
380 IF D=0 THEN 530
390 IF D=5 THEN GOSUB 680
400 IF D=6 THEN GOSUB 730
410 IF D>4 OR D<1 THEN 290
420 GOSUB 1160
430 PRINT "DIRECTION: ";U$
440 M$="":L$="":R$=""
450 ON D1 GOSUB 830,880,950,1020
460 FOR F=5 TO 1 STEP -1
470 PRINT MID$(L$,F,1);
480 PRINT MID$(M$,F,1);
490 PRINT MID$(R$,F,1)
500 NEXT F
510 GOTO 290
520 REM ***********
530 X1=X:Y1=Y
540 X=X-(D1=2)+(D1=4)
550 Y=Y+(D1=3)-(D1=1)
560 IF MID$(A$(X),Y,1)="*" THEN 640
570 IF MID$(A$(X),Y,1)="X" THEN 800
580 MO=MO+1
590 A$(X)=MID$(A$(X),1,Y-1)+"I"+MID$(A$(
X),Y+1,25-Y)
600 A$(X1)=MID$(A$(X1),1,Y1-1)+"."+MID$(
A$(X1),Y1+1,25-Y1)
610 GOSUB 1160
620 PRINT "DIRECTION: ";U$
630 GOTO 440
640 X=X1:Y=Y1
650 PRINT "BAD MOVE"
660 GOTO 290
670 REM ************
680 FOR F=4 TO 27
690 PRINT A$(F)
700 NEXT F
710 RETURN
720 REM ************
730 A$(X)=MID$(A$(X),1,Y-1)+" "+MID$(A$(
X),Y+1,25-Y)
```

```
740 X=INT(RND(1)*4)+9
750 Y=INT(RND(1)*4)+9
760 IF MID$(A$(X),Y,1)="*" THEN 730
770 A$(X)=MID$(A$(X),1,Y-1)+"I"+MID$(A$(
X),Y+1,25-Y)
780 RETURN
790 REM **************
800 PRINT TAB(4);"YOU'RE OUT AFTER"MO"MO
VES..."
810 END
820 REM **************
830 M$=MID$(A$(X),Y,5)
840 L$=MID$(A$(X-1),Y,5)
850 R$=MID$(A$(X+1),Y,5)
860 RETURN
870 REM **************
880 FOR F=X TO X+5
890 M$=M$+MID$(A$(F),Y,1)
900 R$=R$+MID$(A$(F),Y-1,1)
910 L$=L$+MID$(A$(F),Y+1,1)
920 NEXT F
930 RETURN
940 REM **************
950 FOR F=0 TO -5 STEP -1
960 M$=MID$(A$(X),Y+F,1)
970 R$=R$+MID$(A$(X-1),Y+F,1)
980 L$=L$+MID$(A$(X+1),Y+F,1)
990 NEXT F
1000 RETURN
1010 REM **************
1020 FOR F=X TO X-5 STEP-1
1030 M$=M$+MID$(A$(F),Y,1)
1040 R$=R$+MID$(A$(F),Y+1,1)
1050 L$=L$+MID$(A$(F),Y-1,1)
1060 NEXT F
1070 RETURN
1080 REM **************
1090 N=INT(RND(1)*10)+11
1100 A$(N)="     X     "+MID$(A$(N),12,1
4):REM FIVE SPACES EACH SIDE OF THE X
1110 RETURN
1120 REM **************
1130 N=INT(RND(1)*10)+11
```

```
1140 A$(N)=MID$(A$(N),1,19)+"          X":REM
     FIVE SPACES
1150 RETURN
1160 IF D1=1 OR D=1 THEN U$="EAST"
1170 IF D1=2 OR D=2 THEN U$="SOUTH"
1180 IF D1=3 OR D=3 THEN U$="WEST"
1190 IF D1=4 OR D=4 THEN U$="NORTH"
1200 RETURN
```

CAVALIER 'CHUTE

Now it's time for a little more action. In this game you battle wayward wind drifts while attempting to land your parachute safely on a tiny landing pad floating on the waves of the Great (computer-simulated) Ocean.

You start by selecting the level at which you want to play:

```
SELECT YOUR GAME:
     A - EASY
     B - MODERATE
     C - DIFFICULT
     D - INCREDIBLY HARD
              ? C
```

The computer will print out your parachute over and over again as it descends, while you try to guide it onto the landing pad floating on the waves below:

```
          ^
        ^ ^ ^
          O
          Y




      @ @ @ @



          ^
        ^ ^ ^
          O
          Y




      @ @ @ @
```

```
                 ^
               ^ ^ ^
                 O
                 Y

               @@@@

                 ^
               ^ ^ ^
                 O
                 Y
               @@@@
```

```
        CONGRATULATIONS!!
         A SAFE LANDING!
       YOU HAVE 23 POINTS
```

Use the "Z" key to move the parachute to the left and the "M" to move to the right. Miss the pad, and you'll drown!

Try to stop your heart from pounding, and get ready to leap from your plane with this program written by Neal Cavalier-Smith:

```
10  REM CAVALIER 'CHUTE
20  P=20
30  GOSUB 110:REM INTIALISE
40  REM **********
50  REM MAIN CYCLE
60  GOSUB 360:REM PRINT 'CHUTE
70  GOSUB 520:REM LANDING STRIP
80  GOSUB 580:REM GET KEYS
90  GOTO 60
100  REM **************
110  REM INITIALISATION
120  CLS
130  IF INKEY$<>"" THEN 130
140  PRINT:PRINT "SELECT YOUR GAME:"
150  PRINT TAB(6);"A - EASY"
160  PRINT TAB(6);"B - MODERATE"
170  PRINT TAB(6);"C - DIFFICULT"
180  PRINT TAB(6);"D - INCREDIBLY HARD"
190  INPUT "                    ";R$
200  IF R$<"A" OR R$>"D" THEN 190
```

```
210 DF=1/2
220 IF R$="C" THEN DF=1
230 IF R$="B" THEN DF=2
240 IF R$="A" THEN DF=3
250 STP=0:REM SCREEN TOP
260 RANDOMIZE VAL(RIGHT$(TIME$,2))
270 STP=0:REM SCREEN TOP
280 SBOT=19:REM SCREEN BOTTOM
290 SWDE=40:REM WIDTH OF SCREEN
300 SWDE=SWDE-3
310 ACC=INT(RND(1)*(SWDE-4))
320 PAD=INT(RND(1)*(SWDE-10))
330 PLUS=1
340 RETURN
350 REM **************
360 REM PRINT PARACHUTE
370 CLS
380 FOR C=0 TO STP
390 PRINT
400 NEXT C
410 PRINT TAB(ACC);" ^ "
420 PRINT TAB(ACC);"^^^"
430 PRINT TAB(ACC);" O "
440 PRINT TAB(ACC);" Y "
450 IF STP=SBOT-4 THEN 490
460 FOR C=6 TO SBOT-STP
470 PRINT
480 NEXT C
490 STP=STP+1
500 RETURN
510 REM ************
520 REM LANDING STRIP
530 PAD=PAD+PLUS
540 IF PAD>SWDE-6 THEN PLUS=-1
550 PRINT TAB(PAD);"@@@@"
560 RETURN
570 REM ********
580 REM GET KEYS
590 IF STP=SBOT-4 THEN GOSUB 650
600 Y$=INKEY$:REM or GET Y$
610 IF Y$="Z" THEN ACC=ACC-DF
620 IF Y$="M" THEN ACC=ACC+DF
630 RETURN
640 REM **************
```

```
650 REM SEE IF DROWNED
660 IF ACC<PAD-1 THEN 770
670 IF ACC>PAD+2 THEN 770
680 IF ACC=PAD+1 OR ACC=PAD THEN 730
690 PRINT TAB(8);"YOU MADE IT...BY THE"
700 PRINT TAB(9);"SKIN OF YOUR TEETH"
710 P=P+5
720 GOTO 800
730 PRINT TAB(12);"CONGRATULATIONS!!"
740 PRINT TAB(13);"A SAFE LANDING!"
750 P=INT(P+10/DF)
760 GOTO 800
770 PRINT TAB(12);"SPLOSSSSSHHHHHHHH!!"

780 PRINT TAB(14);"YOU GOT SOAKED!"
790 P=P-2
800 AT=AT+1
810 IF AT=20 OR P<0 THEN 890
820 PRINT TAB(11);"YOU HAVE"P"POINTS"
830 FOR X=1 TO 1000:NEXT X
840 IF INKEY$<>"" THEN 840
850 GOSUB 250
860 RETURN
870 REM ********
880 REM DROWNED!
890 PRINT TAB(13);"YOU'VE DROWNED!"
900 PRINT:PRINT TAB(12);"YOU SCORED"P"PO
INTS"
910 PRINT TAB(16);"IN"AT"ATTEMPTS."
920 END
```

JUMPING FALLOUT

In this fascinating game, you have to try and shuffle the digits from one to nine down from the top of this little grid to the bottom:

```
0  12 456789
1  ##3######
2  ##### ###
3  #   ### ##
4  # ##### #
5   ########
6  #####
7  ## # ####
8  #### # ##
```

SCORE: 200

WHICH LEVEL DO YOU WANT TO MOVE (1-8)
                ? 1
HOW MANY MOVES TO THE LEFT? 7

As you can see, the number "3" is already on its way down. When you see the WHICH LEVEL DO YOU WANT TO MOVE? question, enter a number from one to eight. Follow the HOW MANY MOVES TO THE LEFT? question with the number of spaces you want to move this level to the left. As you can see, in the move shown above I indicated that I wanted to move level one a total of seven places to the left. This is how it looked after that move:

```
0  12 456789
1  ####3####
2  ##### ###
3  #   ### ##
4  # ##### #
5   ########
6  #####
7  ## # ####
8  #### # ##
```

SCORE: 191

WHICH LEVEL DO YOU WANT TO MOVE (1-8)
                ? 2
HOW MANY MOVES TO THE LEFT? 1

Notice that when the "3" moved past the left edge of the grid, it reappeared on the right side and continued its move left. Next, I moved the second level one place to the left, so that the "3" fell down one more level, followed by the "5" (see the result below). Look at the following "snapshots" of the game, and you'll soon see how it works:

```
0  12 4 6789
1  ####5####
2  ####3####
3  #   ### ##
4  # ##### #
5   ########
6  #####
7  ## # ####
8  #### # ##
```

SCORE: 187

WHICH LEVEL DO YOU WANT TO MOVE (1-8)
                ? 2
HOW MANY MOVES TO THE LEFT? 3

```
0 1  4 6789
1 #  ######
2 #  ######
3 #   ### ##
4 #2##### #
5 #5#######
6 #3   #####
7 ## # ####
8 #### # ##
```

SCORE: 145

WHICH LEVEL DO YOU WANT TO MOVE (1-8)
           ? 7
HOW MANY MOVES TO THE LEFT? 1

```
0 1  4 6789
1 #  #######
2 #  #######
3 #   ### ##
4 #  ##### #
5 #2#######
6 #5   #####
7 #3# #####
8 #### # ##
```

SCORE: 136

WHICH LEVEL DO YOU WANT TO MOVE (1-8)
           ? 1
HOW MANY MOVES TO THE LEFT? 7
```

```
0         89
1  #7######
2  #6#######
3  #1 ### ##
4  #4##### #
5  #2#######
6  #5  #####
7  #3# #####
8   # #####
```

SCORE: 60

WHICH LEVEL DO YOU WANT TO MOVE (1-8)
          ? 8
HOW MANY MOVES TO THE LEFT? 1

```
0         89
1  #  #######
2  #  #######
3  #   ### ##
4  #  ##### #
5  #  #######
6  #     #####
7  # #  #####
8  #  ######
```

SCORE: 50

WHICH LEVEL DO YOU WANT TO MOVE (1-8)
          ? 1
HOW MANY MOVES TO THE LEFT? 7

```
0
1 ######8#
2 # ######
3 #   ### ##
4 # ##### #
5 # #######
6 #    #####
7 # # #####
8 # #####
```

SCORE: 10

WHICH LEVEL DO YOU WANT TO MOVE (1-8)
              ? 1
HOW MANY MOVES TO THE LEFT? 6

```
0
1 # #######
2 # #######
3 #   ### ##
4 # ##### #
5 # #######
6 #    #####
7 # # #####
8 # #####
```

SCORE: 2
WELL DONE, YOU CLEARED THE BOARD WITH
A SCORE OF   2

THE BEST SCORE SO FAR IS 123
WHICH WAS GAINED BY TIM

DO YOU WANT ANOTHER GAME (Y/N)? N

The object of this game (also written by Neal Cavalier-Smith) is to get all of the digits to "fall out" of the bottom of the grid with the smallest possible number of moves. You start the game with 200 points, and points are *subtracted* from your score with each move. You'll see, if you look closely at the sample run, that you lose more points for moving the lower rows than you do for the top ones. Once you've mastered the game in its present form, set yourself the task of getting all the numbers out, *in order*.

```
10  REM JUMPING FALLOUT
20  GOSUB 870
30  REM *********
40  REM GAME CYCLE
50  GOSUB 140
60  GOSUB 420
70  GOSUB 290
80  GOSUB 580
90  IF V<9 THEN GOTO 60
100 GOSUB 770
110 IF G$<>"N" THEN 50
120 END
130 REM *****************
140 REM NEW GAME VARIABLES
150 S=200:V=0
160 FOR X=2 TO 9
170 FOR Y=1 TO 9
180 A$(X,Y)=" "
190 IF RND(1)>.16 THEN A$(X,Y)="#"
200 NEXT Y
210 A$(X,INT(RND(1)*8+1))=" "
220 NEXT X
230 FOR C=1 TO 9
240 A$(1,C)=RIGHT$(STR$(C),1)
250 A$(10,C)=" "
260 NEXT C
270 RETURN
280 REM ***********
290 REM DISPLAY MOVE
300 CLS
310 PRINT
320 FOR X=1 TO 9
330 PRINT X-1;
340 FOR Y=1 TO 9
350 PRINT A$(X,Y);
```

```basic
360 NEXT Y
370 PRINT
380 NEXT X
390 PRINT:PRINT "SCORE:"S
400 RETURN
410 REM ****************
420 REM FALLDOWN ROUTINE
430 FOR Y=9 TO 1 STEP -1
440 FOR X=1 TO 9
450 IF A$(Y,X)=" " OR A$(Y,X)="#" THEN 4
70
460 GOTO 490
470 NEXT X
480 GOTO 550
490 IF A$(Y+1,X)<>" " THEN 470
500 A$(Y+1,X)=A$(Y,X)
510 IF Y>=9 THEN A$(Y+1,X)=" ":V=V+1
520 A$(Y,X)=" "
530 Y=Y+1
540 GOTO 490
550 NEXT Y
560 RETURN
570 REM ************
580 REM MOVE A LEVEL
590 IF V>=9 THEN RETURN
600 PRINT:PRINT "WHICH LEVEL DO YOU WANT
 TO MOVE (1-8)"
610 INPUT "              ";L
620 L=L+1
630 IF L>9 OR L<2 THEN 610
640 PRINT "HOW MANY MOVES TO THE LEFT";
650 INPUT P
660 IF P<0 OR P>10 THEN 650
670 FOR C=1 TO P
680 T$=A$(L,1)
690 FOR X=1 TO 8
700 A$(L,X)=A$(L,X+1)
710 NEXT X
720 A$(L,9)=T$
730 NEXT C
740 S=S-L-P
750 RETURN
760 REM **********
770 REM END OF GAME
```

```
780 PRINT "WELL DONE, YOU CLEARED THE BO
ARD WITH   A SCORE OF "S
790 IF S>H THEN PRINT "YOU HAVE A NEW HI
GH SCORE. PLEASE        ENTER YOUR NAME "
;:INPUT N$:H=S
800 PRINT:PRINT "THE BEST SCORE SO FAR I
S"H
810 PRINT "WHICH WAS GAINED BY ";N$
820 PRINT:PRINT "DO YOU WANT ANOTHER GAM
E (Y/N)";
830 INPUT G$
840 IF G$<>"N" AND G$<>"Y" THEN 830
850 RETURN
860 REM **********
870 REM INITIALISE
880 RANDOMIZE VAL(RIGHT$(TIME$,2))
890 CLS
900 DIM A$(11,9)
910 H=0
920 N$="NEAL"
930 RETURN
```

RETRO-ACTION

Zip-ee-dee-doo! Here's a fast-moving reaction game for two players.

You're both seated at the keyboard, fingers poised. The screen flashes, and you both jab at the keys. There can only be one winner. Let the person with the best trigger finger be the victor.

When the program (which was written by Les Battyanyi and Todd Harrison) is up and running, you'll see a line drawn on the screen, followed by a series of pairs of circles. After four pairs of them have appeared, each pair closer and closer together, an arrow (formed out of asterisks) will be shown. If it points to the left, the left-hand player must react, and hit the "A" key. If the arrow is pointing to the right, the right-hand player has to move into action, hitting the ";" key. Hitting the key out of turn will cost you dearly. When the arrow points straight down, the first player to react scores points.

The first player to reach 100 points wins the laurel wreath. Here's several examples of the game in action:

```
━━━━━━━━━━━━━━━━━━━━━━━━━━━
        0               0
      0               0
       0             0
        0         0

           *
           *
        *  *  *
         ***
           *
```

WELL DONE!

SCORE 10
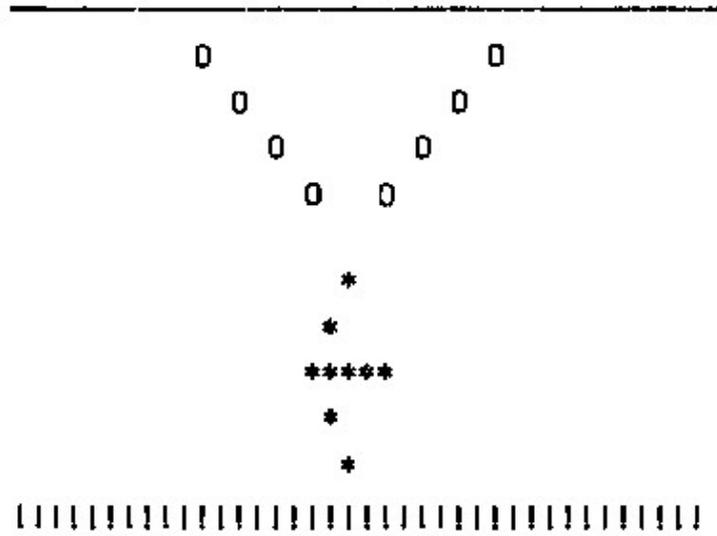
```
      _____
          0           0
           0         0
            0       0
             0   0


              *
              *
            *****
              *
              *
   |||||!|||!|||||!|!|||||||||||||!||||||!||


              YOU FOOL!!
              YOU LOSE 15 POINTS



      _____
          0           0
           0         0
            0       0
             0   0


              *
              *
            *****
              *
              *



      WELL DONE!

      SCORE 30
```
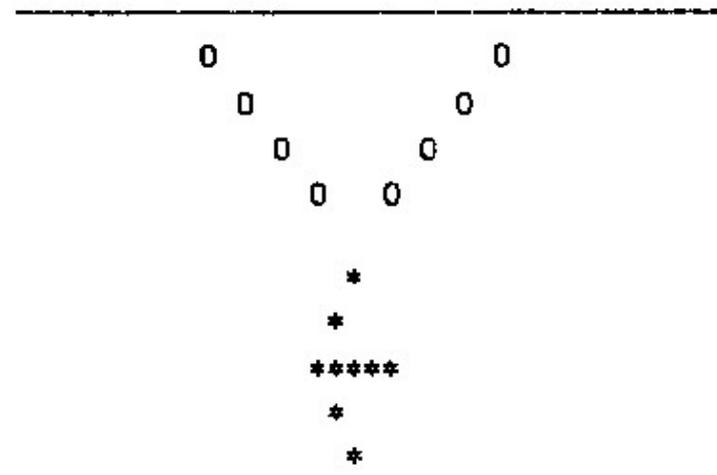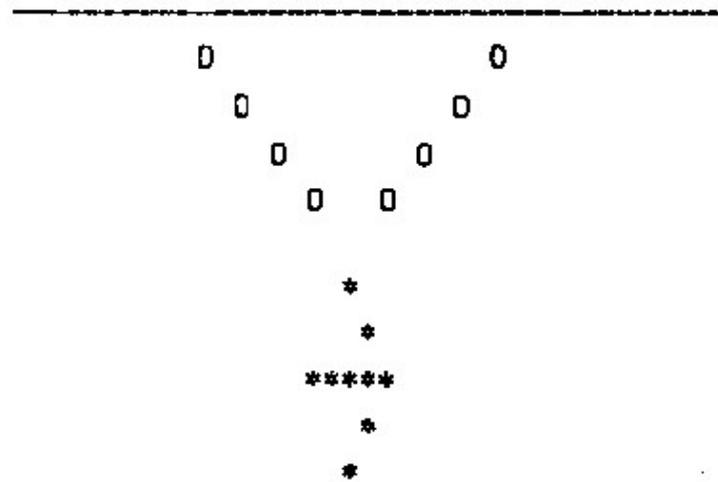
```
          ─────────────────────────────────────

               D               O

             O             D

              O         O

               O   O


                   *

                    *

                *****

                    *

                    *




                         WELL DONE!


                         SCORE 105


                         CONGRATULATIONS!


                         YOU'VE WON!

          BAD LUCK, SUCKER!
```

When your trigger fingers are ready, enter this listing to show what kind of stuff you're made of:

```
10  REM RETRO-ACTION
20  CLS
30  RANDOMIZE VAL(RIGHT$(TIME$,2))
40  T=1000
50  LS=0:RS=0
60  CLS
70  IF T>50 THEN T=T-40
80  PRINT "─────────────────────────────────
──────────"
90 PRINT:PRINT TAB(11);"O";TAB(27);"O"
100  W=T:GOSUB 630
110  PRINT:PRINT TAB(13);"O";TAB(25);"O"
120  GOSUB 630
130  PRINT:PRINT TAB(15);"O";TAB(23);"O"
140  GOSUB 630
150  PRINT:PRINT TAB(17);"O";TAB(21);"O"
160  GOSUB 630
```

```
170 N=INT(RND(1)*4)+1
180 ON N GOSUB 520,580,550,580
190 P=1
200 IF INKEY$<>"" THEN 200
210 G$=INKEY$
220 IF G$="" THEN 210
230 IF G$="A" AND (CT=1 OR CT=2) THEN 31
0
240 IF G$=";" AND (CT=0 OR CT=2) THEN 29
0
250 IF G$="A" AND CT=0 THEN 470
260 IF G$=";" AND CT=1 THEN 460
270 GOTO 190
280 REM *****
290 REM RIGHT
300 P=23
310 PRINT:PRINT
320 IF CT=2 THEN IF INKEY$="" THEN 320
330 PRINT TAB(P);"WELL DONE!"
340 IF P=23 THEN 380
350 LS=LS+10
360 PRINT:PRINT TAB(P);"SCORE"LS
370 GOTO 400
380 RS=RS+10
390 PRINT:PRINT TAB(P);"SCORE"RS
400 IF LS>99 OR RS>99 THEN 660
410 FOR J=1 TO 2000:NEXT J
420 CLS
430 GOTO 60
440 REM *****
450 REM WRONG
460 P=23
470 PRINT "!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!":PRINT
480 PRINT:PRINT TAB(P);"YOU FOOL!!"
490 PRINT TAB(P);"YOU LOSE 15 POINTS"
500 IF P=1 THEN LS=LS-15:GOTO 410
510 RS=RS-15:GOTO 410
520 PRINT:PRINT TAB(19);"*":PRINT TAB(20
);"*":PRINT TAB(17);"******"
530 PRINT TAB(20);"*":PRINT TAB(19);"*"
540 CT=0:RETURN
550 PRINT:PRINT TAB(19);"*":PRINT TAB(18
);"*":PRINT TAB(17);"******"
```

```
560 PRINT TAB(18);"*":PRINT TAB(19);"*"
570 CT=1:RETURN
580 PRINT:PRINT TAB(19);"*":PRINT TAB(19
);"*":PRINT TAB(17);"* * *"
590 PRINT TAB(18);"***":PRINT TAB(19);"*
"
600 CT=2:RETURN
610 REM *****
620 REM DELAY
630 FOR F=1 TO W:NEXT F
640 RETURN
650 REM *******
660 REM VICTORY
670 P=1:IF RS>99 THEN P=23
680 CLS:PRINT:PRINT:PRINT
690 PRINT TAB(P);"CONGRATULATIONS!"
700 PRINT:PRINT TAB(P);"YOU'VE WON!"
710 FOR F=1 TO 2000:NEXT F
720 IF P=23 THEN P=1:GOTO 740
730 P=23
740 PRINT TAB(P);"BAD LUCK, SUCKER!"
750 FOR F=1 TO 1000:NEXT F
```

HUTT RACER

This moving graphics game (written by Ian Hutt, who lives near Hampton Court Palace in England) places you at the wheel of a racing car, trying to reach the end of a twisting, turning track. As if this wasn't difficult enough, the track gets narrower as the race progresses. This program demands close concentration.

An additional hazard is the devilish "jam car," which can block your path down the track. The exhaust of the jam car is shown as an exclamation mark (!) on the screen. The jam car itself is shown as a "V." You can drive through the exhaust, but (of course) you are not allowed to smash into the vehicle ahead of it. If you're just one space away from the car, the exhaust will turn into a plus sign (+) to warn you that you're too close.

At the end of the game you'll be told how far you traveled. Here's a sample of my own experience behind the wheel of the HUTT RACER:

```
I               W   !           I
 I              W   V           I
 I               W              I
 I                W             I
 I                 W            I
 I                 W            I
 I                  W           I
 I                   W          I
 I                   W          I
 I                    ·W        I
 I                      W       I
 I !                    W       I
  IV                    W        I
  I                      W !      I
  I                   !  W        I
   I                 V W           I
    I                  W            I
    I                 W              I
    I!               W              I
    IV              W               I
    I              W                I
```

```
I          W                          I
I          W                          I
 I      W I                           I


          I        W        I
          I I      W        I
          IV        W       I
           I          W       I
            I I        W       I
          I V          W      I
            I            W      I
          I I            W    I
          IV            W     I
          I             W     I
          I             W     I
            I           W     I
            I           W     I
            I           W     I
            I           W I I
            I           W V I


            I     W            I
            I     W           I
             I I  W         I
            I V  W       I
            I    W       I
            I      W      I
            I      W      I
          I        W    I
          I        W I  I
            I     W V   I
            I      W    I
            I      W     I
             I  W        I
             I +         I
             I +         I


          YOU CRASHED AT 133 MILES
```

The position of your car is shown by the "W" at the very bottom of the display. Move your car left with the "Z" key and right with the "M." Look out for "!" and " + "!! When you're ready to battle it out with the narrowing race track and the jam cars, enter and run this listing:

```
10 REM HUTT RACER
20 GOSUB 100:REM INITIALISE
30 GOSUB 240:REM START GRID
40 GOSUB 360:REM RACE
50 GOSUB 740:REM SHOW RESULT
60 IF K$="Y" THEN RUN
70 PRINT:PRINT "OK, BYE..."
80 END
90 REM **********
100 REM INITIALISE
110 RANDOMIZE (VAL(RIGHT$(TIME$,2)))
120 DEFINT A-Z
130 CLS
140 REM *ADJUST VALUES IN NEXT 2 LINES*
150 REM *FOR YOUR OWN SYSTEM*
160 LL=40:REM LINE LENGTH
170 LL=LL-2
180 PL=24:REM PAGE LENGTH
190 C$="W"
200 RW=LL/4*3
210 DT=0
220 RETURN
230 REM **********
240 REM START GRID
250 WL=(LL-RW)/2:WR=WL+RW
260 FOR Y=1 TO PL-1
270 PRINT TAB(WL);"I";TAB(WR);"I";
280 NEXT Y
290 PRINT TAB(WL);"I";TAB(WL+((WR-WL)/2)
-2);"START";TAB(WR);"I"
300 CX=INT(WL+((WR-WL)/2))
310 PRINT:PRINT "GO? ";TAB(WL);"I";TAB(C
X);C$;TAB(WR);"I";
320 GOSUB 850
330 PRINT:PRINT "GO...";TAB(WL);"I";TAB(
CX);C$;TAB(WR);"I";
340 RETURN
350 REM ****
360 REM RACE
```

```
370 R$="FALSE":J$="":JP=0
380 K$=INKEY$
390 DT=DT+1
400 IF K$="Z" THEN CX=CX-1
410 IF K$="M" THEN CX=CX+1
420 IF JP>0 THEN J$="V"
430 IF RND(1)<.2 THEN GOSUB 680
440 IF JP=CX AND J$="V" THEN R$="TRUE"
450 GOSUB 590
460 IF CX=WL THEN R$="TRUE"
470 IF CX=WR THEN R$="TRUE"
480 IF (DT/PL)=INT(DT/PL) THEN WL=WL+1:W
R=WR-1
490 IF RND(1)<.2 THEN WL=WL-1:WR=WR-1:GO
TO 510
500 IF RND(1)>.8 THEN WL=WL+1:WR=WR+1
510 IF WL<1 THEN WL=1
520 IF WR>LL THEN WR=LL
530 IF WR-WL<=1 THEN R$="WIN"
540 GOSUB 900:REM SPEED
550 IF R$="FALSE" THEN 380
560 RETURN
570 REM ********
580 REM SHOW CAR
590 PRINT
600 IF JP=0 THEN PRINT TAB(WL);"I";TAB(C
X);C$;TAB(WR);"I";:GOTO 650
610 IF JP>CX THEN PRINT TAB(WL);"I";TAB(
CX);C$;TAB(JP);J$;TAB(WR);"I";
620 IF JP=CX THEN PRINT TAB(WL);"I";TAB(
CX);"+";TAB(WR);"I";
630 IF JP<CX THEN PRINT TAB(WL);"I";TAB(
JP);J$;TAB(CX);C$;TAB(WR);"I";
640 IF J$="V" THEN J$="":JP=0
650 RETURN
660 REM *************
670 REM START JAM CAR
680 JP=INT(WL+((WR-WL)*RND(1)))
690 IF JP=WL THEN JP=JP+1
700 IF JP=WR THEN JP=JP-1
710 J$="!"
720 RETURN
730 REM ***********
740 REM SHOW RESULT
```

```
750 PRINT:PRINT:PRINT
760 IF R$="WIN" THEN PRINT "WELL DONE. Y
OU'VE COMPLETED"DT"MILES"
770 IF R$="TRUE" THEN PRINT "YOU CRASHED
 AT"DT"MILES"
780 PRINT:PRINT:PRINT "DO YOU WANT ANOTH
ER GO (Y OR N)?"
790 IF INKEY$<>"" THEN 790
800 IF INKEY$="" THEN 800
810 K$=INKEY$
820 IF K$<>"Y" AND K$<>"N" THEN 810
830 RETURN
840 REM *****
850 REM DELAY
860 FOR D=1 TO 1000
870 NEXT D
880 RETURN
890 REM *****
900 REM SPEED
910 REM CHANGE THE 199 FOR BEST EFFECT
920 REM            ON YOUR SYSTEM
930 FOR D=1 TO (361-DT)/199
940 NEXT D
950 RETURN
```

ENGULF

In this game, you are in control of the space-cruiser *Borealis*, seeking to make space safe for the fun-loving human race. There is a single nasty alien making trouble in the corner of the universe you're patrolling. Your job is to "engulf" the alien, immobilizing him, by destroying all the sectors of space around him.

Both you and the alien (shown as an "A") are unable to move onto the outer border of the area of space under view. These "out of bounds" areas are indicated by "–" marks, as you can see in this printout:

```
-> HIGHEST SCORE SO FAR IS 0   <-
-> ALIEN SENSES DANGER FACTOR 0   <-
------------------------------------
----> ALIEN NOW AT 4   8
-> TIME LEFT: 30 --- LASERS FIRED: 0
------------------------------------
      1 2 3 4 5 6 7 8 9 10
   1  - - - - - - - - - -
   2  _ * * * * * * * * _
   3  _ * * * * * * * * _
   4  _ * * * * * * * * _
   5  _ * * * * * * * * _
   6  _ * * * * * * * * _
   7  _ * * * * * * * * _
   8  _ * * A * * * * * _
   9  _ * * * * * * * * _
  10  - - - - - - - - - -

WHICH SECTOR WILL YOU SHOOT AT?
         ACROSS? 4
         AND DOWN? 7
```

The alien doesn't have to change locations on every move. However, if he does decide to move, it may be by one or two squares from his present position. You isolate the alien by blasting areas of space out of existence. You enter the coordinates of the space you want to destroy as two numbers, as you can see here:

```
-> HIGHEST SCORE SO FAR IS 0  <-
-> ALIEN SENSES DANGER FACTOR .66  <-
----------------------------------------
----> ALIEN NOW AT 4  8
-> TIME LEFT: 29 --- LASERS FIRED: 1
----------------------------------------
     12345678910
   1 ----------
   2 _********_
   3 _********_
   4 _********_
   5 _********_
   6 _********_
   7 _** *****_
   8 _**A*****_
   9 _********_
  10 ----------

WHICH SECTOR WILL YOU SHOOT AT?
        ACROSS? 3
        AND DOWN? 8




-> HIGHEST SCORE SO FAR IS 0  <-
-> ALIEN SENSES DANGER FACTOR 1.33  <-
----------------------------------------
----> ALIEN NOW AT 4  9
-> TIME LEFT: 28 --- LASERS FIRED: 2
----------------------------------------
     12345678910
   1 ----------
   2 _********_
   3 _********_
   4 _********_
   5 _********_
   6 _********_
   7 _** *****_
   8 _* *****_
   9 _**A*****_
  10 ----------

WHICH SECTOR WILL YOU SHOOT AT?
        ACROSS? 5
        AND DOWN? 9
```

As I said earlier, you "engulf" the alien by destroying all the squares onto which he could move. Note that you're not allowed to land on the alien, and will destroy yourself if you do. The alien keeps a watch on the space around him, and signals to your computer the degree of danger he senses in his present position, so you can follow (more or less) what the alien is thinking:

```
-> HIGHEST SCORE SO FAR IS 0   <-
-> ALIEN SENSES DANGER FACTOR 2   <-
----------------------------------------
----> ALIEN NOW AT 7   3
-> TIME LEFT: 26 --- LASERS FIRED: 4
----------------------------------------
       1 2 3 4 5 6 7 8 9 1 0
   1   - - - - - - - - - -
   2   _ * * * * * * * _
   3   _ * * * * * A * * _
   4   _ * * * *   * * * _
   5   _ * *     * * * * _
   6   _ * *   * * * * * _
   7   _ * * * * * * * * _
   8   _ * * * * * * * * _
   9   _ * * * * * * * _
  1 0  - - - - - - - - - -

WHICH SECTOR WILL YOU SHOOT AT?
          ACROSS? 8
          AND DOWN? 4
```

```
-> HIGHEST SCORE SO FAR IS 0  <-
-> ALIEN SENSES DANGER FACTOR 1.33  <-
-------------------------------------
----> ALIEN NOW AT 7   4
-> TIME LEFT: 25 --- LASERS FIRED: 5
-------------------------------------
     12345678910
   1 ------------
   2 _********_
   3 _********_
   4 _****  A  *_
   5 _**   ****_
   6 _**  *****_
   7 _********_
   8 _********_
   9 _********_
  10 ----------

WHICH SECTOR WILL YOU SHOOT AT?
        ACROSS? 7
        AND DOWN? 5



-> HIGHEST SCORE SO FAR IS 0  <-
-> ALIEN SENSES DANGER FACTOR 4.66  <-
-------------------------------------
----> ALIEN NOW AT 9   4
-> TIME LEFT: 17 --- LASERS FIRED: 13
-------------------------------------
     12345678910
   1 ------------
   2 _*****  **_
   3 _*****   *_
   4 _****     A_
   5 _**        _
   6 _**  *****_
   7 _********_
   8 _********_
   9 _********_
  10 ----------

WHICH SECTOR WILL YOU SHOOT AT?
        ACROSS? 9
        AND DOWN? 3
```

```
----------------------------------------------
----> ALIEN NOW AT  9   4
-> TIME LEFT: 17 --- LASERS FIRED: 13
----------------------------------------------
        12345678910
    1  ----------
    2  _***** **_
    3  _*****    _
    4  _****    A-
    5  _**      _
    6  _** *****_
    7  _********_
    8  _********_
    9  _********_
   10  ----------
```

```
--------> ENGULFED! WELL DONE...
---------> IT TOOK YOU 13 SHOTS
AND YOU DID IT WITH 17 TIME UNITS LEFT
--------> YOUR RATING IS 1307.692
-----> HIGHEST SCORE SO FAR IS 1307.692


DO YOU WANT ANOTHER GAME (Y/N)?
-------> OVER AND OUT, CAPTAIN!
```

You'll discover that the best strategy is to trap the alien against one of the sides of the grid. This limits his potential moves. Of course, the alien is aware of the danger of being caught near the sides, and uses his limited intelligence to try to keep away from them. Try to build a "fence" of blank areas in a curve around the alien so that you can force him to move into a side.

```
10 REM ENGULF
20 HSCRE=0
30 DIM A(10,10)
40 GOSUB 1030:REM INITIALISE
50 GOSUB 220:REM ALIEN MOVE
60 REM *********
70 REM MAIN LOOP
80 GOSUB 800:REM PRINT OUT
90 GOSUB 670:REM PLAYER MOVE
100 GOSUB 800
```

```
110  GOSUB 220:REM ALIEN MOVE
120  TME=TME-1
130  SHOTS=SHOTS+1
140  IF TME=0 THEN 580
150  GOTO 80
160  REM *********
170  REM COLLISION
180  PRINT TAB(8);"YOU HIT AN ALIEN, CAPT
AIN"
190  PRINT TAB(9);"AND HAVE BEEN DESTROYE
D"
200  GOTO 580
210  REM *********
220  REM ALIEN MOVE
230  REM * CHECK IF SURROUNDED *
240  H=0
250  H=H+A(M-1,N)
260  H=H+A(M+1,N)
270  H=H+A(M,N-1)
280  H=H+A(M,N+1)
290  H=H+A(M-1,N+1)
300  H=H+A(M+1,N+1)
310  H=H+A(M+1,N-1)
320  H=H+A(M-1,N-1)
330  IF H=16 THEN 500:REM SURROUNDED
340  REM * MOVE ALIEN *
350  E=M:F=N
360  CT=0
370  M=M-INT(RND(1)*2)+INT(RND(1)*2)
380  CT=CT+1:IF CT=40 THEN M=E:N=F:GOTO 4
60
390  IF M<2 OR M>9 THEN 370
400  IF (M<4 OR M>7) AND RND(1)>.7 THEN 3
70
410  N=N-INT(RND(1)*2)+INT(RND(1)*2)
420  CT=CT+1:IF CT=40 THEN M=E:N=F:GOTO 4
60
430  IF N<2 OR N>9 THEN 410
440  IF (N<4 OR N>7) AND RND(1)>.7 THEN 4
10
450  IF A(M,N)=2 THEN 370
460  A(E,F)=0
470  A(M,N)=1
480  RETURN
```

```
490 REM ********
500 REM SURROUND
510 GOSUB 800
520 PRINT "--------> ENGULFED! WELL DONE
..."
530 PRINT "---------> IT TOOK YOU"SHOTS"
SHOTS"
540 PRINT "AND YOU DID IT WITH"TME"TIME
UNITS LEFT"
550 Q=TME*1000/SHOTS
560 PRINT "--------> YOUR RATING IS"Q
570 IF Q>HSCRE THEN HSCRE=Q
580 PRINT "-----> HIGHEST SCORE SO FAR I
S"HSCRE
590 IF INKEY$<>"" THEN 590
600 PRINT:PRINT "DO YOU WANT ANOTHER GAM
E (Y/N)?"
610 T$=INKEY$
620 IF T$<>"Y" AND T$<>"N" THEN 610
630 IF T$="Y" THEN 40
640 PRINT "--------> OVER AND OUT, CAPTAI
N!"
650 END
660 REM ***********
670 REM PLAYER MOVE
680 PRINT "WHICH SECTOR WILL YOU SHOOT A
T?"
690 PRINT TAB(8);"ACROSS";
700 INPUT S
710 IF S<2 OR S>9 THEN 700
720 PRINT TAB(8);"AND DOWN";
730 INPUT R
740 IF R<2 OR R>9 THEN 730
750 IF A(R,S)=1 THEN 170:REM ALIEN HIT
760 IF A(R,S)=2 THEN PRINT "THAT SECTOR
IS ALREADY DESTROYED!":RETURN
770 A(R,S)=2
780 RETURN
790 REM *********
800 REM PRINT OUT
810 CLS
820 PRINT:PRINT "-> HIGHEST SCORE SO FAR
 IS"HSCRE" <-"
830 PRINT "-> ALIEN SENSES DANGER FACTOR
```

```
"INT(100*H/3)/100" <-"
840 PRINT "-----------------------------
-------"
850 PRINT "----> ALIEN NOW AT"N;M
860 PRINT "-> TIME LEFT:"TME"--- LASERS
FIRED:"SHOTS
870 PRINT "-----------------------------
-------"
880 PRINT TAB(5);"12345678910"
890 FOR K=1 TO 10
900 IF K<10 THEN PRINT " ";
910 PRINT K;
920 FOR J=1 TO 10
930 IF K<2 OR K>9 OR J<2 OR J>9 THEN PRI
NT "-";:GOTO 970
940 IF A(K,J)=0 THEN PRINT "*";
950 IF A(K,J)=1 THEN PRINT "A";
960 IF A(K,J)=2 THEN PRINT " ";
970 NEXT J
980 PRINT
990 NEXT K
1000 PRINT
1010 RETURN
1020 REM *********
1030 REM INITIALISE
1040 CLS
1050 RANDOMIZE VAL(RIGHT$(TIME$,2))
1060 PRINT:PRINT "PLEASE STAND BY FOR YO
UR MISSION..."
1070 TME=30
1080 SHOTS=0
1090 H=0
1100 FOR B=1 TO 10
1110 FOR C=1 TO 10
1120 A(B,C)=0
1130 IF B<2 OR B>9 OR C<2 OR C>9 THEN A(
B,C)=2
1140 NEXT C
1150 NEXT B
1160 M=INT(RND(1)*7)+2
1170 N=INT(RND(1)*7)+2
1180 A(M,N)=1
1190 RETURN
```

MINE-SWEEPER

You are now commanding a mine-sweeper, with the task of clearing a path through the heavily mined Juicy Straits Canal, so that oil tankers can get through.

Each section of the canal is split into a ten by fifteen grid. Each separate location in this grid can contain a mine. Although you can't actually see the mines, your rusty old mine-detector can tell when a mine is in one of the eight locations that surround your position.

Your ship's position on the grid is shown by a number, which also indicates how many mines are in the "square" of eight locations surrounding you. By backtracking, and by going around mines when you sense them, you can create a clear path from the left-hand side of the screen to the row of #'s on the right-hand side.

Now for the bad news. If you move onto a mine, you'll be blown sky-high.

As you can see from the following sample run, you move around the screen by entering U(p), D(own), R(ight) or L(eft). You leave a clear trail of blank locations for the tankers to use behind you as you traverse the grid:

```
>...............#
>...............#
>...............#
>...............#
>  0............#
>...............#
>...............#
>...............#
>...............#
>...............#
```

```
ENTER YOUR MOVE U(P), D(OWN)
                R(IGHT), L(EFT)
? R
```

```
>................#
>................#
>................#
>................#
>   1...........#
>................#
>................#
>................#
>................#
>................#
```

ENTER YOUR MOVE U(P), D(OWN)
                R(IGHT), L(EFT)
? D


```
>................#
>................#
>................#
>................#
>   ............#
>..1............#
>................#
>................#
>................#
>................#
```

ENTER YOUR MOVE U(P), D(OWN)
                R(IGHT), L(EFT)
? R
SPLAT!!!!

YOU'VE HIT A MINE, TURKEY, SO THE
GAME IS OVER. YOUR SCORE IS 75

```
        >..............#
        >..........#
        >..............#
        >..2..........#
        >      .........#
        >..............#
        >..............#
        >..............#
        >..............#
        >..............#
```

ENTER YOUR MOVE U(P), D(OWN)
                R(IGHT), L(EFT)
? D

```
        >..............#
        >..........#
        >..............#
        >..  .........#
        >       .........#
        >....      ......#
        >........    .....#
        >........    O...#
        >..............#
        >..............#
```

ENTER YOUR MOVE U(P), D(OWN)
                R(IGHT), L(EFT)
? R

```
        >..............#
        >..........#
        >..............#
        >..  .........#
        >        .........#
        >....      ......#
        >........    .....#
        >........     O..#
        >..............#
        >..............#
```

ENTER YOUR MOVE U(P), D(OWN)
                R(IGHT), L(EFT)
? R
```

```
CONGRATULATIONS...
YOU HAVE CLEARED A PATH THROUGH

...@........@..#
..............#
...@..........#
.. @..........#
..........#
....      @.....#
.........   ....@#
......@..     .#
...........   #
.............#

IT TOOK YOU 22 MOVES
YOUR SCORE IS 513
YOU CAN NOW PROGRESS TO LEVEL 9
PRESS <ENTER> TO CONTINUE?
```

At the end of each level, the grid will be reprinted, with the mines shown in position. Your score is related to how direct your path across the screen has been, and to the number of mines in that particular segment of the canal. Each time you finish a level, you'll be given a new grid, with more mines on it. (MINE-SWEEPER was written by Neal Cavalier-Smith.)

```
10  REM MINESWEEPER
20  REM NEAL CAVALIER-SMITH
30  CLS:RANDOMIZE VAL(RIGHT$(TIME$,2))
40  DEFINT A-Z
50  DIM A(11,17)
60  L=1:S=0:M=0
70  REM *********
80  REM LAY MINES
90  FOR X=1 TO 10
100  FOR Y=1 TO 15
110  K=INT(RND(1)*25)+1-L
120  A(X,Y)=46
130  IF K=1 THEN A(X,Y)=64
140  NEXT Y
150  A(X,1)=46
160  NEXT X
170  C=5:B=1
```

```
180 A(C,B)=33
190 GOTO 500
200 REM **************
210 REM PRINT MINEFIELD
220 CLS
230 PRINT:PRINT
240 FOR X=1 TO 10
250 PRINT TAB(6);">";
260 FOR Y=1 TO 15
270 IF A(X,Y)<>64 THEN PRINT CHR$(A(X,Y)
);
280 IF A(X,Y)=64 THEN PRINT ".";
290 NEXT Y
300 PRINT "#"
310 NEXT X
320 PRINT
330 A(C,B)=32
340 REM ************
350 REM MOVE SWEEPER
360 PRINT "ENTER YOUR MOVE U(P), D(OWN)"

370 PRINT ,"  R(IGHT), L(EFT)"
380 INPUT B$
390 C1=0:B1=0
400 IF B$="U" THEN C1=-1
410 IF B$="D" THEN C1=1
420 IF B$="R" THEN B1=1
430 IF B$="L" THEN B1=-1
440 IF C+C1>10 OR C+C1<1 THEN 380
450 IF B+B1>15 THEN 600
460 C=C+C1:B=B+B1
470 IF A(C,B)=64 THEN 800
480 REM *********************
490 REM COUNT ADJACENT MINES
500 N=0
510 FOR K=-1 TO 1
520 FOR D=-1 TO 1
530 IF A(C+K,B+D)=64 THEN N=N+1
540 NEXT D
550 NEXT K
560 A(C,B)=48+N
570 M=M+1
580 GOTO 210
590 REM ********************
```

```
600  REM NEXT LEVEL ROUTINE
610  CLS
620  L=L+1
630  PRINT "CONGRATULATIONS..."
640  PRINT "YOU HAVE CLEARED A PATH THROU
GH":PRINT
650  FOR X=1 TO 10
660  FOR Y=1 TO 15
670  PRINT CHR$(A(X,Y));
680  NEXT Y
690  PRINT "#"
700  NEXT X
710  PRINT
720  PRINT "IT TOOK YOU"M"MOVES"
730  S=S+100-M
740  PRINT "YOUR SCORE IS"S
750  PRINT "YOU CAN NOW PROGRESS TO LEVEL
"L
760  M=0
770  INPUT "PRESS <ENTER> TO CONTINUE";Q$

780  GOTO 80
790  REM *****
800  REM SPLAT
810  PRINT "SPLAT!!!!"
820  PRINT:PRINT "YOU'VE HIT A MINE, TURK
EY, SO THE"
830  PRINT "GAME IS OVER. YOUR SCORE IS"S
+L*10-M
```

CAR THIRTEEN

In this game you become one of "New York's Finest," as the police in Gotham are inexplicably called. You are patrolling the city in CAR THIRTEEN, waiting to respond to a radio call.

You may feel that the city you're patrolling is a little smaller than the New York you remember, but that's the result of spending too much time in front of your computer, and not enough time in the Real World. Here's the city map:

```
                              E Street
                              ;
                 _____ ; 7th Street
    _____:
   |            |   |   |    |
   |_____|___|___|____| 6th Street
   |            |   |   |
   |_____|__|__|_____ 5th Street
   |            |   |   |   |   |
   |_____|__|__|__|___| 4th Street
   |            |   |   |   |   |
   |_____|__|___|__|___| 3rd Street
   |            |   |   |   |   |
   |_____|__|___|__|___| 2nd Street
   |            |   |   |   |   |
   |_____|__|__|__|___| 1st Street
   A          B   C   D   F   G
```

In contrast to many programs in which you have to locate an object on a grid, the target in this program does not stand still. In fact, it does its level best to evade you at every turn.

Your car radio informs you that a robbery has been committed. You have to capture the crooks by landing on the corner they are currently occupying. Here's the game in action:

CAR 13! CAR 13!

A ROBBERY IS IN PROGRESS AT THE CORNER
OF 2 AND B STREETS. RESPOND IMMEDIATELY

YOU'RE AT THE CORNER OF 5 & D STREETS

WHICH WAY: [-W-N-S-E-]? S

CAR 13! CAR 13!

CROOK LAST SEEN HEADING SOUTH

YOU'RE AT THE CORNER OF 4 & D STREETS

WHICH WAY: [-W-N-S-E-]? S

CAR 13! CAR 13!

CROOK HAS STOPPED AT RED LIGHT

YOU'RE AT THE CORNER OF 3 & D STREETS

WHICH WAY: [-W-N-S-E-]? W

CAR 13! CAR 13!

CROOK LAST SEEN HEADING EAST

YOU'RE AT THE CORNER OF 3 & C STREETS

WHICH WAY: [-W-N-S-E-]? S

CAR 13! CAR 13!

CROOK HAS STOPPED AT RED LIGHT

YOU'RE AT THE CORNER OF 2 & C STREETS

WHICH WAY: [-W-N-S-E-]? S

```
                        GOTCHA!!
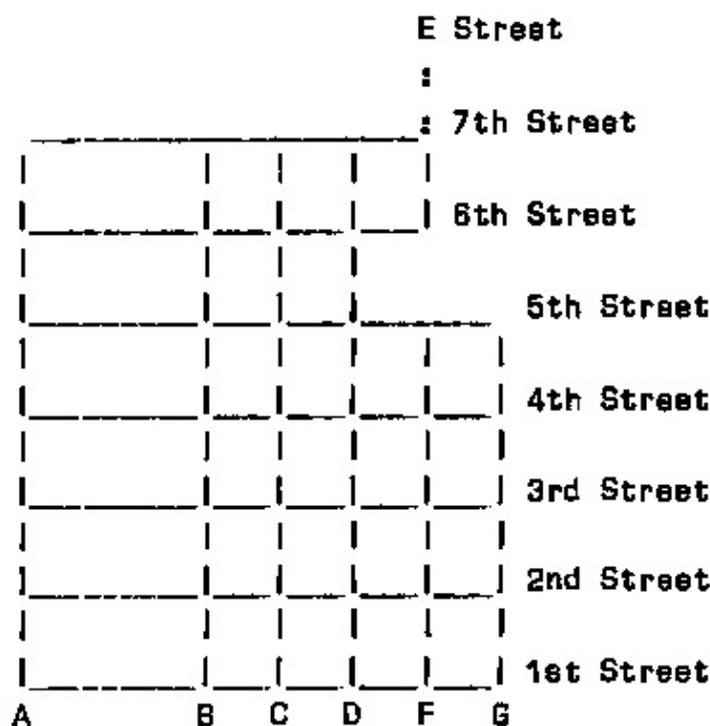
            HEY, WELL DONE! YOU CAUGHT THE CROOK.

            NOW YOU'LL BE PROMOTED TO CAPTAIN!
```

Keep one eye on the map, or this may happen:

```
        CAR 13! CAR 13!

        CROOK HAS STOPPED AT RED LIGHT

        YOU'RE AT THE CORNER OF 7 & E STREETS

        WHICH WAY: (-W-S-)? N


        YOU DUMMY! YOU'VE RUN OFF THE ROAD!

        YOU'VE NOT ONLY DAMAGED EXPENSIVE
        PROPERTY, BUT YOU'VE INJURED SEVERAL
        PEOPLE AS WELL. IT'S TIME YOU TURNED IN
                    YOUR BADGE!
```

As you can see, you are given information regarding the location of the crook's car. Try and nab him as soon as possible. To make this challenging game (by Martin Richardson) harder, the crook has a secret hideout which changes from game to game. If he gets there before he's caught, the game is over, and you're the loser.

Polish up your blue light, officer, and get into action with this listing:

```
10  REM CAR THIRTEEN
20  REM Engage CAPS LOCK before playing
30  REM ****************
40  RANDOMIZE VAL(RIGHT$(TIME$,2))
50  DEF FNR(X)=INT(RND(1)*X)+1
60  N=65:B1=FNR(5):B2=FNR(5)
70  CLS
80  A=FNR(7):B=FNR(7)
90  IF B1=A OR B2=B THEN 80
```

```
100  B=B+N:B$=CHR$(B)
110  IF B$="E" AND A<6 THEN 80
120  IF B$="F" AND A>5 THEN 80
130  IF A=6 AND (B$>"E" OR B$<"B") THEN 8
0
140  IF A=7 AND B$>"E" THEN 80
150  PRINT:PRINT "CAR 13! CAR 13!":PRINT
160  PRINT "A ROBBERY IS IN PROGRESS AT T
HE CORNER"
170  PRINT "OF"A"AND ";
180  C=FNR(6):IF C=A THEN 180
190  PRINT B$;" STREETS. RESPOND IMMEDIAT
ELY"
200  D=FNR(7)-1:IF D=B THEN 200
210  D=D+N
220  D$=CHR$(D)
230  IF D$="E" AND C<6 THEN 200
240  IF D$="F" AND C>5 THEN 200
250  IF C=6 AND (D$>"E" OR D$<"B") THEN 2
00
260  IF C=7 AND D$>"E" THEN 200
270  PRINT:PRINT "YOU'RE AT THE CORNER OF
"C"& "D$" STREETS"
280  PRINT:PRINT "WHICH WAY: (";
290  GOSUB 1250
300  IF A$<>"N" AND A$<>"S" AND A$<>"E" A
ND A$<>"W" THEN 280
310  IF A$="N" THEN 420
320  IF A$="S" THEN 490
330  IF A$="E" THEN 560
340  REM ****
350  REM WEST
360  IF D=N OR C=6 AND D=N+1 THEN 630
370  D=D-1
380  IF C<6 AND D=N+4 THEN D=N+3
390  D$=CHR$(D):GOTO 710
400  REM *****
410  REM NORTH
420  IF C=7 THEN 630
430  IF (D=N+5 OR D=N+6) AND C=5 THEN 630

440  C=C+1
450  IF D=N AND C=6 THEN C=7
460  GOTO 710
```

```
470 REM *****
480 REM SOUTH
490 IF C=1 THEN 630
500 IF D=N+4 AND C=6 THEN 630
510 C=C-1
520 IF D=N AND C=6 THEN C=5
530 GOTO 710
540 REM ****
550 REM EAST
560 IF D=N+6 THEN 630
570 IF (C=7 OR C=6) AND D=N+4 THEN 630
580 D=D+1
590 IF C<6 AND D=N+4 THEN D=N+5
600 D$=CHR$(D):GOTO 710
610 REM ************
620 REM RUN OFF ROAD
630 PRINT:PRINT "YOU DUMMY! YOU'VE RUN O
FF THE ROAD!"
640 PRINT:PRINT "YOU'VE NOT ONLY DAMAGED
 EXPENSIVE"
650 PRINT "PROPERTY, BUT YOU'VE INJURED
SEVERAL"
660 PRINT "PEOPLE AS WELL. IT'S TIME YOU
 TURNED IN"
670 PRINT TAB(14);"YOUR BADGE!"
680 GOTO 1220
690 REM **********
700 REM CROOK MOVE
710 IF A=C AND B=D THEN 1130
720 IF RND(1)<.4 THEN 750
730 PRINT:PRINT "CAR 13! CAR 13!"
740 PRINT:PRINT "CROOK HAS STOPPED AT RE
D LIGHT":GOTO 270
750 M=FNR(4)
760 ON M GOTO 790,860,930,1000
770 REM *****
780 REM NORTH
790 IF A=7 OR (B=N+5 AND A=5) THEN 750
800 IF B=D AND A+1=C THEN 750
810 A=A+1:W$="NORTH":N$=CHR$(B)
820 IF B=N AND A=6 THEN A=7
830 GOTO 1070
840 REM *****
850 REM SOUTH
```

```
860  IF A=1 OR (B=N+4 AND A=6) THEN 750
870  IF B=D AND A-1=C THEN 750
880  A=A-1:W$="SOUTH":N$=CHR$(B)
890  IF B=N AND A=6 THEN A=5
900  GOTO 1070
910  REM ****
920  REM EAST
930  IF B=N+6 OR ((A=7 OR A=6) AND B=N+4)
 THEN 750
940  IF A=C AND B+1=D THEN 750
950  B=B+1:W$="EAST":N$=STR$(A)
960  IF A<6 AND B=N+4 THEN B=N+5
970  GOTO 1070
980  REM ****
990  REM WEST
1000  IF B=N OR (A=6 AND B=N+1) THEN 750
1010  IF A=C AND B-1=D THEN 750
1020  B=B-1:W$="WEST":N$=STR$(A)
1030  IF A<6 AND B=N+4 THEN B=N+3
1040  REM **********
1050  REM WHICH WAY?
1060  CLS
1070  IF A=B1 AND B=B2 THEN 1190
1080  PRINT:PRINT "CAR 13! CAR 13!":PRINT

1090  PRINT "CROOK LAST SEEN HEADING ";W$

1100  GOTO 270
1110  REM ************
1120  REM CROOK CAUGHT
1130  PRINT:PRINT TAB(12);"GOTCHA!!"
1140  PRINT:PRINT "HEY, WELL DONE! YOU CA
UGHT THE CROOK."
1150  PRINT:PRINT "NOW YOU'LL BE PROMOTED
 TO CAPTAIN!"
1160  GOTO 1220
1170  REM *********************
1180  REM CROOK EVADES CAPTURE
1190  PRINT:PRINT "CAR 13! CAR 13!"
1200  PRINT:PRINT "THE CROOK HAS DISAPPEA
RED INTO"
1210  PRINT "HIS SECRET HIDEOUT. HE GOT A
WAY!"
1220  END
```

```basic
1230 REM ******************
1240 REM DIRECTION ROUTINE
1250 IF D=N OR (C=6 AND D=N+1) THEN 1270

1260 PRINT "-W";
1270 IF C=7 OR ((D=N+5 OR D=N+6) AND C=5
) THEN 1300
1280 PRINT "-N";
1290 IF C=1 OR (D=N+4 AND C=6) THEN 1310

1300 PRINT "-S";
1310 IF D=N+6 OR ((C=7 OR C=6) AND D=N+4
) THEN 1330
1320 PRINT "-E";
1330 PRINT "-)";
1340 INPUT A$
1350 CLS
1360 RETURN
```

BULLS-EYE

With this archery program you can shoot an arrow aimed straight for the center of the target—without leaving your keyboard.

The target appears like this on your screen:

```
        1   2   3   4   5   6   7
      ─────────────────────────────
  1 :      +   +   +   +   +        : 1
  2 :  +   #   #   #   #   #   +    : 2
  3 :  +   #   %   %   %   #   +    : 3
  4 :  +   #   %   *   %   #   +    : 4
  5 :  +   #   %   %   %   #   +    : 5
  6 :  +   #   #   #   #   #   +    : 6
  7 :      +   +   +   +   +        : 7
      ─────────────────────────────
        1   2   3   4   5   6   7
```

The "+" signs on your target are worth two points, hitting the "#" symbols gain you three points, you get five for the "%" and ten for hitting the "*", the bulls-eye. The target is scored as follows:

```
        1   2   3   4   5   6   7
      ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─
  1 :      2   2   2   2   2        : 1
  2 :  2   3   3   3   3   3   2    : 2
  3 :  2   3   5   5   5   3   2    : 3
  4 :  2   3   5   *   5   3   2    : 4
  5 :  2   3   5   5   5   3   2    : 5
  6 :  2   3   3   3   3   3   2    : 6
  7 :      2   2   2   2   2        : 7
      ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─
        1   2   3   4   5   6   7
```

You "hit" areas of the target by pressing the space bar of your computer to stop the series of numbers which appears on the screen, as you can see here:

```
STOP ME FOR ACROSS...

    1   2   3   4   5
                5       OK


NOW FOR DOWN...

    1   2   3   4
                4       OK
```

Once you've done this, the computer will reprint the target, showing the shot number, the score you gained from that shot, and your cumulative score for the game:

```
THAT WAS SHOT NUMBER 1

YOU SCORED 5   SO YOUR SCORE IS 5

        1   2   3   4   5   6   7
      _____
  1 :         +   +   +   +   +       : 1
  2 :     +   #   #   #   #   #   +   : 2
  3 :     +   #   %   \\  :  //   +   : 3
  4 :     +   #   %  ——=X=——     +   : 4
  5 :     +   #   %  //  :  \\   +   : 5
  6 :     +   #   #   #   #   #   +   : 6
  7 :         +   +   +   +   +       : 7
      _____
        1   2   3   4   5   6   7
```

And so the game unfolds:

```
          1   2   3   4   5   6   7
        _____
   1 :       +   +   +   +   +           : 1
   2 :   +   #   #   #   #   #   +        : 2
   3 :   +   #   %   %   %   #   +        : 3
   4 :   +   #   %   *   %   #   +        : 4
   5 :   +   #   %   %   %   #   +        : 5
   6 :   +   #   #   #   #   #   +        : 6
   7 :       +   +   +   +   +            : 7
        _____
          1   2   3   4   5   6   7
```

STOP ME FOR ACROSS...

```
    1   2   3   4
                4      OK
```

NOW FOR DOWN...

```
    1   2   3
                3      OK
```

THAT WAS SHOT NUMBER 4

YOU SCORED 5   SO YOUR SCORE IS 14

```
          1   2   3   4   5   6   7
        _____
   1 :       +   +   +   +   +           : 1
   2 :   +   #   \\  :   //  #   +        : 2
   3 :   +   #   ——=X=——   #   +          : 3
   4 :   +   #   //  :   \\  #   +        : 4
   5 :   +   #   %   %   %   #   +        : 5
   6 :   +   #   #   #   #   #   +        : 6
   7 :       +   +   +   +   +            : 7
        _____
          1   2   3   4   5   6   7
```

```
        1   2   3   4   5   6   7
      ------------------------------
 1 :      +   +   +   +   +         : 1
 2 :  +   #   #   #   #   #   +     : 2
 3 :  +   #   %   %   %   #   +     : 3
 4 :  +   #   %   *   %   #   +     : 4
 5 :  +   #   %   %   %   #   +     : 5
 6 :  +   #   #   #   #   #   +     : 6
 7 :      +   +   +   +   +         : 7
      ------------------------------
        1   2   3   4   5   6   7
```

STOP ME FOR ACROSS...

```
    1   2   3   4
                4       OK
```

NOW FOR DOWN...

```
    1   2   3   4
                4       OK
```


        THAT WAS SHOT NUMBER 5

    YOU SCORED 10   SO YOUR SCORE IS 24

            >> BULLSEYE <<

```
        1   2   3   4   5   6   7
      ------------------------------
 1 :      +   +   +   +   +         : 1
 2 :  +   #   #   #   #   #   +     : 2
 3 :  +   #   \\  :   //  #   +     : 3
 4 :  +   #   --=X=--     #   +     : 4
 5 :  +   #   //  :   \\  #   +     : 5
 6 :  +   #   #   #   #   #   +     : 6
 7 :      +   +   +   +   +         : 7
      ------------------------------
        1   2   3   4   5   6   7
```

```
            THAT WAS SHOT NUMBER 8

     YOU  SCORED 3   SO  YOUR  SCORE  IS 33


               1   2   3   4   5   6   7
             ┌─────────────────────────────
        1 :      +   +   +   +   +         : 1
        2 :  +   #   #   #  \\   :  //      : 2
        3 :  +   #   %   %  ──=X=──         : 3
        4 :  +   #   %   *  //   :  \\      : 4
        5 :  +   #   %   %   %   #   +      : 5
        6 :  +   #   #   #   #   #   +      : 6
        7 :      +   +   +   +   +          : 7
             └─────────────────────────────
               1   2   3   4   5   6   7
```

At the end, the program will announce your score for the game, and
compare it against your previous best score:


```
            THAT WAS SHOT NUMBER 10

     YOU  SCORED 10   SO  YOUR  SCORE  IS 53

               >>  BULLSEYE  <<

               1   2   3   4   5   6   7
             ┌─────────────────────────────
        1 :      +   +   +   +   +         : 1
        2 :  +   #   #   #   #   #   +      : 2
        3 :  +   #  \\   :  //   #   +      : 3
        4 :  +   #  ──=X=──       #   +    : 4
        5 :  +   #  //   :  \\   #   +      : 5
        6 :  +   #   #   #   #   #   +      : 6
        7 :      +   +   +   +   +          : 7
             └─────────────────────────────
               1   2   3   4   5   6   7
```

```
YOU SCORED A TOTAL OF 53

AN AVERAGE OF 5.3 PER SHOT

THE HIGH SCORE IS 65

STAND BY FOR A NEW ROUND
```

By all means modify the appearance of the target to take advantage of the graphics on your computer. It doesn't really matter what you do with the target visually—so long as the various sections are shown clearly—as the "real" target is the Z(7,7) array that the program checks your shots against.

Here's the listing so that you can send a few arrows on their way:

```
10  REM BULLSEYE
20  GOSUB 780:REM INITIALISE
30  GOSUB 440:REM PRINT TARGET
40  R=0:S=0
50  SHOT=SHOT+1
60  H=0
70  PRINT
80  PRINT "STOP ME FOR ACROSS...":PRINT:P
RINT TAB(8);
90  IF INKEY$<>"" THEN 90
100  H=H+1
110  PRINT H;
120  GOSUB 1130
130  IF INKEY$<>"" THEN R=H:GOTO 160
140  IF H<7 THEN 100
150  R=7
160  PRINT TAB(16);R;"   OK"
170  H=0
180  PRINT
190  PRINT "NOW FOR DOWN...":PRINT:PRINT
TAB(8);
200  IF INKEY$<>"" THEN 200
210  H=H+1
220  PRINT H;
230  GOSUB 1130
240  IF INKEY$<>"" THEN S=H:GOTO 270
250  IF H<7 THEN 210
```

```
260 S=7
270 PRINT TAB(16);H;"    OK"
280 GOSUB 1130:GOSUB 1130:GOSUB 1130
290 GOSUB 440
300 FOR K=1 TO 1000:NEXT K
310 R=0:S=0
320 GOSUB 440
330 IF SHOT<10 THEN 40
340 PRINT:PRINT
350 PRINT TAB(7);"YOU SCORED A TOTAL OF"
;SCR
360 PRINT:PRINT TAB(7);"AN AVERAGE OF";S
CR/10;"PER SHOT"
370 IF SCR>HI THEN HI=SCR
380 PRINT:PRINT TAB(7);"THE HIGH SCORE I
S";HI
390 PRINT:PRINT TAB(7);"STAND BY FOR A N
EW ROUND"
400 FOR K=1 TO 2500:NEXT K
410 SHOT=0:SCR=0:R=0:S=0
420 GOTO 30
430 REM ************
440 REM PRINT TARGET
450 CLS
460 IF R=0 THEN 610
470 A$(S,R)="=X="
480 IF S>1 THEN A$(S-1,R)=" : "
490 IF S<7 THEN A$(S+1,R)=" : "
500 IF R>1 THEN A$(S,R-1)=" --"
510 IF R<7 THEN A$(S,R+1)="-- "
520 IF S>1 AND R>1 THEN A$(S-1,R-1)=" \\
"
530 IF S<7 AND R<7 THEN A$(S+1,R+1)="\\
"
540 IF S>1 AND R<7 THEN A$(S-1,R+1)="//
"
550 IF S<7 AND R>1 THEN A$(S+1,R-1)=" //
"
560 HIT=Z(S,R)
570 SCR=SCR+HIT
580 PRINT:PRINT TAB(7);"THAT WAS SHOT NU
MBER";SHOT
590 PRINT:PRINT TAB(3);"YOU SCORED";HIT;
" SO YOUR SCORE IS";SCR
```

```
600 IF R=4 AND S=4 THEN PRINT:PRINT TAB(
12);">> BULLSEYE <<"
610 PRINT
620 PRINT TAB(11);"1  2  3  4  5  6  7"
630 PRINT TAB(9);"----------------------
-"
640 FOR J=1 TO 7
650 PRINT TAB(4);J;":  ";
660 FOR K=1 TO 7
670 PRINT A$(J,K);
680 NEXT K
690 PRINT "   :";J
700 NEXT J
710 PRINT TAB(9);"----------------------
-"
720 PRINT TAB(11);"1  2  3  4  5  6  7"
730 RESTORE
740 GOSUB 840
750 RETURN
760 NEXT K
770 REM **********
780 REM INITIALISE
790 CLS
800 RANDOMIZE(VAL(RIGHT$(TIME$,2)))
810 DIM A$(7,7),Z(7,7)
820 SCR=0:HIT=0:SHOT=0
830 R=0:S=0
840 FOR B=1 TO 7
850 FOR C=1 TO 7
860 READ A$(B,C)
870 NEXT C
880 NEXT B
890 FOR B=1 TO 7
900 FOR C=1 TO 7
910 READ Z(B,C)
920 NEXT C
930 NEXT B
940 RETURN
950 REM *************************
960 REM +=2; #=3; %=5; *=10
970 DATA "   "," + "," + "," + "," + ","
 + ","   "
980 DATA " + "," # "," # "," # "," # ","
 # "," + "
```

```
990 DATA " + "," # "," % "," % "," % ","
  # "," + "
1000 DATA " + "," # "," % "," * "," % ",
" # "," + "
1010 DATA " + "," # "," % "," % "," % ",
" # "," + "
1020 DATA " + "," # "," # "," # "," # ",
" # "," + "
1030 DATA "    "," + "," + "," + "," + ",
" + ","    "
1040 DATA 0,2,2,2,2,2,0
1050 DATA 2,3,3,3,3,3,2
1060 DATA 2,3,5,5,5,3,2
1070 DATA 2,3,5,10,5,3,2
1080 DATA 2,3,5,5,5,3,2
1090 DATA 2,3,3,3,3,3,2
1100 DATA 0,2,2,2,2,2,0
1110 REM *****
1120 REM ADJUST LOOP BELOW FOR MAXIMUM
              CHALLENGE ON YOUR SYSTEM
1130 REM DELAY
1140 FOR K=1 TO 100:NEXT K
1150 RETURN
```

DANIEL MORGAN'S MILITIA

In 1781, it looked as if the British would be the victors in the American War of Independence. Then they suffered a serious defeat in the Battle of Cowpens—which lasted little more than an hour—against troops rallying behind General Daniel Morgan.

    This program lets you play the part of General Morgan's troops in the Battle of Cowpens. This is how the game begins:

```
THIS IS YOUR TIME OF TESTING,
   GENERAL MORGAN


ENTER YOUR CHOICE OF LEVEL (1 TO 10)

     10 IS THE MOST DIFFICULT
      1 IS THE EASIEST

        ? 7
```

```
MORALE IS 0     YOU'VE FIRED 0 SHOTS
       ^ ^ ^ ^ ^ ^ V ^ ^ ^ ^ ^
       I                 I
       I                 I
       I                 I
       I                 I
       I                 I
       I                 I
       I                 I
       I                 I
       I                 I
       I                 I
       I                 I
       I                 I
       I                 I
       I 4 8             I
       I  5 3 9   8   8 5  I
       I  5  6 6      4   I
       I  7 2 2          I
```

As you can see, there are ten levels of difficulty. The British are represented by the numbers at the bottom of the track. They move relentlessly toward your position at the top. Your men are represented by the "V" at the top. You move it left (with the "Z" key) or right (with the "M" key), and fire using the space bar.

Your score is related to two things: the numbers your shots destroy, and their position within the British ranks. As you can see, there are four rows of British soldiers. The top row is worth the least, and those in the final row are worth the most. You cannot shoot "through" a soldier to hit the one behind him, but must blast the front soldier first, to get a shot at those in the back rows:

```
MORALE IS 28    YOU'VE FIRED 1 SHOTS
           ^ ^ ^ ^ ^ ^ V ^ ^ ^ ^ ^
           I                   I
           I                   I
           I                   I
           I                   I
           I                   I
           I                   I
           I                   I
           I                   I
           I                   I
           I                   I
           I                   I
           I·                  I
           I                   I
           I                   I
           I 4 8               I
           I 5 3 9       8 5   I
           I 5 6 6    4        I
           I 7 2 2             I


MORALE IS 137    YOU'VE FIRED 3 SHOTS
           ^ ^ ^ ^ V ^ ^ ^ ^ ^ ^ ^
           I                   I
           I                   I
           I                   I
           I                   I
           I                   I
           I                   I
           I                   I
           I                   I
           I                   I
           I                   I
           I                   I
           I 4 8               I
           I 5 3         8 5   I
           I 5    6    4       I
           I 7 2 2             I
```

```
MORALE IS 251     YOU'VE FIRED 5 SHOTS
          ^ ^ ^ ^ v ^ ^ ^ ^ ^ ^
          I                 I
          I                 I
          I                 I
          I                 I
          I                 I
          I  8              I
          I  53        85   I
          I  5    6    4    I
          I  72            I
```

```
MORALE IS 318     YOU'VE FIRED 6 SHOTS
          ^ ^ ^ ^ ^ ^ ^ v ^ ^ ^ ^
          I                 I
          I                 I
          I  8              I
          I  53        85   I
          I  5         4    I
          I  72            I
```

```
MORALE IS 355     YOU'VE FIRED 7 SHOTS
          ^ ^ ^ ^ ^ ^ ^ ^ v ^ ^ ^
          I                 I
          I  8              I
          I  53        5    I
          I  5         4    I
          I  72            I
```

Your troops have a limited number of shots (related to the level of dif-
ficulty) and the game ends if the front row of soldiers (or where they would
be if they had not been shot by you) reaches your position. (Note that after
all the British have been killed, one more shot must be fired to end the game.)
At the end of the battle, your troops will be rated on their skill, which is
calculated from the number and value of soldiers shot, the skill level at which
you played, and the number of shots you've fired:

```
MORALE IS 400    YOU'VE FIRED 8 SHOTS
              * * * * * * * * V * * *
        I  8               I
        I  53         5  I
        I  5               I
        I  72             I

     THE BRITISH HAVE BEATEN YOU

     YOUR TROOPS' RATING IS 14124
```

General Morgan, a nation awaits you:

```
10  REM DANIEL MORGAN'S MILITIA
20  GOSUB 650:REM INITIALISE
30  GOTO 280
40  REM **********
50  REM MAIN CYCLE
60  CLS
70  COUNT=COUNT-LEV/10
80  PRINT "MORALE IS"INT(SCR)"  YOU'VE FI
RED"SHOTS"SHOTS"
90  IF COUNT<1 THEN EDFLAG=2
100  IF SHOTS>35-LEV THEN EDFLAG=3
110  PRINT TAB(11);H$
120  FOR J=1 TO INT(COUNT+.5)
130  PRINT TAB(11);"I            I":REM
          10 SPACES
140  NEXT J
150  PRINT TAB(11);"I";A$;"I"
160  PRINT TAB(11);"I";B$;"I"
170  PRINT TAB(11);"I";C$;"I"
180  PRINT TAB(11);"I";D$;"I"
190  IF EDFLAG=1 THEN PRINT:PRINT TAB(4);
"YOU'VE BEATEN THE BRITISH!":GOTO 320
200  IF EDFLAG=2 THEN PRINT:PRINT TAB(4);
"THE BRITISH HAVE BEATEN YOU":GOTO 320
210  IF EDFLAG=3 THEN PRINT:PRINT TAB(3);
"YOU'RE OUT OF AMMUNITION!":GOTO 320
220  F$=INKEY$
230  REM DELETE NEXT LINE FOR A MUCH MORE
          DIFFICULT GAME...
```

```
240 IF F$<>"Z" AND F$<>"M" AND F$<>" " T
HEN 220
250 IF F$="Z" THEN PST=PST-1:IF PST<1 TH
EN PST=1
260 IF F$="M" THEN PST=PST+1:IF PST>10 T
HEN PST=10
270 IF F$=" " THEN SHOTS=SHOTS+1:GOSUB 4
10:REM FIRE
280 M$="^^^^^^^^^^^"
290 H$=LEFT$(M$,PST)+"V"+RIGHT$(M$,11-PS
T)
300 GOTO 60
310 REM **********
320 REM END OF GAME
330 PRINT
340 EFFECT=SHOTS
350 IF EDFLAG=1 THEN EFFECT=.1
360 IF EDFLAG=3 THEN EFFECT=97
370 PRINT TAB(4);"YOUR TROOPS' RATING IS
"INT((1974*SCR)/(EFFECT*LEV+.0005))
380 IF INKEY$<>"" THEN 380
390 END
400 REM ***************
410 REM FIRE SUBROUTINE
420 IF MID$(A$,PST,1)=" " THEN 460
430 SCR=SCR+VAL(MID$(A$,PST,1))*LEV
440 MID$(A$,PST,1)=" "
450 RETURN
460 IF MID$(B$,PST,1)=" " THEN 500
470 SCR=SCR+2*VAL(MID$(B$,PST,1))*LEV/3
480 MID$(B$,PST,1)=" "
490 RETURN
500 IF MID$(C$,PST,1)=" " THEN 540
510 SCR=SCR+4*VAL(MID$(C$,PST,1))*LEV/2.
5
520 MID$(C$,PST,1)=" "
530 RETURN
540 IF MID$(D$,PST,1)=" " THEN 580
550 SCR=SCR+8*VAL(MID$(D$,PST,1))*LEV/1.
3
560 MID$(D$,PST,1)=" "
570 RETURN
580 IF A$<>"          " THEN RETURN:REM
10 SPACES
```

```
590 IF B$<>"          " THEN RETURN:REM
10 SPACES
600 IF C$<>"          " THEN RETURN:REM
10 SPACES
610 IF D$<>"          " THEN RETURN:REM
10 SPACES
620 EDFLAG=1
630 RETURN
640 REM *************
650 REM INITIALISATION
660 CLS
670 GOSUB 1010:REM GET LEVEL
680 RANDOMIZE VAL(RIGHT$(TIME$,2))
690 FOR Z=1 TO 10
700 IF RND(1)<.6 THEN 740
710 GOSUB 970
720 A$=A$+T$
730 GOTO 750
740 A$=A$+" "
750 IF RND(1)<.6 THEN 790
760 GOSUB 970
770 B$=B$+T$
780 GOTO 800
790 B$=B$+" "
800 IF RND(1)<.6 THEN 840
810 GOSUB 970
820 C$=C$+T$
830 GOTO 850
840 C$=C$+" "
850 IF RND(1)<.6 THEN 890
860 GOSUB 970
870 D$=D$+T$
880 GOTO 900
890 D$=D$+" "
900 NEXT Z
910 COUNT=15
920 PST=INT(RND(1)*9)+1
930 SCR=0
940 EDFLAG=0
950 SHOTS=0
960 RETURN
970 T$=STR$(INT(RND(1)*9)+1)
980 T$=RIGHT$(T$,1)
990 RETURN
```

```
1000 REM ********
1010 REM GET LEVEL
1020 PRINT:PRINT:PRINT
1030 PRINT TAB(3);"IT IS 2 AM ON JANUARY
 17, 1781"
1040 PRINT:PRINT
1050 PRINT TAB(3);"THIS IS YOUR TIME OF
TESTING,                 GENERAL MORGAN"
1060 PRINT:PRINT
1070 PRINT "ENTER YOUR CHOICE OF LEVEL (
1 TO 10)"
1080 PRINT:PRINT TAB(8);"10 IS THE MOST
DIFFICULT"
1090 PRINT TAB(12);"1 IS THE EASIEST"
1100 PRINT:INPUT "                ";LEV
1110 IF LEV<1 OR LEV>10 THEN 1100
1120 RETURN
```

TAXI!!

This is an absorbing and complex simulation game, in which you play the part of a cab driver in a busy city.

When you run the program, you'll see the city shown as follows:

```
B  -  BUS STATION
P  -  PASSENGER
R  -  RAILWAY STATION
D  -  DESTINATION
T  -  TAXI              P AND D WILL
F  -  FUEL         APPEAR IN DUE COURSE


     XXXXXXXXXXXX
     X  @    @      X
     X  @@@   R@@@X
     X        @  B X
     X@  @@  @  @@  X
     X@   @  @    @ X
     X@  @@  @  @@  X
     X   @T  @  @@  X
     XF     @@       X
     X  @@  @@  @@  X
     X  @          @ X
     XXXXXXXXXXXX

  PRESS <RETURN> TO START THE GAME
  ?
```

The "@" symbols represent houses, the "R" is a railway station, "B" represents a bus station, "F" the place where you can refuel your cab, and "T" (for "Taxi") is *you*. After seeing the street plan on the screen, press the Return key, and the game will begin:

```
XXXXXXXXXXXX
X  @     @      X
X  @@@    R@@@X
X        @   B  X
X@  @@  @  @@  X
X@   @  @    @  X
X@  @@  @  @@  X
X   @T  @P@@  X
XF     @@       X
X  @@  @@  @@  X
X   @        @  X
XXXXXXXXXXXX
```

FUEL 140   ENTER NEXT MOVE:
FARE 0   U[P],   D[OWN]
 TIP 100   L[EFT], R[IGHT]
SCORE 0

                    ? D

Your passenger appears as a "P" on the map, and you move your cab around by entering U(p), D(own), L(eft) or R(ight). You have to get to your passenger as quickly as possible, and take him or her to the destination by the shortest possible route. The destination ("D") is shown on the map as soon as you pick the passenger up. You have to move your cab around to get to the passenger, find out where he or she is going, and then move to the destination:

```
>>  YOUR  DESTINATION  IS  MARKED  BY  A  'D'
    XXXXXXXXXXXX
    X  @     @      X
    X  @@@    D@@@X
    X        @   B  X
    X@  @@  @  @@  X
    X@   @  @    @  X
    X@  @@  @  @@  X
    X   @    @  @@  X
    XF     @@       X
    X  @@  @@  @@  X
    X   @        @  X
    XXXXXXXXXXXX
```

```
FUEL 104        ENTER NEXT MOVE:
FARE 54            U[P],    D[OWN]
 TIP 38            L[EFT], R[IGHT]
SCORE 0


          ?  U
```

As you can see, you use up a great deal of gas cruising around, picking up and setting down passengers. You can refuel at "F," and must pay $1.00 per gallon. Note that your score is the number of dollars you've earned from passengers, so the money you spend on fuel is deducted from your score. (You can only refuel when you've got less than 100 gallons in your tank.)

And so you cruise around, until you drop off your passenger:

```
XXXXXXXXXXXX
X  @     @      X
X  @@@    D@@@X
X        @T B  X
X@  @@  @  @@  X
X@   @  @    @  X
X@  @@  @  @@  X
X   @   @  @@  X
XF       @@      X
X  @@  @@  @@  X
X   @         @  X
XXXXXXXXXXXX
```

```
FUEL 88         ENTER NEXT MOVE:
FARE 78            U[P],    D[OWN]
 TIP 6             L[EFT], R[IGHT]
SCORE 0


          ?  U
```

```
        XXXXXXXXXXXX
        X  @     @       X
        X  @@@    R@@@X
        X        @   B  X
        X@  @@  @  @@  X
        X@   @  @    @  X
        X@  @@  PT@@  X
        X    @   @  @@  X
        XF     @@        X
        X  @@  @@  @@  X
        X  @          @  X
        XXXXXXXXXXXX

    FUEL  63        ENTER  NEXT  MOVE:
    FARE  24           U(P),     D(OWN)
     TIP  68           L(EFT),  R(IGHT)
   SCORE  9


            ?  L




        XXXXXXXXXXXX
        X  @     @       X
        X  @@@    R@@@X
        X        @   B  X
        X@  @@  @  @@  X
        X@   @  @    @  X
        X@  @@  @  @@  X
        X    @T  @  @@  X
        XF     @@        X
        X  @@D@@  @@  X
        X  @          @  X
        XXXXXXXXXXXX

    FUEL  47        ENTER  NEXT  MOVE:
    FARE  4B           U(P),     D(OWN)
     TIP  46           L(EFT),  R(IGHT)
   SCORE  9


            ?  D
```

```
YOU'VE REACHED YOUR DESTINATION
TOTAL FARE IS 90  - INCLUDES TIP OF 30

A NEW PASSENGER IS WAITING...
```

Your fare at the end of a journey depends on how far you take the passenger. Note that your tip goes down more quickly than the fare goes up, so you should always take the shortest route.

The game ends when you run out of gas. Beware of simply ferrying passengers from the railway station to the bus terminal, as this takes up a lot of fuel, and they are both a long way from the gas station. You use up more fuel going through the bus terminal or the station, because of congestion, so you should avoid those locations if you can. TAXI!! was written by Neal Cavalier-Smith.

```
10  REM TAXI!!
20  GOSUB 120
30  GOSUB 1160
40  REM **************
50  REM ** PLAY GAME **
60  GOSUB 400
70  GOSUB 980
80  GOSUB 520
90  GOTO 60
100 END
110 REM ****************
120 REM INITIALISE
130 CLS
140 RANDOMIZE VAL(RIGHT$(TIME$,2))
150 T=100:F=140:S=0
160 DIM A(10,10)
170 Z=0:L=1:D=7:A=4:P=32
180 FOR X=1 TO 10
190 FOR Y=1 TO 10
200 READ R
210 IF R=0 THEN R=32
220 IF R=1 THEN R=64
230 A(X,Y)=R
240 NEXT Y
250 NEXT X
260 PRINT:PRINT " B - BUS STATION"
270 PRINT " P - PASSENGER"
280 PRINT " R - RAILWAY STATION"
```

```
290 PRINT " D - DESTINATION"
300 PRINT " T - TAXI","       P AND D WIL
L"
310 PRINT " F - FUEL","  APPEAR IN DUE C
OURSE"
320 PRINT
330 GOSUB 400
340 PRINT
350 PRINT "PRESS <RETURN> TO START THE G
AME"
360 INPUT R$
370 CLS
380 RETURN
390 REM **********
400 REM PRINT MAP
410 PRINT TAB(5);"XXXXXXXXXXXX"
420 FOR X=1 TO 10
430 PRINT TAB(5);"X";
440 FOR Y=1 TO 10
450 PRINT CHR$(A(X,Y));
460 NEXT Y
470 PRINT "X"
480 NEXT X
490 PRINT TAB(5);"XXXXXXXXXXXX"
500 RETURN
510 REM **********
520 REM ACCEPT MOVE
530 PRINT:INPUT "              ";M$
540 B=A:E=D
550 IF M$="D" AND D<10 THEN D=D+1
560 IF M$="U" AND D>1 THEN D=D-1
570 IF M$="R" AND A<10 THEN A=A+1
580 IF M$="L" AND A>1 THEN A=A-1
590 IF A(D,A)=80 OR A(D,A)=68 THEN 620
600 IF A(D,A)=64 THEN D=E:A=B:GOTO 520
610 IF P<>64 AND P<>32 THEN GOSUB 860
620 A(E,B)=P
630 P=A(D,A)
640 A(D,A)=84
650 IF T>0 THEN T=T-8
660 F=F-4
670 IF F<0 THEN GOSUB 1290
680 Z=Z+6
690 CLS
```

```
700 IF P=80 THEN GOSUB 740
710 IF P=68 THEN GOSUB 1050
720 RETURN
730 REM ****************
740 REM PICK UP PASSENGER
750 H=Z:W=T
760 PRINT:PRINT "YOU HAVE COLLECTED YOUR
 PASSENGER"
770 A(R1,R2)=J
780 P=J
790 GOSUB 1160
800 A(R1,R2)=68
810 PRINT ">> YOUR DESTINATION IS MARKED
 BY A 'D'"
820 Z=H
830 T=W+10
840 RETURN
850 REM *********
860 REM BUS/TRAIN
870 IF P=70 AND F<100 THEN GOSUB 910
880 IF P=66 OR P=82 THEN F=F-5
890 RETURN
900 REM ******
910 REM REFUEL
920 AMOUNT=150
930 IF S<150 THEN AMOUNT=S
940 F=F+AMOUNT
950 S=S-AMOUNT
960 RETURN
970 REM *****************
980 REM PRINT OUT RESULTS
990 PRINT:PRINT " FUEL"F,"ENTER NEXT MOV
E:"
1000 PRINT " FARE"Z,"  U(P),   D(OWN)"
1010 PRINT "  TIP"T,"  L(EFT), R(IGHT)"
1020 PRINT "SCORE"S
1030 RETURN
1040 REM ******************
1050 REM DESTINATION REACHED
1060 PRINT "YOU'VE REACHED YOUR DESTINAT
ION"
1070 PRINT "TOTAL FARE IS"T+Z;
1080 IF T<=0 THEN PRINT " (NO TIP)":GOTO
 1100
```

```
1090 PRINT " - INCLUDES TIP OF"T
1100 PRINT:PRINT "A NEW PASSENGER IS WAI
TING..."
1110 P=J:S=S+T+X
1120 GOSUB 1160
1130 FOR Q=1 TO 2000:NEXT Q:CLS
1140 RETURN
1150 REM ********************
1160 REM CREATE NEW PASSENGER
1170 R1=INT(RND(1)*9)+1
1180 R2=INT(RND(1)*9)+1
1190 IF A(R1,R2)=84 THEN 1170
1200 IF A(R1,R2)<>64 THEN 1240
1210 R=INT(RND(1)*2)
1220 IF R=1 THEN R1=2:R2=7
1230 IF R=2 THEN R1=3:R2=9
1240 J=A(R1,R2)
1250 A(R1,R2)=80
1260 T=100:Z=0
1270 RETURN
1280 REM **********
1290 REM OUT OF GAS
1300 PRINT:PRINT:PRINT
1310 PRINT "YOU'VE RUN OUT OF GAS..."
1320 PRINT ".....SO THE GAME IS OVER"
1330 PRINT:PRINT "YOUR SCORE IS"S+Z-T
1340 END
1350 REM ********
1360 REM MAP DATA
1370 DATA 0,1,0,0,0,1,0,0,0,00
1380 DATA 0,1,1,1,0,0,82,1,1,1
1390 DATA 0,0,0,0,0,1,0,0,66,0
1400 DATA 1,0,1,1,0,1,0,1,1,00
1410 DATA 1,0,0,1,0,1,0,0,1,00
1420 DATA 1,0,1,1,0,1,0,1,1,00
1430 DATA 0,0,1,84,0,1,0,1,1,0
1440 DATA 70,0,0,0,1,1,0,0,0,0
1450 DATA 0,1,1,0,1,1,0,1,1,00
1460 DATA 0,0,1,0,0,0,0,0,1,00
```

Through Dungeons Deep
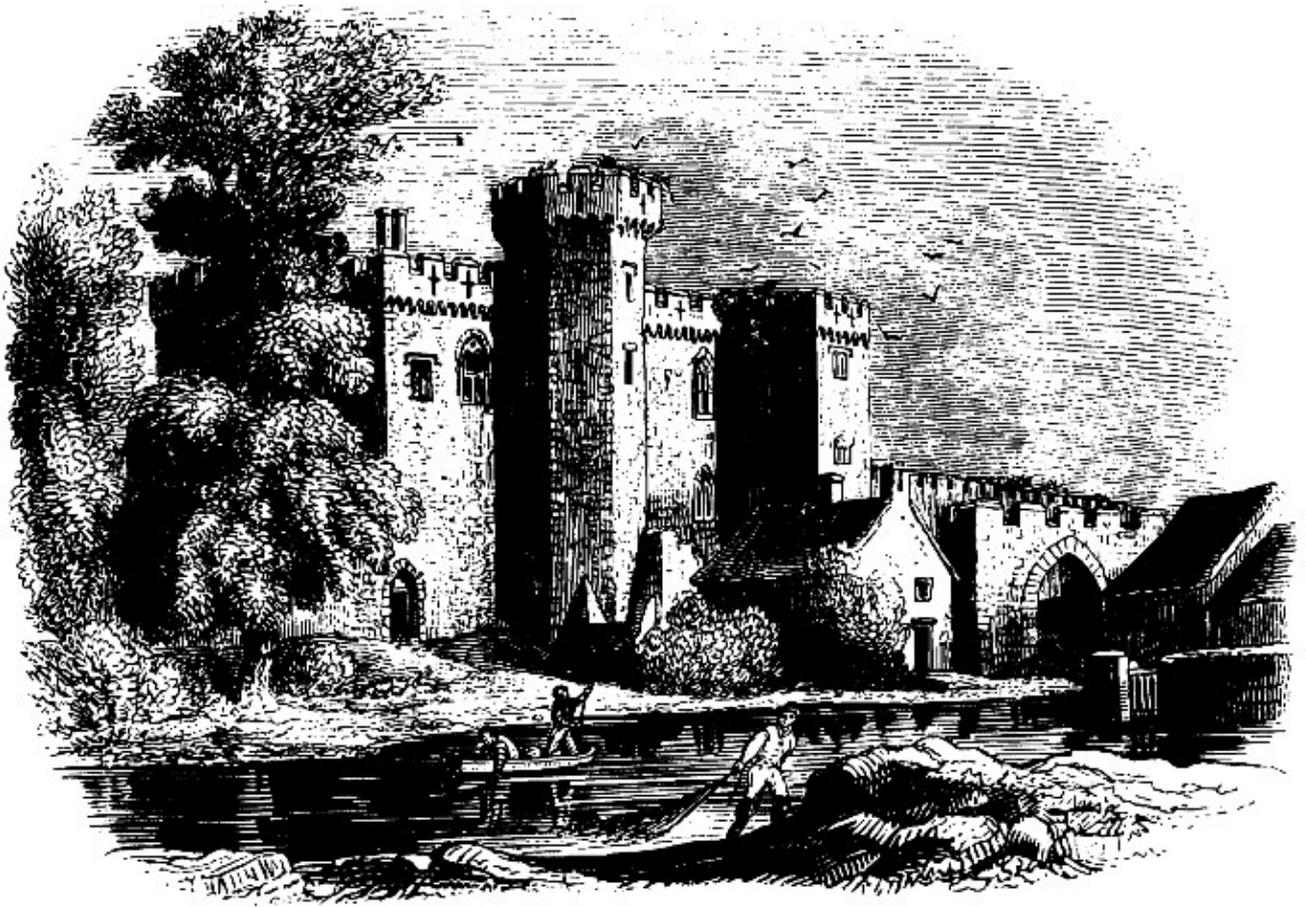
Exploring underground dungeons, fighting fierce dragons, grabbing great stockpiles of gold and gems . . . ah, that's the life! But it's not easy to find dungeons and all the rest where I live, and I'm willing to bet it's much the same for you. That's why Adventure games programs are so popular. They provide imaginative, escapist entertainment.

In this section of the book we take on the forces of dread in GHOST-HUNTER, explore a post-holocaust world as the GOTHAM RUNNER, and do a bit of exploring around the solar system in the program ORBITAL PILOT. From there, if you still have your wits about you, you can tackle a round or two of IT'S A MAD, MAD WORLD, or settle down to relax with our OFF THE WALL ADVENTURE. (If you'd like to learn more about creating your own Adventure programs, you might be interested in my book *Creating Adventure Games on Your Computer*, which is also published by Ballantine Books.)

GHOSTHUNTER

Martin Richardson of Blackbury, Virginia, wrote me that his favorite game in *The Giant Book of Computer Games* was THE BANNOCHBURN LEGACY, an Adventure game set within a haunted castle. Inspired by that program, Martin produced this Adventure, which takes place in a house which—by one of those unexplained mysteries which crop up from time to time—bears an uncanny resemblance to Martin's own house.

Here's a sample of the program in action, which will give you a pretty good idea of how it works:

```
                GHOSTHUNTER


                PLEASE STAND BY


        WHAT'S YOUR NAME, HERO? TIM


        WELCOME, TIM.

        YOUR ABILITIES ARE:

                DEXTERITY: 8
                 STAMINA: 8
                   SPEED: 8
                CONDITION: GOOD

        YOU'RE AT THE FRONT OF A DARK,
        FOREBODING HOUSE. THE FRONT DOOR SEEMS
        TO BE NAILED SHUT. THROUGH AN OPEN
        WINDOW YOU CAN SEE A ROOM CONTAINING
        DUSTY FURNITURE, AND AN OLD, SCRATCHED
        PIANO. THE OTHER WINDOWS ARE BOARDED
        YOU CAN GO TO THE EAST OR WEST SIDES
                OF THE HOUSE.


        WHAT DO YOU WANT TO DO? E
```

YOU'RE NOW AT THE EAST SIDE OF THE
HOUSE. THERE'S A DOOR HERE, WHICH SEEMS
TO LEAD TO THE BASEMENT, BUT IT'S ALL
BOARDED UP AND IMPASSABLE. THE WINDOWS
ON THIS SIDE OF THE HOUSE ARE BOARDED
UP. YOU CAN GO TO THE NORTH OR THE
        SOUTH SIDES OF THE HOUSE.

WHAT DO YOU WANT TO DO? S

THIS WAS ONCE THE DEN. ALL OF THE
FURNITURE IN THIS ROOM IS COVERED WITH
SHEETS. THERE ARE SEVERAL PAINTINGS ON
THE WALL OF BYGONE MEN AND WOMEN, AND
YOU SEE A FIREPLACE IN THE WEST WALL.
THERE'S A DOOR IN THE EAST WALL, AND
ONE IN THE WEST WALL.
THERE IS A LARGE LAVISH RUG, DETAILED
WITH PICTURES AND COLORFUL DESIGNS
IN THE MIDDLE OF THE ROOM

YOU CAN SEE: MUMMY
IT HAS A SCARE FACTOR OF 10 AND
A DEXTERITY OF 6

WHAT DO YOU WANT TO DO? F

                        POW!!
        POW!!
                PUNCH!!
        PUNCH!!
                        CLAW!!
        KICK!!

                CLAW!!
                        POW!!
        PUNCH!!
        KICK!!
    BITE!!

 YOUR ATTACK CAUSES THE MUMMY
 TO VANISH FOREVER

```
          YOUR ABILITIES ARE:


               DEXTERITY: 8
                STAMINA: 9
                  SPEED: 8
              CONDITION: GOOD


THIS WAS ONCE THE DEN. ALL OF THE
FURNITURE IN THIS ROOM IS COVERED WITH
SHEETS. THERE ARE SEVERAL PAINTINGS ON
THE WALL OF BYGONE MEN AND WOMEN, AND
YOU SEE A FIREPLACE IN THE WEST WALL.
THERE'S A DOOR IN THE EAST WALL, AND
ONE IN THE WEST WALL.
THERE IS A LARGE LAVISH RUG, DETAILED
WITH PICTURES AND COLORFUL DESIGNS
IN THE MIDDLE OF THE ROOM



WHAT DO YOU WANT TO DO? QUIT


DON'T TALK WEIRD TO ME


WHAT DO YOU WANT TO DO? E
```

The program accepts one- or two-word commands, some of which can be abbreviated. You move around the house with single-letter commands, such as "N" for North, and so on. Any command in the vocabulary that follows which contains a ")" can be abbreviated to the letter which comes before the ")":

F)IGHT: This is used any time you wish to engage a creature in combat.

R)UN: If the creature you encounter is too powerful for your liking, you can use this command to attempt to flee from it.

GET: Use this command, followed by the name of an object, in order to pick up that object.

DROP: This command, followed by the name of an object, allows you to get rid of the object. You can't have more than one object in any room at the same time.

N, S, E, W, U or D: Movement commands ("U" is Up, "D" is Down, etc.)

I)NVENTORY: This will tell you the name of everything you're carrying.

L)OOK: This command will get your computer to reprint your attributes (these are explained below) and the room description.

As you have seen in the sample run, you have three attributes (or abilities). There is also a "health rating" you must keep track of. Your *dexterity* measures how evasive you are. The higher this number is, the better are your chances of not getting hit in a fight. Your *stamina* measures how brave you are. If you meet a monster with a higher score, you become frightened, which makes it all the more likely that you'll be hit. If you defeat a monster, you get braver, and your stamina rating increases.

You have a *speed* score as well (as does the monster—but you don't get to see the monster's speed rating). The difference between your speed and the monster's affects, fairly predictably, your chances of escape.

There are four *health* ratings: good, fair, poor and dead! Each time you're hit, your health goes one point down the scale. If you're clever, you'll discover how to restore your health if it is a bit on the dull side.

Be brave now, and take on the Forces of Darkness, with GHOSTHUNTER:

```
10   REM GHOSTHUNTER
20   RANDOMIZE VAL(RIGHT$(TIME$,2))
30   GOSUB 5970
40   PRINT TAB(12);"GHOSTHUNTER"
50   PRINT:PRINT
60   PRINT TAB(11);"PLEASE STAND BY"
70   DEF FNR(X)=INT(RND(1)*X)+1
80   DIM R$(17),F(11),P(10),X(11),I$(11),Q
$(10),O$(10)
90   R=1:Q=1
100  REM *************
110  REM READ ROOM DATA
120  FOR X=1 TO 17:READ R$(X):NEXT X
130  REM *********
140  REM PLACE RUG
150  A=FNR(4)+4
160  R$(A)=R$(A)+"01"
170  FOR X=5 TO 8
180  IF X=A THEN 200
190  R$(X)=R$(X)+"00"
200  NEXT X
210  REM ****************************
220  REM DISTRIBUTE ITEMS/INHABITANTS
230  FOR X=1 TO 3
240  A=FNR(13)+4
```

```
250  IF LEN(R$(A))>12 THEN 240
260  R$(A)=R$(A)+"00"
270  NEXT X
280  REM
290  FOR X=1 TO 10
300  X$=STR$(X)
310  IF X<10 THEN MID$(X$,1,1)="0"
320  IF X=10 THEN X$=RIGHT$(X$,2)
330  A=FNR(17)
340  IF LEN(R$(A))>12 THEN 330
350  R$(A)=R$(A)+X$
360  NEXT X
370  REM *******************
380  REM SET STARTING VALUES
390  DX=FNR(5)+7
400  ST=FNR(3)+5
410  SP=FNR(7)+3
420  CO=3:CO$="GOOD"
430  REM ******************
440  REM SET MONSTER VALUES
450  FOR X=1 TO 10:READ I$(X):NEXT X
460  FOR X=5 TO 10
470  F(X)=FNR(5)+5
480  P(X)=FNR(7)+3
490  X(X)=FNR(5)+5
500  NEXT X
510  F(11)=FNR(10)+10
520  X(11)=FNR(5)+7
530  REM **********
540  REM START GAME
550  GOSUB 5970
560  INPUT "WHAT'S YOUR NAME, HERO";N$
570  GOSUB 5970
580  PRINT "WELCOME, ";N$;"."
590  PRINT:PRINT "YOUR ABILITIES ARE:"
600  PRINT:PRINT TAB(11);"DEXTERITY:"DX
610  PRINT TAB(13);"STAMINA:"ST
620  PRINT TAB(15);"SPEED:"SP
630  PRINT TAB(11);"CONDITION: ";CO$
640  IF CO=0 THEN 5900
650  IF R>8 THEN 680
660  ON R GOSUB 5600,5690,5770,5830,4760,
4850,4900,4970
670  GOTO 690
```

```
680 ON R-8 GOSUB 5080,5140,5180,5210,527
0,5310,5390,5440,5520
690 IF MID$(R$(R),11,2)<>"00" THEN GOSUB
 2730:GOTO 710
700 PRINT
710 F=0:IX=0:ES=0
720 IF VAL(MID$(R$(R),13,2))=0 THEN 810
730 P=VAL(MID$(R$(R),13,2))
740 PRINT "YOU CAN SEE: ";I$(P)
750 IF P<5 OR P>10 THEN 790
760 PRINT "IT HAS A SCARE FACTOR OF"F(P)
"AND"
770 PRINT "A DEXTERITY OF"X(P):PRINT
780 F=1:GOTO 810
790 IX=1
800 REM ********************
810 PRINT:INPUT "WHAT DO YOU WANT TO DO"
;V$
820 PRINT
830 Z$=LEFT$(V$,1)
840 IF LEFT$(V$,2)="DR" THEN 1400
850 IF LEFT$(V$,3)="EAT" THEN 3260
860 IF Z$="I" THEN 1320
870 IF Z$="P" THEN 1690
880 IF Z$="O" THEN 3080
890 IF Z$="F" THEN 2140
900 IF Z$="R" THEN 2860
910 IF Z$="G" THEN 1240
920 IF Z$="L" THEN 570
930 IF Z$="U" OR Z$="D" THEN 1140
940 IF Z$="N" THEN T=1:GOTO 1060
950 IF Z$="S" THEN T=3:GOTO 1060
960 IF Z$="E" THEN T=5:GOTO 1060
970 IF Z$="W" THEN T=7:GOTO 1060
980 X=FNR(4)
990 ON X GOTO 1000,1010,1020,1030
1000 PRINT "WHAT?":GOTO 810
1010 PRINT "I DON'T UNDERSTAND, ";N$:GOT
O 810
1020 PRINT "WHATCHA MEAN BY THAT?":GOTO
810
1030 PRINT "DON'T TALK WEIRD TO ME":GOTO
 810
1040 REM **********
```

```
1050 REM N, S, E, W
1060 X=VAL(MID$(R$(R),T,2))
1070 PRINT
1080 IF F=1 AND ES<>1 THEN PRINT "THE ";
I$(P);" STOPS YOU":GOTO 2150
1090 IF X=0 THEN PRINT "YOU CAN'T GO THA
T WAY":IF ES=1 THEN 2140
1100 IF X=0 AND ES<>1 THEN 810
1110 R=X:GOTO 570
1120 REM *********
1130 REM UP OR DOWN
1140 X=VAL(MID$(R$(R),9,2))
1150 PRINT
1160 IF F=1 AND ES<>1 THEN PRINT "THE ";
I$(P);" SAYS 'NO GO'":GOTO 2150
1170 IF Z$="U" AND X=13 THEN R=X:GOTO 57
0
1180 IF Z$="D" AND X=9 THEN R=X:GOTO 570

1190 IF Z$="D" AND MID$(R$(R),11,2)="02"
 AND TD=1 THEN 1830
1200 PRINT "YOU CAN'T GO THAT WAY!":GOTO
 810
1210 END
1220 REM ***
1230 REM GET
1240 IF IX=0 THEN PRINT "THERE'S NOTHING
 HERE TO GET":GOTO 810
1250 PRINT TAB(12);"> IT'S BEEN DONE"
1260 O$(Q)=I$(P):Q=Q+1
1270 MID$(R$(R),13,2)="00"
1280 GOTO 810
1290 REM *********
1300 REM INVENTORY
1310 PRINT
1320 IF Q=1 THEN PRINT "YOU'RE NOT CARRY
ING ANYTHING":GOTO 810
1330 PRINT "YOU'RE CARRYING:"
1340 FOR X=1 TO Q-1
1350 PRINT TAB(5);"> ";O$(X)
1360 NEXT X
1370 GOTO 810
1380 REM ****
1390 REM DROP
```

```
1400 IF Q=1 THEN PRINT "YOU AREN'T CARRY
ING IT!":GOTO 810
1410 LA=0
1420 IF RIGHT$(R$(R),2)<>"00" THEN LA=1
1430 IF LA=1 THEN PRINT "THERE'S ALREADY
 SOMETHING HERE":GOTO 810
1440 IF V$="DROP" THEN 1510
1450 Z$=""
1460 IF RIGHT$(V$,3)="OPE" THEN V$="ROPE
":Z$="01"
1470 IF RIGHT$(V$,3)="KEY" THEN V$="KEY"
:Z$="02"
1480 IF RIGHT$(V$,3)="NCH" THEN V$="LUNC
H":Z$="03"
1490 IF RIGHT$(V$,3)="LUB" THEN V$="CLUB
":Z$="04"
1500 GOTO 1530
1510 PRINT:INPUT "WHAT DO YOU WANT TO DR
OP";V$
1520 V=1:GOTO 1460
1530 V=0:X=0
1540 X=X+1
1550 IF V$<>O$(X) AND X<Q THEN 1540
1560 IF X=Q THEN 1640
1570 Q=Q-1
1580 Q$(X)=""
1590 IF X=Q+1 THEN 1610
1600 FOR Y=X TO Q-1:O$(Y)=O$(Y+1):NEXT Y
1610 MID$(R$(R),13,2)=Z$
1620 PRINT TAB(12);"> IT'S BEEN DONE"
1630 GOTO 810
1640 PRINT "YOU AREN'T CARRYING IT":GOTO
 810
1650 REM ********
1660 REM PULL RUG
1670 RUG=0
1680 PRINT
1690 IF MID$(R$(R),11,2)<>"00" THEN RUG=
1
1700 IF RIGHT$(V$,3)="ULL" THEN PRINT:IN
PUT "WHAT DO YOU WANT TO PULL";V$
1710 IF RIGHT$(V$,3)="RUG" THEN 1730
1720 PRINT "YOU CAN'T PULL THAT HERE":GO
TO 810
```

```
1730 IF RUG<>1 THEN PRINT "I DON'T SEE A
NY RUG HERE":GOTO 810
1740 IF MID$(R$(R),11,2)<>"02" THEN 1770

1750 PRINT "YOU DON'T HAVE ENOUGH STRENG
TH TO"
1760 PRINT TAB(6);"MOVE IT AGAIN":GOTO 8
10
1770 MID$(R$(R),11,2)="02"
1780 PRINT:PRINT "THE RUG MOVES AWAY TO
REVEAL A"
1790 PRINT "TRAPDOOR SET INTO THE FLOOR"

1800 GOTO 810
1810 REM *********************
1820 REM DOWN INTO THE DEPTHS
1830 X=0
1840 X=X+1
1850 IF O$(X)="ROPE" THEN 1880
1860 IF X<Q-1 THEN 1840
1870 PRINT "IT IS TOO FAR DOWN. YOU MAY
NEED A ROPE":GOTO 810
1880 PRINT:PRINT "WITH THE ROPE SECURELY
 FASTENED, YOU"
1890 PRINT "SLOWLY LOWER YOURSELF INTO T
HE HOLE."
1900 PRINT:PRINT
1910 FOR X=1 TO 1000:NEXT X:GOTO 3470
1920 REM **********************
1930 REM FIGHT TABLE SUBROUTINE
1940 REM ** GHOST RESOLUTION **
1950 NUM=ST-F(P):DEX=X(P)
1960 X=FNR(3)+3:GOSUB 4010
1970 IF NUM>3 THEN NUM=3
1980 IF NUM<-3 THEN NUM=-3
1990 DEX=DEX+NUM
2000 ROLL=FNR(18)
2010 IF ROLL>DEX THEN F1=1:T=T+1
2020 RETURN
2030 REM ** HUMAN RESOLUTION **
2040 NUM=F(P)=ST:DEX=X(P)
2050 X=FNR(3)+3:GOSUB 4010
2060 IF NUM>3 THEN NUM=3
2070 IF NUM<-3 THEN NUM=-3
```

```
2080 DEX=DEX+NUM
2090 ROLL=FNR(18)
2100 IF ROLL>DEX THEN F2=1:T=T+1
2110 RETURN
2120 REM *********
2130 REM THE FIGHT
2140 IF F<>1 THEN PRINT "THERE'S NOTHING
 HERE TO FIGHT!":GOTO 810
2150 GOSUB 1950
2160 T=0:ES=0
2170 IF F1=1 THEN F1=0:GOSUB 2260:GOSUB
2630:T=T+1:ST=ST-1
2180 IF CO=0 THEN FOR X=1 TO 1000:NEXT X
:GOTO 570
2190 GOSUB 2040
2200 IF F2=1 THEN F2=0:GOSUB 2450:MID$(R
$(R),13,2)="00":ST=ST+1:F=0:T=T+1
2210 IF T=0 THEN PRINT "THE ";I$(P);" BA
CKS AWAY......"
2220 GOTO 810
2230 REM *************
2240 REM FIGHT RESULTS
2250 PRINT
2260 X=FNR(5)
2270 ON X GOTO 2280,2310,2340,2370,2400
2280 PRINT "THE ";I$(P);" KNOCKS INTO YO
U,"
2290 PRINT "SENDING YOU SPRAWLING ONTO
THE FLOOR."
2300 RETURN
2310 PRINT "YOU'VE JUST BEEN BITTEN BY"
2320 PRINT "THE ";I$(P);"!!!"
2330 RETURN
2340 PRINT "THE ";I$(P);" KICKS YOU IN"
2350 PRINT "YOUR BIG FAT STOMACH!"
2360 RETURN
2370 PRINT "YOU'RE ALMOST SCARED TO DEAT
H BY"
2380 PRINT "THE FEROCIOUS ";I$(P);"!!"
2390 RETURN
2400 PRINT "THE ";I$(P);" RAISES ITS FIS
T"
2410 PRINT "AND SENDS YOU FLYING ACROSS
THE ROOM"
```

```
2420 RETURN
2430 REM **********
2440 REM SMASHEROO!
2450 X=FNR(5)
2460 ON X GOTO 2470,2500,2530,2560,2590
2470 PRINT "YOU LASH OUT AT THE ";I$(P);
","
2480 PRINT "SENDING IT INTO OBLIVION"
2490 RETURN
2500 PRINT "YOUR ATTACK CAUSES THE ";I$(
P)
2510 PRINT "TO VANISH FOREVER"
2520 RETURN
2530 PRINT "YOU JUST MANAGE TO SEND THE
";I$(P)
2540 PRINT "AWAY FROM THE MATERIAL WORLD
"
2550 RETURN
2560 PRINT "YOU GOT IT! THE ";I$(P)
2570 PRINT "DISAPPEARS, NEVER TO BE SEEN
 AGAIN"
2580 RETURN
2590 PRINT "BASH! SWIPE! YOU WIN! THE"
2600 PRINT I$(P);" VANISHES INTO THIN AI
R."
2610 RETURN
2620 REM ******
2630 REM INJURY
2640 CO=CO-1
2650 REM *********
2660 REM CONDITION
2670 IF CO=3 THEN CO$="GOOD"
2680 IF CO=2 THEN CO$="FAIR"
2690 IF CO=1 THEN CO$="POOR"
2700 IF CO=0 THEN CO$="DEAD"
2710 RETURN
2720 REM ***********
2730 REM RUG IN ROOM
2740 PRINT "THERE IS A LARGE LAVISH RUG,
 DETAILED"
2750 PRINT "WITH PICTURES AND COLORFUL D
ESIGNS"
2760 IF MID$(R$(R),11,2)="02" THEN 2790
2770 PRINT "IN THE MIDDLE OF THE ROOM
```

```
2780 PRINT:RETURN
2790 PRINT "PULLED TO ONE SIDE OF THE RO
OM. A"
2800 PRINT "LARGE TRAPDOOR IS SET INTO T
HE FLOOR"
2810 PRINT "IN THE MIDDLE OF THE ROOM"
2820 GOSUB 3000
2830 PRINT:RETURN
2840 REM ***
2850 REM RUN
2860 IF F<>1 THEN PRINT "THERE IS NOTHIN
G HERE TO RUN FROM!":GOTO 810
2870 NUM=SP-P(P)
2880 IF NUM<-3 THEN NUM=-3
2890 IF NUM>3 THEN NUM=3
2900 RN=5+NUM
2910 X=FNR(10):IF X<RN THEN 2950
2920 PRINT "THE ";I$(P);" IS TOO FAST FO
R"
2930 PRINT "YOU. YOU MUST STAY AND FIGHT
."
2940 GOTO 2140
2950 PRINT:INPUT "WHICH WAY TO ESCAPE";V
$
2960 Z$=LEFT$(V$,1)
2970 ES=1:GOTO 930
2980 REM *******************
2990 REM TRAPDOOR SUBROUTINE
3000 IF TD=1 THEN 3030
3010 PRINT "THE TRAPDOOR IS CLOSED"
3020 RETURN
3030 PRINT "THE TRAPDOOR LIES OPEN, REVE
ALING A"
3040 PRINT "LARGE HOLE UNDER THE HOUSE."

3050 RETURN
3060 REM ****
3070 REM OPEN
3080 IF MID$(R$(R),11,2)<>"02" THEN PRIN
T "THERE'S NOTHING TO OPEN":GOTO 810
3090 IF TD=1 THEN PRINT "IT'S ALREADY OP
EN, TURKEY!":GOTO 810
3100 IF RIGHT$(V$,3)="PEN" THEN INPUT "W
HAT DO YOU WANT TO OPEN?";V$
```

```
3110 IF RIGHT$(V$,3)="OOR" THEN 3130
3120 PRINT "YOU CAN'T OPEN THAT!":GOTO 8
10
3130 X=0
3140 X=X+1
3150 IF O$(X)="KEY" THEN 3200
3160 IF X<Q-1 THEN 3140
3170 PRINT "THE TRAPDOOR IS LOCKED AND Y
OU DON'T"
3180 PRINT "HAVE THE KEY TO OPEN IT."
3190 GOTO 810
3200 PRINT "THE TRAPDOOR OPENS TO REVEAL
A DARK"
3210 PRINT "HOLE UNDER THE HOUSE"

3220 X=0:TD=1
3230 GOTO 810
3240 REM ***
3250 REM EAT
3260 IF RIGHT$(V$,3)<>"EAT" THEN 3280
3270 INPUT "WHAT DO YOU WANT TO EAT?";V$
3280 IF RIGHT$(V$,3)="NCH" OR RIGHT$(V$,
3)="OOD" THEN 3360
3290 X=FNR(5)
3300 ON X GOTO 3310,3320,3330,3340,3350
3310 PRINT "I'M GOING TO BE SICK!":GOTO
810
3320 PRINT "THAT'S DISGUSTING!":GOTO 810
3330 PRINT "YUKKK!!!!!!!!!":GOTO 810
3340 PRINT "I JUST LOST MY APPETITE":GOT
O 810
3350 PRINT "THINK AGAIN, TURKEY!":GOTO 8
10
3360 X=0
3370 X=X+1
3380 IF O$(X)="LUNCH" THEN 3410
3390 IF X<Q-1 THEN 3370
3400 PRINT "YOU DON'T HAVE ANY LUNCH":GO
TO 810
3410 PRINT TAB(10);"* GULP! *"
3420 Q=Q-1:O$(X)="":IF X=Q THEN 3440
3430 FOR Y=X TO Q-1:O$(Y)=O$(Y+1):NEXT Y
3440 CO=3:GOSUB 2670:GOTO 810
3450 REM ******
```

```
3460 REM FINALE
3470 PRINT N$;" YOUR ABILITIES ARE:"
3480 PRINT TAB(5);"DEXTERITY:"DX
3490 PRINT TAB(5);"STAMINA:  "ST
3500 PRINT TAB(5);"SPEED:    "SP
3510 PRINT TAB(5);"CONDITION:"CO$
3520 PRINT
3530 PRINT "THE TRAPDOOR SLAMS SHUT ABOV
E YOU."
3540 PRINT "YOU ARE NOW IN THE CELLAR. I
T IS LIT"
3550 PRINT "BY LIGHT WHICH COMES THROUGH
 CRACKS"
3560 PRINT "IN THE EAST WALL. THE STENCH
 OF"
3570 PRINT "THIS PLACE IS UNREAL."
3580 PRINT
3590 PRINT "SUDDENLY, A VOICE BOOMS OUT:
"
3600 PRINT TAB(2);"WHO DARES INVADE MY P
LACE OF"
3610 PRINT TAB(2);"SANCTUARY? I SHALL DE
STROY"
3620 PRINT TAB(2);"YOU FOR THIS INTRUSIO
N!!"
3630 PRINT:PRINT "A GHASTLY FORM DRIFTS
FROM OUT OF THE"
3640 PRINT "SHADOWS...IT IS THE SPIRIT O
F SILICON"
3650 PRINT "GULCH! HIS SCARE FACTOR IS"F
(11)"AND"
3660 PRINT "HIS DEXTERITY IS"X(11)"WHICH
 IS PRETTY"
3670 PRINT "BAD. THERE'S NO RUNNING AWAY
 HERE,"
3680 PRINT "YOU MUST STAND AND FIGHT!!"
3690 P=11:I$(11)="SPIRIT!
3700 X=0
3710 X=X+1
3720 IF O$(X)="CLUB" THEN 3780
3730 IF X<Q-1 THEN 3710
3740 X=0
3750 PRINT:PRINT "YOU MUST FIGHT WITH YO
UR BARE HANDS,"
```

```
3760 PRINT "WHICH PUTS YOU AT A MAJOR DI
SADVANTAGE."
3770 GOTO 3830
3780 PRINT "THE CLUB INCREASES YOUR CHAN
CES OF"
3790 PRINT "SUCCESS AGAINST THE SPIRIT,
ADDING"
3800 PRINT "TO YOUR STAMINA!!"
3810 ST=ST+5:PRINT
3820 PRINT "YOUR STAMINA RATING IS NOW"S
T
3830 PRINT:INPUT "PRESS <RETURN> TO STAR
T THE FIGHT",A$
3840 H1=3:H2=3:T=0
3850 REM *************
3860 REM SPIRIT ATTACK
3870 GOSUB 1940
3880 IF F1=1 THEN H2=H2-1:IF H2<=0 THEN
GOSUB 2450:GOTO 4230
3890 REM ************
3900 REM HUMAN ATTACK
3910 GOSUB 2030
3920 IF F2=1 THEN H2=H2-1:IF H2<=0 THEN
GOSUB 2450:GOTO 4230
3930 IF F2=1 THEN F2=0:GOSUB 4310:PRINT
"THE SPIRIT CAN TAKE"H1"MORE HITS"
3940 IF H1<=0 THEN 4120
3950 IF T=0 THEN 3870
3960 T=0
3970 PRINT:INPUT "HIT <RETURN> TO CONTIN
UE FIGHT!",A$
3980 GOTO 3870
3990 REM ***********
4000 REM FIGHT SOUNDS
4010 FOR Y=1 TO X
4020 Z=FNR(5):TA=FNR(23)
4030 ON Z GOSUB 4070,4080,4090,4100,4110

4040 FOR A=1 TO 250:NEXT A
4050 NEXT Y
4060 PRINT:RETURN
4070 PRINT TAB(TA);"BITE!!":RETURN
4080 PRINT TAB(TA);"CLAW!!":RETURN
4090 PRINT TAB(TA);"PUNCH!!":RETURN
```

```
4100 PRINT TAB(TA);"POW!!":RETURN
4110 PRINT TAB(TA);"KICK!!":RETURN
4120 IF H2=0 THEN 4170
4130 CLS
4140 PRINT:PRINT "THE SPIRIT OF SILICON
GULCH DEFEATED"
4150 PRINT TAB(8);"YOU, ";N$;"."
4160 GOTO 5900
4170 PRINT:PRINT "YOU DEFEATED THE SPIRI
T OF SILICON"
4180 PRINT "GULCH, BUT DIED YOURSELF IN
THE PROCESS!"
4190 PRINT "SEVERAL DAYS AFTER THE FINAL
 FIGHT,"
4200 PRINT "YOUR BODY IS FOUND, AND YOU
ARE GIVEN"
4210 PRINT "A HERO'S BURIAL. YOUR NAME W
ILL LIVE ON"
4220 END
4230 PRINT:PRINT "YOU DID IT!! THE SPIRI
T OF SILICON"
4240 PRINT "GULCH HAS BEEN DEFEATED AT L
AST. AS YOU"
4250 PRINT "SIT DOWN TO CATCH YOUR BREAT
H, THE EAST"
4260 PRINT "DOOR SUDDENLY CRASHES IN, AN
D A GROUP"
4270 PRINT "OF POLICEMEN ENTER. YOU ARE
TAKEN TO"
4280 PRINT "THE PRESIDENT'S OFFICE TO BE
 AWARDED"
4290 PRINT "THE CONGRESSIONAL MEDAL OF H
ONOR!"
4300 END
4310 X=FNR(5)
4320 ON X GOTO 4330,4360,4390,4420,4450
4330 PRINT "YOU HIT THE SPIRIT WITH SUCH
 FORCE"
4340 PRINT "THAT IT ALMOST FLIES THROUGH
 THE WALL!"
4350 RETURN
4360 PRINT "YOUR FOOT FLIES OUT, AND WHA
CKS THE"
4370 PRINT "SPIRIT IN THE STOMACH, OOF!"
```

```
4380 RETURN
4390 PRINT "YOUR ARM LASHES OUT, CATCHIN
G THE"
4400 PRINT "SILICON GULCH SPIRIT IN THE
NECK"
4410 RETURN
4420 PRINT "YOU HIT THE SPIRIT IN THE HE
AD, ALMOST"
4430 PRINT "KNOCKING HIM DOWN!"
4440 RETURN
4450 PRINT "A SWIFT BLOW TO THE NECK INF
LICTS A"
4460 PRINT "NASTY WOUND TO THE SPIRIT!!"

4470 RETURN
4480 REM *********
4490 RED ROOM DATA
4500 DATA "00000204000000"
4510 DATA "03010000000000"
4520 DATA "00000204000000"
4530 DATA "03010500000000"
4540 DATA "0000100400"
4550 DATA "1000090000"
4560 DATA "0008001200"
4570 DATA "0700000900"
4580 DATA "120008061300"
4590 DATA "110612050000"
4600 DATA "001000000000"
4610 DATA "000907100000"
4620 DATA "151714160900"
4630 DATA "000000130000"
4640 DATA "001300000000"
4650 DATA "000013000000"
4660 DATA "130000000000"
4670 REM *********
4680 REM ITEM NAMES
4690 DATA "ROPE","KEY","LUNCH","CLUB"
4700 REM ************
4710 REM MONSTER NAMES
4720 DATA "GHOST","SKELETON","MUMMY","ZO
MBIE"
4730 DATA "GHOUL","SPECTRE"
4740 REM *****************
4750 REM ROOM DESCRIPTIONS
```

```
4760 PRINT:PRINT "THIS WAS ONCE THE DEN.
 ALL OF THE"
4770 PRINT "FURNITURE IN THIS ROOM IS CO
VERED WITH"
4780 PRINT "SHEETS. THERE ARE SEVERAL PA
INTINGS ON"
4790 PRINT "THE WALL OF BYGONE MEN AND W
OMEN, AND"
4800 PRINT "YOU SEE A FIREPLACE IN THE W
EST WALL."
4810 PRINT "THERE'S A DOOR IN THE EAST W
ALL, AND"
4820 PRINT "ONE IN THE WEST WALL."
4830 RETURN
4840 PRINT:PRINT "THIS APPEARS TO HAVE B
EEN A BEDROOM."
4850 PRINT "THERE IS AN OLD ROTTING BED
BESIDE THE"
4860 PRINT "THE SOUTH WALL, AND A DRESSE
R AGAINST"
4870 PRINT "THE EAST WALL. THERE ARE DOO
RS IN THE"
4880 PRINT "NORTH AND EAST WALLS."
4890 RETURN
4900 PRINT:PRINT "THIS WAS ONCE THE DINI
NG ROOM. A LARGE"
4910 PRINT "HEAVY OAKEN TABLE IS IN THE
MIDDLE OF"
4920 PRINT "THE ROOM, WITH SIX CHAIRS AR
OUND IT."
4930 PRINT "DUST COVERS THE TABLE. THERE
'S A DOOR"
4940 PRINT "IN THE WEST WALL, AND AN OPE
N PORTAL"
4950 PRINT TAB(10);"TO THE SOUTH."
4960 RETURN
4970 PRINT:PRINT "THIS IS THE LIVING ROO
M. A LONG SOFA"
4980 PRINT "SITS AGAINST THE EAST WALL;
A COFFEE"
4990 PRINT "TABLE RESTS IN FRONT OF IT.
THERE'S A"
5000 PRINT "CHAIR UNDER A LARGE WINDOW I
N THE SOUTH"
```

```
5010 PRINT "WALL, AND A PIANO RESTS BY T
HE WEST WALL"
5020 PRINT "THROUGH THE WINDOW YOU CAN S
EE A"
5030 PRINT "COBBLED PATH LEADING UP FROM
 THE ROAD"
5040 PRINT "TO THE HOUSE. THERE'S A DORO
 IN THE"
5050 PRINT "WEST WALL, AND AN OPEN PORTA
L IN THE"
5060 PRINT TAB(18);"NORTHERN WALL."
5070 RETURN
5080 PRINT:PRINT "THIS IS THE FOYER. THE
RE'S A TALL DOOR"
5090 PRINT "IN THE SOUTH WALL WHICH APPE
ARS TO BE"
5100 PRINT "NAILED SHUT. THERE ARE DOORS
 IN EACH OF"
5110 PRINT "THE OTHER WALLS. A STAIRWAY
LEADS UP"
5120 PRINT TAB(8);"AGAINST THE WEST WALL
."
5130 RETURN
5140 PRINT:PRINT "YOU'RE IN A SHORT HALL
WAY. THERE'S A"
5150 PRINT "DOOR IN THE NORTH, SOUTH AND
 WEST"
5160 PRINT "WALLS, AND AN OPEN PORTAL TO
 THE EAST."
5170 RETURN
5180 PRINT:PRINT "THIS IS AN EMPTY CLOSE
T. THE ONLY EXIT"
5190 PRINT TAB(12);"IS THE SOUTH DOOR."
5200 RETURN
5210 PRINT:PRINT "THIS ROOM WAS OBVIOUSL
Y THE KITCHEN."
5220 PRINT "THERE'S AN OLD SINK AND OVEN
 BY THE"
5230 PRINT "NORTH WALL, AND A TABLE BY T
HE SOUTHERN"
5240 PRINT "WALL. THERE ARE DOORS IN THE
 EAST AND"
5250 PRINT "SOUTH WALLS, AND A PORTAL TO
 THE WEST."
```

```
5260 RETURN
5270 PRINT:PRINT "THIS IS AN UPSTAIRS FO
YER. YOU CAN SEE"
5280 PRINT "DOORS IN EACH WALL, AND A ST
AIRCASE"
5290 PRINT TAB(8);"LEADS DOWN FROM HERE.
"
5300 RETURN
5310 PRINT:PRINT "THIS IS A BEDROOM. THE
 REMAINS OF A BED"
5320 PRINT "FILL THE SOUTHERN HALF OF TH
E ROOM AND"
5330 PRINT "A BROKEN DRESSER IS AGAINST
THE WEST"
5340 PRINT "WALL. THERE ARE DUSTY SHEETS
 DRAPED"
5350 PRINT "OVER SEVERAL CHAIRS IN THE M
IDDLE OF"
5360 PRINT "THE NORTH AND SOUTH SIDES OF
 THE HOUSE."
5380 RETURN
5390 PRINT:PRINT "THIS IS A CLOSET. THE
ROTTED REMAINS OF"
5400 PRINT "SEVERAL ITEMS OF CLOTHING HA
NG LOOSELY"
5410 PRINT "ON RUSTED HANGERS. THE ONLY
DOOR IS"
5420 PRINT TAB(12);"IN THE SOUTH WALL."
5430 RETURN
5440 PRINT:PRINT "THIS ROOM WAS APPARENT
LY THE LIBRARY."
5450 PRINT "THERE IS A BOOKCASE AGAINST
EACH WALL."
5460 PRINT "ALTHOUGH THEY ARE MOSTLY EMP
TY, A FEW"
5470 PRINT "OF THE SHELVES HAVE ONE OR T
WO BOOKS ON"
5480 PRINT "THEM. THESE BOOKS ARE VERY O
LD, AND"
5490 PRINT "CRUMBLE WHEN TOUCHED. THERE'
S A DOOR"
5500 PRINT TAB(8);"IN THE EAST WALL."
```

```
5510 RETURN
5520 PRINT:PRINT "YOU'RE NOW IN WHAT WAS
 ONCE THE STUDY."
5530 PRINT "AN ANCIENT BROKEN DESK LIES
AGAINST THE"
5540 PRINT "SOUTH WALL, AND A CHAIR REST
S NEXT TO"
5550 PRINT "IT. THERE'S A BOOKSHELF AGAI
NST THE"
5560 PRINT "EAST WALL, AND AN EMPTY CHES
T AGAINST"
5570 PRINT "THE WEST ONE. THE ONLY EXIT
IS DOOR IN"
5580 PRINT TAB(8);"THE NORTHERN WALL."
5590 RETURN
5600 PRINT:PRINT "YOU'RE AT THE FRONT OF
 A DARK,"
5610 PRINT "FOREBODING HOUSE. THE FRONT
DOOR SEEMS"
5620 PRINT "TO BE NAILED SHUT. THROUGH A
N OPEN"
5630 PRINT "WINDOW YOU CAN SEE A ROOM CO
NTAINING"
5640 PRINT "DUSTY FURNITURE, AND AN OLD,
 SCRATCHED"
5650 PRINT "PIANO. THE OTHER WINDOWS ARE
 BOARDED"
5660 PRINT "YOU CAN GO TO THE EAST OR WE
ST SIDES"
5670 PRINT TAB(12);"OF THE HOUSE."
5680 RETURN
5690 PRINT:PRINT "YOU'RE NOW AT THE EAST
 SIDE OF THE"
5700 PRINT "HOUSE. THERE'S A DOOR HERE,
WHICH SEEMS"
5710 PRINT "TO LEAD TO THE BASEMENT, BUT
 IT'S ALL"
5720 PRINT "BOARDED UP AND IMPASSABLE. T
HE WINDOWS"
5730 PRINT "ON THIS SIDE OF THE HOUSE AR
E BOARDED"
5740 PRINT "UP. YOU CAN GO TO THE NORTH
OR THE"
```

```
5750 PRINT TAB(5);"SOUTH SIDES OF THE HO
USE."
5760 RETURN
5770 PRINT:PRINT "YOU'RE NOW BEHIND THE
HOUSE, ON THE"
5780 PRINT "NORTH SIDE. ALL YOU CAN SEE
ON THIS"
5790 PRINT "SIDE ARE BOARDED-UP WINDOWS.
 YOU CAN"
5800 PRINT "GO TO THE EAST OR WEST SIDES
 OF THIS"
5810 PRINT TAB(15);"OLD HOUSE."
5820 RETURN
5830 PRINT:PRINT "YOU ARE NOW ON THE WES
T SIDE OF THE"
5840 PRINT "HOUSE. THERE'S A DOOR LEADIN
G INTO THE"
5850 PRINT "HOUSE TO THE EAST. YOU CAN A
LSO EXPLORE"
5860 PRINT "THE NORTH AND SOUTH SIDES OF
 THE HOUSE."
5870 RETURN
5880 REM *****
5890 REM DEATH
5900 PRINT:PRINT "YOU ARE NOW DEAD. BECA
USE OF YOUR"
5910 PRINT "BRAVENESS AND STRENGTH, THE
SPIRIT HAS"
5920 PRINT "DECIDED TO GIVE YOU THE HONO
R OF"
5930 PRINT "JOINING HIS MINIONS IN INHAB
ITING THIS"
5940 PRINT "HOUSE FOREVER. HAPPY HAUNTIN
G!!!"
5950 END
5960 REM *************
5970 REM CLS/SPACE OUT
5980 CLS
5990 PRINT:PRINT:PRINT
6000 RETURN
```

GOTHAM RUNNER

The world as we know it has ended. Despite the years of desperate talking, one day the big bombs started falling. In the aftermath, there were no victors, only survivors.

You are one of the survivors. Aided by a mutant pit pony you have befriended, you live a precarious life in the ruins of New York City. In GOTHAM RUNNER, you and your pony are trying to cross the 100-mile width of the city. A rabid pack of mutant dogs has got your scent, and is relentlessly pursuing you.

As you can tell from this morbid description, you have a mess of problems. And there are more, as you'll only discover when you run the program. There are several incidents which will not occur in a particular game (and no "unusual" incident will happen more than once in a run).

You'll see how simple it is to play by looking at these samples of the game in action:

```
NUMBER OF DAYS ELAPSED: 1

YOU HAVE TRAVELLED 32 MILES


ENTER YOUR COMMAND:
        1 - EAT FROM YOUR SUPPLIES
        2 - PROCEED CAUTIOUSLY
        3 - MAKE A RUN FOR IT
        4 - TAKE A REST STOP
    ? 3




NUMBER OF DAYS ELAPSED: 2

YOU HAVE TRAVELLED 38 MILES

THE DOG PACK HAS COVERED 6 MILES

IT IS 32 MILES BEHIND YOU
```

```
ENTER YOUR COMMAND:
      1 - EAT FROM YOUR SUPPLIES
      2 - PROCEED CAUTIOUSLY
      3 - MAKE A RUN FOR IT
      4 - TAKE A REST STOP
   ? 4
YOU AND YOUR MUTANT PIT PONY SPEND A
FEW FITFUL HOURS IN SLEEP...

YOU FIND A SUPPLY OF
UNCONTAMINATED FOOD!
```

```
NUMBER OF DAYS ELAPSED: 3

YOU HAVE TRAVELLED 38 MILES

THE DOG PACK HAS COVERED 13 MILES

IT IS 25 MILES BEHIND YOU


ENTER YOUR COMMAND:
      1 - EAT FROM YOUR SUPPLIES
      2 - PROCEED CAUTIOUSLY
      3 - MAKE A RUN FOR IT
      4 - TAKE A REST STOP
   ? 1
```

Later in the same run:

```
YOU HAVE TRAVELLED 66 MILES

THE DOG PACK HAS COVERED 57 MILES

IT IS 9 MILES BEHIND YOU


YOU HEAR THE DREADFUL SOUND OF A
RATTLESNAKE...IT STRIKES...BUT AT THE
SAME TIME YOU SWING OUT AT IT WITH
        YOUR CLUB...
```

IN THE CONFUSION, YOU DO NOT KNOW IF
HAS BITTEN YOU...OR WHETHER YOU HIT
IT BEFORE IT COULD STRIKE...

YOU ARE GETTING VERY HUNGRY...

ENTER YOUR COMMAND:
        1 - EAT FROM YOUR SUPPLIES
        2 - PROCEED CAUTIOUSLY
        3 - MAKE A RUN FOR IT
        4 - TAKE A REST STOP
    ? 1

NUMBER OF DAYS ELAPSED: 11

YOU HAVE TRAVELLED 66 MILES

THE DOG PACK HAS COVERED 65 MILES

IT IS 1 MILES BEHIND YOU

YOU SHOULD LOOK FOR NEW FOOD SUPPLIES

ENTER YOUR COMMAND:
        1 - EAT FROM YOUR SUPPLIES
        2 - PROCEED CAUTIOUSLY
        3 - MAKE A RUN FOR IT
        4 - TAKE A REST STOP
    ? 3
_____

NUMBER OF DAYS ELAPSED: 12

YOU HAVE TRAVELLED 76 MILES

THE DOG PACK HAS COVERED 72 MILES

IT IS 4 MILES BEHIND YOU

THE RUBBLE SHIFTS BENEATH YOUR FEET...
YOU FIND YOURSELF SLIPPING DOWN...
AND SLOWLY DRAG YOURSELF, GREATLY
WEAKENED, BACK TO STREET LEVEL...

YOU SHOULD LOOK FOR NEW FOOD SUPPLIES

ENTER YOUR COMMAND:
        1 - EAT FROM YOUR SUPPLIES
        2 - PROCEED CAUTIOUSLY
        3 - MAKE A RUN FOR IT
        4 - TAKE A REST STOP
    ? 2

NUMBER OF DAYS ELAPSED: 13

YOU HAVE TRAVELLED 82 MILES

THE DOG PACK HAS COVERED 80 MILES

IT IS 2 MILES BEHIND YOU

YOU SHOULD LOOK FOR NEW FOOD SUPPLIES

YOU ARE GETTING VERY HUNGRY...

ENTER YOUR COMMAND:
        1 - EAT FROM YOUR SUPPLIES
        2 - PROCEED CAUTIOUSLY
        3 - MAKE A RUN FOR IT
        4 - TAKE A REST STOP
    ? 1
    _____

NUMBER OF DAYS ELAPSED: 14

YOU HAVE TRAVELLED 82 MILES

THE DOG PACK HAS GOT YOU

When you're ready to run across the ruins, enter and run this program (written in conjunction with Ian Turtle, a British student):

```
10 REM GOTHAM RUNNER
20 GOSUB 590:REM INITIALISE
30 M=M+1
40 B=B-1
50 IF B>0 THEN 110
60 PRINT "YOU SHOULD HAVE EATEN. YOU SLU
MP DOWN                    AND DIE..."
70 PRINT:PRINT "THE DOG PACK SNIFFS THE
AIR...AND               ADVANCES RAPIDLY..."

80 END
90 REM *********
100 REM MAIN CYCLE
110 CLS
120 PRINT
130 PRINT "NUMBER OF DAYS ELAPSED:"M
140 PRINT:PRINT "YOU HAVE TRAVELLED"T"MI
LES":PRINT
150 IF N=0 THEN 190
160 IF T-N<1 THEN PRINT "THE DOG PACK HA
S GOT YOU":END
170 PRINT "THE DOG PACK HAS COVERED"N"MI
LES"
180 PRINT:PRINT "IT IS"T-N"MILES BEHIND
YOU"
190 PRINT:PRINT
200 IF RND(1)>.8 THEN GOSUB 680
210 IF D<2 THEN PRINT "YOU SHOULD LOOK F
OR NEW FOOD SUPPLIES":PRINT
220 IF B<2 THEN PRINT "YOU ARE GETTING V
ERY HUNGRY...":PRINT
230 PRINT "ENTER YOUR COMMAND:"
240 PRINT "          1 - EAT FROM YOUR SUPPL
IES"
250 PRINT "          2 - PROCEED CAUTIOUSLY"

260 PRINT "          3 - MAKE A RUN FOR IT"
270 PRINT "          4 - TAKE A REST STOP"
280 INPUT "   ";Z
290 IF Z<1 OR Z>4 THEN 280
```

```
300  ON Z GOTO 320,370,400,440
310  REM ****************
320  IF D=0 THEN PRINT:PRINT "YOU HAVE NO
 FOOD LEFT":GOTO 230
330  B=5
340  D=D-1
350  REM ****************
360  GOTO 460
370  C=C+2
380  T=T+4+INT(RND(1)*3)
390  GOTO 460
400  C=C+3
410  T=T+6+INT(RND(1)*5)
420  REM ****************
430  GOTO 460
440  C=0
450  PRINT "YOU AND YOUR MUTANT PIT PONY
SPEND A    FEW FITFUL HOURS IN SLEEP..."

460  IF C>9 THEN PRINT "YOUR PONY DIES. Y
OU SHOULD HAVE RESTED   IT MORE.":END
470  IF INT(RND(1)*12)<>6 THEN 520
480  REM ****************
490  PRINT:PRINT "YOU FIND A SUPPLY OF
                 UNCONTAMINATED FOOD!"
500  C=C-5
510  D=3
520  N=N+5+INT(RND(1)*4)
530  IF T<100 THEN 550
540  PRINT "YOU HAVE TRAVERSED THE RUINED
 CITY AND       ESCAPED. WELL DONE!":END
550  PRINT "-----------------------------
------"
560  FOR J=1 TO 1200:NEXT J
570  GOTO 30
580  REM ****************
590  REM INITIALISATION
600  CLS
610  DIM H(6)
620  RANDOMIZE VAL(RIGHT$(TIME$,2))
630  T=INT(RND(1)*20)+21
640  M=0:C=0:N=0
650  B=5:D=3
660  RETURN
```

```
670 REM *********
680 REM INCIDENTS
690 K=0
700 X=INT(RND(1)*6)+1
710 IF K=6 THEN RETURN
720 IF H(X)=1 THEN K=K+1:GOTO 700
730 H(X)=1
740 ON X GOSUB 800,870,930,1000,1100,119
0
750 FOR X=1 TO 1500:NEXT X
760 B=B-INT(RND(1)*2)
770 PRINT
780 RETURN
790 REM ************
800 REM MUTANT HUMAN
810 PRINT "AS YOU STARE IN HORROR, A HUM
AN BEING"
820 PRINT "DRESSED IN ROTTEN RAGS STUMBL
ES TOWARDS"
830 PRINT "YOU...AND EMBRACES YOU. HE IS
 LETHALLY"
840 PRINT "CHARGED WITH RADIATION..."
850 RETURN
860 REM *****
870 REM STORM
880 PRINT "A MASSIVE WIND STORM SWEEPS D
OWN THE"
890 PRINT "AVENUE...YOU AND YOUR PONY DA
SH TO"
900 PRINT "ONE SIDE IN A VAIN BID TO FIN
D SHELTER"
910 RETURN
920 REM ******
930 REM BURIED
940 PRINT "THE RUBBLE SHIFTS BENEATH YOU
R FEET..."
950 PRINT "YOU FIND YOURSELF SLIPPING DO
WN..."
960 PRINT "AND SLOWLY DRAG YOURSELF, GRE
ATLY"
970 PRINT "WEAKENED, BACK TO STREET LEVE
L..."
980 RETURN
990 REM *****
```

```
1000 REM SNAKE
1010 PRINT "YOU HEAR THE DREADFUL SOUND
OF A"
1020 PRINT "RATTLESNAKE...IT STRIKES...B
UT AT THE"
1030 PRINT "SAME TIME YOU SWING OUT AT I
T WITH"
1040 PRINT TAB(8);"YOUR CLUB..."
1050 PRINT "IN THE CONFUSION, YOU DO NOT
 KNOW IF"
1060 PRINT "HAS BITTEN YOU...OR WHETHER
YOU HIT"
1070 PRINT "IT BEFORE IT COULD STRIKE...
"
1080 RETURN
1090 REM ***********
1100 REM PHOSPHORUS ATTACK
1110 PRINT "YOU HEAR THE DREADED SCREAMI
NG OF NINE"
1120 PRINT "CRAZED MEMBERS OF THE PHOSPH
OR GANG..."
1130 PRINT "THEY ATTACK...AND AS YOU WHE
EL AWAY ON"
1140 PRINT "YOUR LOYAL PIT PONY, THEY TH
ROW A"
1150 PRINT "POWDERED WHITE PHOSPHORUS BO
MB AT YOU."
1160 PRINT "IT EXPLODES WITH A FIERCE WH
ITE GLOW,"
1170 PRINT "AND FOR A MOMENT OR TWO YOU
ARE BLINDED"
1180 RETURN
1190 REM MUTANT PUMA
1200 PRINT "YOU HEAR A SNARL BEHIND YOU,
 AND SEE"
1210 PRINT "A BLACK MUTANT PUMA READY TO
 LEAP.."
1220 PRINT "YOU DIG YOUR HEELS INTO YOUR
 PONY'S"
1230 PRINT "SIDES...AND ATTEMPT TO RUN A
WAY FROM"
1240 PRINT "IT....WILL YOU SUCCEED?"
1250 FOR X=1 TO 1000:NEXT X
1260 IF RND(1)>.7 THEN 1290
```

```
1270 PRINT TAB(4);"YOU SEEM TO HAVE REAC
HED SAFETY"
1280 RETURN
1290 PRINT "THE PUMA LEAPS...AND YOUR PO
NY GOES"
1300 PRINT "DOWN...THE PUMA'S JAWS TIGHT
EN AROUND"
1310 PRINT "YOUR LEGS AS YOU KICK WILDLY
..."
1320 PRINT "YOU KNOW THIS IS THE END..."

1330 END
```

ORBITAL PILOT

If you tend to find other Adventure programs too taxing for your brain, you're sure to enjoy running ORBITAL PILOT. There's no complex vocabulary to master, no haunted house or deserted island to map. Instead, you simply choose between the two alternative courses of action which the program presents to you.

Here's ORBITAL PILOT in action. So as not to spoil the program for you, I'm not showing you the shortest (and probably least interesting) run:

```
YOU HAVE SCORED 734 POINTS


YOU ARE NOW IN THE FINAL SECONDS OF
TAKEOFF. DO YOU WISH TO ABORT THE
MISSION (1) OR CONTINUE WITH THE
            FLIGHT (2)?
1
YOU HAVE SCORED 635 POINTS


YOU ABORT THE FLIGHT, AND ARE FORCED
TO RESIGN FROM THE SPACE ACADEMY AS
A RESULT OF YOUR COWARDLY ACTION.
```

Note that the longer you take to make a decision, the fewer points you'll score. The listing is waiting for you, when you want to become an ORBITAL PILOT:

```
10 REM ORBITAL PILOT
20 CLS
30 NUM=367
40 GOSUB 780
50 PRINT "YOU ARE NOW IN THE FINAL SECON
DS OF"
60 PRINT "TAKEOFF. DO YOU WISH TO ABORT
THE"
```

```
70 PRINT "MISSION (1) OR CONTINUE WITH T
HE"
80 PRINT TAB(12);"FLIGHT (2)?"
90 GOSUB 690
100 IF A$="2" THEN 150
110 PRINT "YOU ABORT THE FLIGHT, AND ARE
 FORCED"
120 PRINT "TO RESIGN FROM THE SPACE ACAD
EMY AS"
130 PRINT "A RESULT OF YOUR COWARDLY ACT
ION."
140 END
150 PRINT "YOU ARE NOW WAY UP IN THE COS
MOS...."
160 GOSUB 780
170 PRINT "DO YOU WANT TO GO INTO EARTH
ORBIT (1),"
180 PRINT "OR CONTINUE INTO THE SOLAR SY
STEM (2)?"
190 GOSUB 690
200 IF A$="2" THEN 360
210 PRINT "YOUR ENERGY LEVEL IS LOW. DO
YOU WANT"
220 PRINT "TO DIM THE LIGHTS TO SAVE POW
ER (1),"
230 PRINT "OR SHUT DOWN THE HEATING (2)?
"
240 GOSUB 690
250 IF A$="2" THEN 330
260 PRINT "YOU CAN'T SEE YOUR NAVIGATION
 CHART."
270 GOSUB 780
280 PRINT "WILL YOU TURN RIGHT (1) OR LE
FT (2)?"
290 GOSUB 690
300 IF A$="2" THEN 610
310 PRINT "YOU CRASHED INTO AN ASTEROID"
320 END
330 PRINT "IT IS VERY, VERY COLD HERE, S
O YOU"
340 PRINT TAB(12);"FREEZE TO DEATH"
350 END
360 PRINT TAB(RND(1)*8);"YOU ARE WAY OUT
 IN SPACE"
```

```
370 GOSUB 780
380 PRINT "WILL YOU HEAD FOR MARS(1) OR
VENUS (2)?"
390 GOSUB 690
400 IF A$="2" THEN 480
410 PRINT "MARTIANS CAPTURE YOU. WILL YO
U RUN FOR"
420 PRINT "SAFETY (1) OR REASON WITH THE
M (2)?"
430 GOSUB 690
440 IF A$="1" THEN PRINT "YOU RUN OUTSID
E":GOTO 330
450 PRINT "YOU ARE SUCCESSFUL":GOSUB 780
460 PRINT "YOUR FLIGHT CONTINUES":GOSUB
780
470 GOTO 210
480 PRINT "IT IS VERY WARM HERE...":PRIN
T
490 PRINT "YOU ARE LOW ON WATER. WILL YO
U BUY"
500 PRINT "FROM THE VENUSIANS (1) OR HEA
D BACK TO"
510 PRINT TAB(10);"GOOD OLD EARTH (2)?"
520 GOSUB 690
530 IF A$="2" THEN 610
540 PRINT "YOUR WATER SUPPLIES HAVE BEEN
 RENEWED."
550 PRINT "YOU ARE BACK IN SPACE. DO YOU
 WANT TO"
560 PRINT "ORBIT THE EARTH (1) OR CONTIN
UE ON"
570 PRINT TAB(7);"IN THE SOLAR SYSTEM (2
)?"
580 GOSUB 690
590 IF A$="1" THEN 210
600 GOTO 360
610 PRINT "YOU LAND SAFELY ON EARTH AND
THE"
620 PRINT "PRESS ACCLAIM YOU AS A HERO.
YOUR"
630 PRINT "INVITATION TO A WHITE HOUSE R
ECEPTION"
640 PRINT "IN YOUR HONOR SHOULD ARRIVE S
HORTLY..."
```

```
650 FOR T=1 TO 2000:NEXT T
660 GOSUB 780
670 END
680 REM *****
690 REM INPUT
700 IF INKEY$<>"" THEN 700
710 A$=INKEY$
720 NUM=NUM-1.2
730 IF A$="" THEN 710
740 IF A$<>"1" AND A$<>"2" THEN 730
750 GOSUB 780
760 RETURN
770 REM **************
780 REM DELAY/PRINTOUT
790 NUM=NUM+367
800 FOR J=1 TO 30
810 FOR A=1 TO 100:NEXT A
820 PRINT
830 IF J=15 AND NUM>0 THEN PRINT "YOU HA
VE SCORED"INT(NUM)"POINTS"
840 NEXT J
850 RETURN
```

IT'S A MAD, MAD WORLD

You were a fool to escape from the lunatic asylum. After all, life was good there, with made-to-measure straightjackets and congenial company. In this Adventure program, you've escaped into the big, wide world, and you discover that life can be pretty tough on the outside.

You'll be confronted with a number of odd situations in this game. There are enough strange things happening to make you even more unbalanced. You have to try and solve a few of the problems in order to be able to return to the security of your comfortable, padded cell.

As you can see from this short sample run, you are faced with two choices at each point in the game. The choice you make determines what will happen next:

```
        IT'S A MAD, MAD WORLD


     YOU HAVE CRASHED ON AN ISLAND


   DO YOU:


   1. HOBBLE ALONG THE BEACH
   2. STAY BY THE HANGLIDER


                1




      A ROARING TIGER APPEARS


   DO YOU:


   1. RUN INTO THE FOREST
   2. JUMP INTO THE WATER


                2
```

```
          YOU SEE A PIRATE SHIP

          DO YOU:

          1. GO TO SHORE
          2. BOARD THE SHIP


                     2



          YOU BECOME A PIRATE FOR YEARS BEFORE YOU
            ARE CAST ADRIFT IN A BATH

          DO YOU:

          1. DO YOU WISH TO PRAY
          2. PADDLE FOR SHORE


                     1



            A GENIE APPEARS AND GIVES YOU A WISH

          DO YOU:

          1. WISH TO GO HOME
          2. WISH TO BE FILTHY RICH


                     2
```

It's interesting to see that the program is nearly all data statements. A similar outline could easily be used to produce a game of your own. I suggest that—for maximum enjoyment—the program should be typed in by someone who will not be playing the game.

```
10  REM IT'S A MAD, MAD WORLD
20  GOSUB 380:REM INITIALISE
30  L=1
40  CLS
50  PRINT TAB(6);"IT'S A MAD, MAD WORLD"
60  PRINT:PRINT " ";W$(L)
```

```
70 REM ***************
80 PRINT
90 IF L=21 THEN L=20
100 IF W(L)<>1 THEN 170
110 PRINT TAB(2);"YOU WERE NOT CRAZY ENO
UGH TO WIN THIS"
120 PRINT "ADVENTURE. IF YOU WANT SOME A
DVICE, TRY"
130 PRINT TAB(3);"WRITING ADVENTURE GAME
S..."
140 PRINT:PRINT TAB(6);"...THAT WILL SEN
D YOU CRAZY!"
150 END
160 REM ***************
170 IF W(L)<>2 THEN 220
180 PRINT "WELL DONE. YOU MUST BE MAD TO
 FINISH"
190 PRINT TAB(9);"THIS ADVENTURE!":PRINT

200 END
210 REM ***************
220 PRINT "DO YOU:"
230 PRINT
240 PRINT "1. ";A$(L)
250 PRINT
260 PRINT "2. ";B$(L)
270 IF INKEY$<>"" THEN 270
280 N$=INKEY$
290 IF N$="" THEN 280
300 IF N$="1" THEN L=A(L):GOTO 40
310 IF N$="2" THEN L=B(L):GOTO 40
320 PRINT
330 PRINT TAB(8);"NO SUCH CHOICE, FOOL!"
340 GOTO 270
350 END
360 REM **********
370 REM INITIALISE
380 CLS
390 DIM W$(25),A$(25),B$(25)
400 DIM W(25),A(25),B(25)
410 FOR X=1 TO 25
420 READ W$(X),W(X)
430 READ A$(X),A(X)
440 READ B$(X),B(X)
```

```
450 NEXT X
460 RETURN
470 REM ****
480 REM DATA
490 DATA "YOU HAVE CRASHED ON AN ISLAND"
,0
500 DATA "HOBBLE ALONG THE BEACH",2,"STA
Y BY THE HANGLIDER",10
510 DATA "A ROARING TIGER APPEARS",0
520 DATA "RUN INTO THE FOREST",3,"JUMP I
NTO THE WATER",11
530 DATA "YOU SEE A DARK CAVE",0
540 DATA "ENTER IT",4,"KEEP GOING INLAND
",7
550 DATA "YOU SEE A BAG OF GOLD",0
560 DATA "LEAVE IT",5,"TAKE IT",6
570 DATA "A TROLL COMES BY AND TAKES THE
 GOLD.    YOUR CHANCE TO BE RICH GOES!"
580 DATA 0,"CRY FOR HELP",10,"PRACTICE B
EING A LAWNMOWER",25
590 DATA "A MONSTER APPEARS, YOU CANNOT
RUN AWAY  AS THE GOLD IS TOO HEAVY..."
600 DATA 1,0,0,0,0
610 DATA "YOU SEE A BOTTLE OF WINE",0
620 DATA "DRINK IT",8,"RUB THE BOTTLE",9

630 DATA "YOU FEEL RATHER HAPPY, PINK DI
SKDRIVES DANCE BEFORE YOUR EYES"
640 DATA 1,0,0,0,0
650 DATA "A GENIE APPEARS AND GIVES YOU
A WISH",0
660 DATA "WISH TO GO HOME",25,"WISH TO B
E FILTHY RICH",5
670 DATA "A SPACE CRAFT LANDS",0
680 DATA "ENTER IT",12,"JUMP IN THE WATE
R",11
690 DATA "YOU SEE A PIRATE SHIP",0
700 DATA "GO TO SHORE",3,"BOARD THE SHIP
",15
710 DATA "THE ALIENS WANT TO CONQUER EAR
TH",0
720 DATA "HELP THEM",14,"FIGHT THEM",13
730 DATA "FOOLISH PERSON. YOU ARE KILLED
 IN THE    CONFLICT",1,0,0,0,0
```

```
740 DATA "A HARD BATTLE BUT YOU WON. YOU
 ARE      STANDING IN THE BATTLE FIELD"
750 DATA 0,"SURVEY THE BATTLEFIELD",16,"
REST AND DO NOTHING",14
760 DATA "YOU BECOME A PIRATE FOR YEARS
BEFORE YOU ARE CAST ADRIFT IN A BATH"
770 DATA 0,"DO YOU WISH TO PRAY",9,"PADD
LE FOR SHORE",20
780 DATA "A WOUNDED HUMAN LIMPS TOWARDS
YOU",0
790 DATA "KILL HIM",18,"DRESS HIS WOUNDS
",17
800 DATA "HE TURNS OUT TO BE THE KING OF
 THE      COUNTRY YOU DEFEATED",0
810 DATA "FLEE FROM HIM",3,"ASK FOR HIS
FORGIVENESS",19
820 DATA "MISTAKE IN MESSAGE! SHOULD HAV
E READ 'HUMANOID', AN ALIEN ALLY"
830 DATA 1,0,0,0,0
840 DATA "YOU GET HIS FORGIVENESS AND HE
 SENDS YOU BACK TO YOUR HOME",2,0,0,0,0
850 DATA "YOU ARE IN A BATH. THERE IS A
RUBBER   DUCK AND A SPONGE WITH YOU"
860 DATA 0,"STAY IN THE WARM BATH",21,"G
ET OUT AND DRY YOURSELF",22
870 DATA "I DON'T BLAME YOU AT ALL...BUT
 YOU MUST DO SOMETHING",20,0,0,0,0
880 DATA "YOU'RE OUT AND DRY. DO YOU WAN
T TO TAKE THE DUCKIE WITH YOU?"
890 DATA 0,"OH YES PLEASE",23,"NO THANK
YOU",24
900 DATA "CARRYING THE SACRED DUCK IS PU
NISHABLE  BY DEATH HERE!",1,0,0,0,0
910 DATA "YOU ARE IN A CLEARING IN A FOR
EST",0
920 DATA "GO TO THE EAST, BACK TO THE CA
VE",3
930 DATA "MAKE FOR THE PORT TO THE WEST"
,11
940 DATA "YOU'RE BACK AT HOME IN YOUR OW
N PADDED  CELL; THE JACKET FITS SNUGLY"
950 DATA 2,0,0,0,0
```

OFF THE WALL ADVENTURE

This Adventure really is off the wall! Your computer and its random number generator have got together to cook up the world's least logical dungeon labyrinth. Don't bother trying to map it. Save your energy for the serious business of survival.

You start the game at a mysterious crossroad, deep within the cave system:

```
YOU REACH A CROSSWAY. YOU CAN GO NORTH,
SOUTH, WEST OR EAST
        ENTER N, S, W, OR E? W

YOU'RE AT AN ILLUSIONARY WALL
DO YOU WANT TO GO THROUGH IT (Y OR N)? Y
```

You start the game with a strength rating of 100. It falls each time you are injured, and the game ends when it falls to zero. There is no time to enjoy the scenery in our Adventure environment, as the monsters come on thick and strong:

```
YOUR STRENGTH IS 100

YOU'RE IN A DESERTED CHAPEL...

LOOK OUT...

A GOBLIN ATTACKS YOU!

DO YOU WANT TO FIGHT OR RUN (F OR R)? F
```

YOU MANAGE TO KILL IT...

YOU FIND A LEAD PIECE
WITH A STREET VALUE OF $ 5
_____

_____

_____

YOUR STRENGTH IS 100

YOU'RE IN A ROCKY DUNGEON...

YOU'RE CARRYING TREASURE WORTH $ 5

LOOK OUT...

A DRAGON ATTACKS YOU!

DO YOU WANT TO FIGHT OR RUN (F OR R)? R

AND AWAY YOU RUN...

THE MONSTER CHASES YOU...

BUT YOU MANAGE TO GET AWAY...

YOU REACH A CROSSWAY. YOU CAN GO NORTH,
SOUTH, WEST OR EAST
            ENTER N, S, W, OR E? S

YOU'RE WALKING THROUGH A LONG TWISTY,
TURNING PASSAGEWAY...

YOU'VE FALLEN INTO
    A CONCEALED PIT
YOU'VE BEEN INJURED...

YOU'RE AT A NATURAL BREAK IN THE ROCK
DO YOU WANT TO GO THROUGH IT (Y OR N)? N

You soon learn how foolish it is to leap into a battle with the strange creatures you find:

```
YOUR STRENGTH IS 10

YOU'RE IN A DESERTED CHAPEL...

YOU'RE CARRYING TREASURE WORTH $ 22

LOOK OUT...

A WARLORD ATTACKS YOU!

DO YOU WANT TO FIGHT OR RUN (F OR R)? Y
? F

YOU'VE BEEN INJURED...

YOU ARE DEAD, EXPLORER!

YOU KILLED 3 MONSTERS...

AND FOUND TREASURE WORTH $ 22
```

Here's the listing of the program that will let you visit this strange dungeon. (It was written by Garry Wilson, who lives in Canberra, the capital of Australia—and modified extensively by me.)

```
10 REM OFF THE WALL ADVENTURE
20 GOSUB 820:REM INITIALISE
30 GOTO 500
40 GOSUB 770
50 IF LIVES<1 THEN 680
60 PRINT:PRINT "YOUR STRENGTH IS"LIVES*1
0:PRINT
70 Z=INT(RND(1)*6)+1
80 PRINT "YOU'RE IN A ";R$(Z)
90 M=INT(RND(1)*6)+1
100 GOSUB 770
110 IF E>1 THEN PRINT "YOU'RE CARRYING T
REASURE WORTH $"E
120 PRINT:PRINT "LOOK OUT..."
```

```
130 GOSUB 770
140 PRINT "A";A$(M);" ATTACKS YOU!"
150 IF M=2 OR M=5 OR M=6 THEN C=C+1
160 GOTO 240
170 GOSUB 770
180 K=INT(RND(1)*6)+1
190 PRINT "YOU'RE AT A";E$(K):PRINT "DO
YOU WANT TO GO THROUGH IT (Y OR N)";
200 INPUT D$
210 IF D$<>"N" AND D$<>"Y" THEN 200
220 IF D$="Y" THEN 50
230 GOTO 360
240 GOSUB 770
250 PRINT "DO YOU WANT TO FIGHT OR RUN (
F OR R)";
260 INPUT B$
270 IF B$<>"F" AND B$<>"R" THEN 260
280 GOSUB 770
290 IF B$="F" THEN 440
300 PRINT "AND AWAY YOU RUN..."
310 GOSUB 770
320 PRINT "THE MONSTER CHASES YOU..."
330 GOSUB 770
340 PRINT "BUT YOU MANAGE TO GET AWAY...
"
350 GOTO 500
360 GOSUB 770
370 PRINT "YOU'RE WALKING THROUGH A LONG
 TWISTY,   TURNING PASSAGEWAY..."
380 GOSUB 770
390 P=INT(RND(1)*3)+1
400 Q=INT(RND(1)*6)+1
410 IF P=1 THEN PRINT "YOU'VE FALLEN INT
O":PRINT TAB(4);"A";P$(Q):LIVES=LIVES-1
420 IF P=2 THEN 170
430 IF P=3 THEN 500
440 IF M=1 OR M=3 OR M=4 THEN LIVES=LIVE
S-1:PRINT "YOU'VE BEEN INJURED..."
450 IF M=2 OR M=5 OR M=6 THEN PRINT "YOU
 MANAGE TO KILL IT...":GOTO 570
460 IF LIVES<1 THEN 680
470 IF M=2 OR M=5 OR M=6 THEN C=C+1
480 GOTO 170
490 REM **********
```

```
500 GOSUB 770
510 PRINT "YOU REACH A CROSSWAY. YOU CAN
 GO NORTH, SOUTH, WEST OR EAST"
520 PRINT TAB(9);"ENTER N, S, W, OR E";
530 INPUT D$
540 IF D$="S" THEN 90
550 IF D$="N" THEN 360
560 IF D$="W" THEN 170
570 T=INT(RND(1)*6)+1
580 GOSUB 770
590 PRINT "YOU FIND A";T$(T);" PIECE"
600 PRINT "WITH A STREET VALUE OF $"T
610 E=E+T
620 FOR J=1 TO 3
630 PRINT "--------------------------------
------"
640 GOSUB 770
650 NEXT J
660 GOTO 40
670 REM ******************
680 GOSUB 770
690 PRINT "YOU ARE DEAD, EXPLORER!"
700 GOSUB 770
710 PRINT "YOU KILLED"C"MONSTERS..."
720 GOSUB 770
730 PRINT "AND FOUND TREASURE WORTH $"E
740 GOSUB 770
750 END
760 REM *****
770 REM DELAY
780 FOR U=1 TO 1000:NEXT U
790 PRINT
800 RETURN
810 REM *************
820 REM INITIALISATION
830 CLS
840 RANDOMIZE VAL(RIGHT$(TIME$,2))
850 DIM A$(6),T$(6),P$(6),E$(6),T(6)
860 FOR M=1 TO 6
870 READ A$(M)
880 NEXT M
890 FOR M=1 TO 6
900 READ T$(M),W(M)
910 NEXT M
```

```
920 FOR M=1 TO 6
930 READ R$(M),P$(M),E$(M)
940 NEXT M
950 LIVES=10:C=0
960 RETURN
970 REM ****
980 REM DATA
990 REM NOTE SPACES WITHIN QUOTE MARKS
1000 DATA " DRAGON"," GOBLIN"," WARLORD"

1010 DATA "N ORC"," WRAITH","N ELF"
1020 DATA "N IRON",50," GOLD",1000," SIL
VER",350
1030 DATA " COPPER",500," LEAD",200," ME
RCURY",4050
1040 DATA "DANK, DARK CAVE..."
1050 DATA "N OPEN PIT"
1060 DATA "N OPEN DOORWAY"
1070 DATA "GOBLIN BARRACKS"
1080 DATA " CONCEALED PIT"
1090 DATA "N ARCHWAY DOOR"
1100 DATA "DESERTED CHAPEL..."
1110 DATA " STONE STAIRWELL"
1120 DATA "N ILLUSIONARY WALL"
1130 DATA "FORMER GUARD ROOM..."
1140 DATA " HIDDEN TRAPDOOR"
1150 DATA " NATURAL BREAK IN THE ROCK"
1160 DATA "ROCKY DUNGEON..."
1170 DATA " SHIFTING, TWISTY MIST..."
1180 DATA " RUBBLE-FILLED SINKHOLE"
1190 DATA "LIMESTONE CAVE"
1200 DATA " SUBMERGED TOMB"
1210 DATA " WRAITHLIKE FOG..."
```

.

Discovering the Real You

Aren't computers wonderful! After saving the world from aliens, and fighting with a dragon or two, you can combine the world's newest technology with some of its elder wisdom, to find out who you really are.

THE CELTIC TAROT will give you "guidance," using the Major Arcana of the deck of Tarot cards, in reply to any question you ask. THE BOOK OF CHANGES program allows you to consult the *I Ching* without having to know how to cast the yarrow stalks which are traditionally used for this purpose. Once you've got a line on your current state of mind, you can see what the immediate future has to hold by interpreting the graphic output of our biorhythm program GOLDEN DAYS. And finally, to help you integrate all this information, the YEAR OF THE MONKEY program will tell you how your personality has been shaped by the Chinese year in which you were born.

THE CELTIC TAROT

Many experts believe that Tarot cards—widely used in fortune-telling—appeared at the end of the 1300's in medieval France. "Whether the cards came from India, Egypt, or China . . . is of little moment," writes Frank Lind (*How to Understand the Tarot*, The Aquarian Press, Wellingborough, UK, 1979). "What is of far more importance . . . is the antiquity of much of their symbolism" (pp. 7–8). The standard playing cards we use for games evolved from the original Tarot decks.

The 78 cards in the Tarot are divided into the Major and Minor Arcana. Fifty-six of the cards form four suits (Cups, Swords, Pentacles and Wands). The fourteenth card in each suit is an additional court card, the knight, which was dropped when the ordinary deck of cards was formed. The 56 cards of the Minor Arcana have their own esoteric meanings and are often used in divination.

However, it is the Major Arcana (sometimes known as the "greater trumps") which is the real key to the Tarot. Our program concentrates on the twenty-two cards in this arcana. Occultists who use the Tarot claim the Major Arcana is like a mirror held up to the life of a man, showing his grief and happiness, his plans and their fulfillment or destruction, his friendships, loves and hatreds. Each card is many-sided, like a well-cut diamond. And each facet holds an insight.

There is no need for you to learn what each card signifies in order to use our program. Nor do you have to buy a Tarot deck, although you may well want to after running our program a few times.

There are many methods of using and interpreting the Tarot. Our program uses a pattern known as the "Celtic Cross." The "Celtic Cross" was chosen because (according to *Predicting the Future*, The Diagram Group, Ballantine Books, New York, 1983; p. 56) it is "probably the most useful and versatile of all tarot spreads."

The program does most of the work, leaving the finer points of interpretation up to you:

```
ENTER YOUR QUESTION OR CONCERN NOW
AND I WILL USE THE CELTIC CROSS SPREAD
IN AN ATTEMPT TO GIVE SOME GUIDANCE...
```

? IS THERE WISDOM IN STANDING FOR
    CLASS PRESIDENT NEXT TERM

    PLEASE STAND BY....

IS THERE WISDOM IN STANDING FOR
    CLASS PRESIDENT NEXT TERM?

            ... LET ME SEE...

****
THIS IS WHERE YOU STAND NOW...

JUDGEMENT: A PERIOD OF FRESH BEGINNINGS
AND ASSESSING VALUES...
****

****
THIS CARD IS FOR THE NEAR FUTURE...

THE FOOL: NEW BEGINNINGS AND CHALLENGES
****

****
AND THIS ONE IS WHAT YOU MIGHT DO...

THE TOWER: UNFORTUNATE INDICATIONS,
REGROWTH CAN BE EXPECTED..
****

****
THIS IS SOMETHING IN THE PAST THAT IS
RELEVANT TO YOUR QUESTION...

THE WORLD: COMPLETION OF A DIFFICULT
TASK, ATTAINMENT OF A GOAL
****

****
THIS CARD RELATES TO A MORE RECENT PAST
EVENT...

THE CHARIOT: A GOOD STAGE IN YOUR LIFE
ATTAINED, TRAVEL LIKELY...
****

```
****************************************
NOW, THIS CARD INDICATES YOUR POSITION
IN SIX MONTHS OR SO...
        ------------
DEATH: FRESH AWARENESS WILL COME FROM
TEMPORARY SETBACKS...
****************************************


****************************************
IN YOUR LIFE OR WORK, THIS MOST CLOSELY
INFLUENCES YOU...
        ------------
ANGEL OF TIME (TEMPERANCE): MODERATION
DEMANDED; WISE CHOICE SEEN
****************************************


****************************************
THIS CARD REPRESENTS SOCIAL INFLUENCES
ON YOUR QUERY...
        ------------
JUSTICE: BALANCE WILL BE REACHED,
DUE REWARD LIKELY...
****************************************


****************************************
YOUR HOPES AND FEARS ARE REFLECTED IN
THIS CARD...
        ------------
HANGED MAN: CAST AWAY MATERIAL VALUES,
SACRIFICE REWARDED...
****************************************


****************************************
AND, FROM THESE, IN REPLY, THIS CARD
POINTS TOWARDS AN ANSWER...
        ------------
THE SUN: A GOAL WITHIN REACH, LIGHT
AFTER DARKNESS...
****************************************
```

As with all "fortune-telling," the final decision on whether or not to act in response to information you're given rests with you. Run this program a few times, and then see if it leads to any valuable insights:

```
10 REM THE CELTIC TAROT
20 GOSUB 380:REM INITIALISE
30 GOSUB 250:REM ENTER QUESTION
40 GOSUB 530
50 PRINT R$;"?":PRINT
60 PRINT TAB(16);"... LET ME SEE..."
70 GOSUB 530:GOSUB 530
80 REM *******
90 REM PREDICT
100 FOR J=1 TO 10
110 GOSUB 510:REM DELAY/SPACE OUT
120 PRINT "********************************
*********"
130 PRINT A$(J)
140 GOSUB 530
150 X=INT(RND(1)*22):IF H(X)=1 THEN 150
160 H(X)=1
170 PRINT TAB(13);"-----------"
180 PRINT B$(X)
190 PRINT "********************************
*********"
200 GOSUB 530
210 NEXT J
220 GOSUB 510
230 END
240 REM **************
250 REM ENTER QUESTION
260 GOSUB 510
270 PRINT "ENTER YOUR QUESTION OR CONCER
N NOW"
280 PRINT "AND I WILL USE THE CELTIC CRO
SS SPREAD"
290 PRINT "IN AN ATTEMPT TO GIVE SOME GU
IDANCE..."
300 GOSUB 510
310 INPUT R$
320 GOSUB 510
330 PRINT TAB(4);"PLEASE STAND BY...."
340 GOSUB 530
350 CLS
360 RETURN
370 REM *********
380 REM INITIALISE
390 CLS
```

```
400 RANDOMIZE VAL(RIGHT$(TIME$,2))
410 DIM A$(10),B$(21),H(21)
420 FOR J=1 TO 10
430 READ A$(J)
440 NEXT J
450 FOR J=0 TO 21
460 H(J)=0
470 READ B$(J)
480 NEXT J
490 RETURN
500 REM **************
510 REM DELAY/SPACE OUT
520 PRINT:PRINT
530 FOR Z=1 TO 1000:NEXT Z
540 RETURN
550 REM *****************
560 REM INTRODUCTORY DATA
570 DATA "THIS IS WHERE YOU STAND NOW...
"
580 DATA "THIS CARD IS FOR THE NEAR FUTU
RE..."
590 DATA "AND THIS ONE IS WHAT YOU MIGHT
 DO..."
600 DATA "THIS IS SOMETHING IN THE PAST
THAT IS   RELEVANT TO YOUR QUESTION..."
610 DATA "THIS CARD RELATES TO A MORE RE
CENT PAST EVENT..."
620 DATA "NOW, THIS CARD INDICATES YOUR
POSITION  IN SIX MONTHS OR SO..."
630 DATA "IN YOUR LIFE OR WORK, THIS MOS
T CLOSELY INFLUENCES YOU..."
640 DATA "THIS CARD REPRESENTS SOCIAL IN
FLUENCES  ON YOUR QUERY..."
650 DATA "YOUR HOPES AND FEARS ARE REFLE
CTED IN   THIS CARD..."
660 DATA "AND, FROM THESE, IN REPLY, THI
S CARD    POINTS TOWARDS AN ANSWER..."
670 REM ********
680 REM CARD DATA
690 DATA "THE FOOL: NEW BEGINNINGS AND C
HALLENGES"
700 DATA "THE MAGICIAN: OUTWARD PROGRESS
,         DECISIONS TO BE MADE..."
710 DATA "THE HIGH PRIESTESS: WISDOM, A
```

```
PROBLEM     WILL BE SIMPLIFIED..."
720 DATA "THE EMPRESS: A STABLE SITUATIO
N, GOOD     FORTUNE..."
730 DATA "THE EMPEROR: GOALS WILL BE REA
CHED,       BEWARE OF RUTHLESSNESS..."
740 DATA "THE HIGH PRIEST: LISTEN TO ADV
ICE,        UNDERSTANDING LIKELY..."
750 DATA "THE LOVERS: A POSITIVE DECISIO
N LIKELY, RELATIONSHIPS PROSPER..."
760 DATA "THE CHARIOT: A GOOD STAGE IN Y
OUR LIFE   ATTAINED, TRAVEL LIKELY..."
770 DATA "JUSTICE: BALANCE WILL BE REACH
ED,         DUE REWARD LIKELY..."
780 DATA "THE HERMIT: REVALUATION OF PRI
ORITIES    INDICATED, INNER GROWTH"
790 DATA "WHEEL OF FORTUNE: GROWTH, LUCK
,           DECISIONS TO BE MADE..."
800 DATA "STRENGTH: YOUR INNER QUALITIES
 WILL       ENSURE YOU MEET THE TEST..."
810 DATA "HANGED MAN: CAST AWAY MATERIAL
 VALUES,    SACRIFICE REWARDED..."
820 DATA "DEATH: FRESH AWARENESS WILL CO
ME FROM    TEMPORARY SETBACKS..."
830 DATA "ANGEL OF TIME (TEMPERANCE): MO
DERATION   DEMANDED; WISE CHOICE SEEN"
840 DATA "THE DEVIL: BE WARY OF GIVING I
N TOO       EASILY TO YOUR WHIMS"
850 DATA "THE TOWER: UNFORTUNATE INDICAT
IONS,       REGROWTH CAN BE EXPECTED.."
860 DATA "THE STAR: VERY POSITIVE, FRESH
            DEVELOPMENTS SEEN..."
870 DATA "THE MOON: TRUST YOUR HEART RAT
HER THAN   YOUR HEAD..."
880 DATA "THE SUN: A GOAL WITHIN REACH,
LIGHT       AFTER DARKNESS..."
890 DATA "JUDGEMENT: A PERIOD OF FRESH B
EGINNINGS AND ASSESSING VALUES..."
900 DATA "THE WORLD: COMPLETION OF A DIF
FICULT      TASK, ATTAINMENT OF A GOAL"
```

THE BOOK OF CHANGES

The oracle called the *I Ching* comes from ancient China. For hundreds of years the future has been glimpsed, the correct path for action indicated, through the *I Ching*, the Book of Changes.

Proponents of the book claim that long study of it will shed light not only on an individual's path and destiny, but on the larger tides which sweep up the affairs of mankind, and on those which control the patterns which lie behind the existence of the entire universe.

Whether or not such grandiose claims are true, there is no doubt that the *I Ching* is a fascinating book, and investigation of it is a most interesting study. In this program, based on one by William Linden of Kew Gardens, New York, you are given the keys to the investigation of the book.

The *I Ching* is traditionally consulted by casting yarrow stalks. The way the stalks fall indicates particular references in the book. If yarrow stalks are few and far between in your neck of the woods this year, you can use this program to throw the sticks for you. Naturally, the program demands a peripheral in order to use it: a copy of the book version of the *I Ching*, from which the text assigned by the computer's output can be read.

Let's see the program in action; giving you information you can use to help you make a decision at the next presidential election:

```
        ENTER YOUR QUESTION....


        ? WHAT QUALITIES SHOULD WE LOOK FOR IN A PRESIDENT



            XXXXXXXX         XXXXXXXX
            XXXXXXXX         XXXXXXXX
            XXX   XXX        XXX   XXX
            XXX   XXX        XXX   XXX
            XXX   XXX        XXXXXXXXX
            XXX   XXX        XXX   XXX

               20               59
```

KUAN, CONTEMPLATION
                HUAN, DISPERSAL

        MOVING LINES: 2

    WHAT QUALITIES SHOULD WE LOOK FOR IN A PRESIDENT?

Looking these up in a copy of the *I Ching* provides some rather interesting insights. Here's the program to enable you to cast your own yarrow stalks:


```
10 REM CHANGES
20 GOTO 280
30 REM **************
40 REM REGULAR LINES
50 IF L(Z)=7 OR L(Z)=9 THEN PRINT "XXXXX
XXXX";
60 IF L(Z)=6 OR L(Z)=8 THEN PRINT "XXX
 XXX";
70 RETURN
80 REM **************
90 REM 'MOVED' LINES
100 IF L(Z)<8 THEN PRINT "XXXXXXXXX";
110 IF L(Z)>7 THEN PRINT "XXX   XXX";
120 RETURN
130 REM **************
140 REM LOOK UP TABLE
150 RESTORE
160 FOR Z=1 TO IDEX
170 READ NUM,N$
180 NEXT Z
190 RETURN
200 REM ****************
210 REM LIST MOVING LINES
220 PRINT TAB(5);"MOVING LINES: ";
230 FOR Z=1 TO 6
240 IF L(Z)=6 OR L(Z)=9 THEN PRINT Z;
250 NEXT Z
260 RETURN
270 REM ************
280 REM MAIN PROGRAM
290 CLS
300 RANDOMIZE VAL(RIGHT$(TIME$,2))
```

```
310 DIM L(6)
320 REM **********
330 REM LINE CODES
340 MOVIG=0
350 PRINT:PRINT
360 PRINT "ENTER YOUR QUESTION...."
370 PRINT:INPUT "    ";Q$
380 CLS
390 REM *******************
400 REM GENERATE LINE CODES
410 FOR Z=1 TO 6
420 THROW=INT(RND(1)*16)
430 IF THROW=0 THEN L(Z)=6
440 IF THROW>0 AND THROW<6 THEN L(Z)=7
450 IF THROW>5 AND THROW<13 THEN L(Z)=8
460 IF THROW>12 THEN L(Z)=9
470 IF THROW=0 OR THROW=12 THEN MOVIG=1
480 NEXT Z
490 REM ********
500 REM PRINTOUT
510 PRINT:PRINT:PRINT
520 FOR Z=6 TO 1 STEP -1
530 PRINT TAB(3);
540 GOSUB 40
550 PRINT TAB(18);
560 IF MOVIG=1 THEN GOSUB 90
570 PRINT
580 NEXT Z
590 REM **********
600 REM FIND INDEX
610 IDEX=1
620 FOR Z=1 TO 6
630 IF L(Z)=6 OR L(Z)=8 THEN IDEX=IDEX+2
^(6-Z)
640 NEXT Z
650 GOSUB 140
660 V$=N$
670 PRINT:PRINT TAB(6);NUM;
680 IF MOVIG=0 THEN 760
690 IDEX=1
700 FOR Z=1 TO 6
710 IF L(Z)>7 THEN IDEX=IDEX+2^(6-Z)
720 NEXT Z
730 GOSUB 140
```

```
740 W$=N$
750 PRINT TAB(21);NUM;
760 PRINT:PRINT:PRINT TAB(2);V$;
770 IF MOVIG=1 THEN PRINT TAB(13);W$;
780 PRINT:PRINT
790 IF MOVIG=1 THEN GOSUB 210
800 PRINT:PRINT:PRINT Q$;"?"
810 IF INKEY$<>"" THEN 810
820 PRINT:PRINT "ENTER 'Y' FOR ANOTHER Q
UESTION OR          'N' TO STOP"
830 A$=INKEY$
840 IF A$<>"Y" AND A$<>"y" AND A$<>"N" A
ND A$<>"n" THEN 830
850 CLS
860 IF A$="Y" OR A$="y" THEN 340
870 PRINT:PRINT
880 PRINT "OK, THANKS FOR CONSULTING ME"
890 END
900 REM ****
910 REM DATA
920 DATA 1,"CH'IEN, THE CREATIVE"
930 DATA 43,"KUAI, BREAKTHROUGH"
940 DATA 14,"TA YU, POSSESSIONS"
950 DATA 34,"TA CHUANG, POWER OF THE GRE
AT"
960 DATA 9,"HSIAO CHU'U, TAMING POWER OF
 THE SMALL"
970 DATA 5,"HSU, WAITING"
980 DATA 26,"TA CH'U, TAMING POWER OF TH
E GREAT"
990 DATA 11,"T'AI, PEACE"
1000 DATA 10,"LU, WARINESS"
1010 DATA 58,"TUI, THE JOYOUS"
1020 DATA 38,"K'UEI, ESTRANGEMENT"
1030 DATA 54,"KUEI MEI, THE MAIDEN"
1040 DATA 61,"CHUNG FU, INNER TRUTH"
1050 DATA 60,"CHIEH, LIMITATION"
1060 DATA 41,"SUN, DECREASE"
1070 DATA 19,"LIN, APPROACH"
1080 DATA 13,"T'UNG JEN, FELLOWSHIP"
1090 DATA 49,"KO, REVOLUTION"
1100 DATA 30,"LI, CLINGING"
1110 DATA 55,"FENG, ABUNDANCE"
1120 DATA 37,"CHIA DEN, THE FAMILY"
```

```
1130 DATA 63,"CHI CHI, AFTER COMPLETION"
1140 DATA 22,"PI, GRACE"
1150 DATA 36,"MING I, DARKENING"
1160 DATA 25,"WU WANG, INNOCENCE"
1170 DATA 17,"SUI, FOLLOWING"
1180 DATA 21,"SHIH HO, BITING THROUGH"
1190 DATA 51,"CHEN, THE AROUSING"
1200 DATA 42,"I, INCREASE"
1210 DATA 3,"CHUN, DIFFICULTY AT START"
1220 DATA 27,"I, NOURISHMENT"
1230 DATA 24,"FU, RETURN"
1240 DATA 44,"KOU, MEETING"
1250 DATA 28,"TA KUO, THE GREAT"
1260 DATA 50,"TING, THE CAULDRON"
1270 DATA 32,"HENG, DURATION"
1280 DATA 57,"SUN, THE GENTLE"
1290 DATA 48,"CHING, THE WELL"
1300 DATA 18,"KU, DECAY"
1310 DATA 46,"SHENG, PUSHING UPWARD"
1320 DATA 6,"SUNG, CONFLICT"
1330 DATA 47,"K'UN, OPPRESSION"
1340 DATA 64,"WEI CHI, BEFORE COMPLETENE
SS"
1350 DATA 40,"HSIEH, RELEASE"
1360 DATA 59,"HUAN, DISPERSAL"
1370 DATA 29,"K'AN, THE DEEP"
1380 DATA 4,"MENG, YOUTHFUL FOLLY"
1390 DATA 7,"SHIH, THE ARMY"
1400 DATA 33,"TUN, WITHDRAWAL"
1410 DATA 31,"HSIEN, INFLUENCE"
1420 DATA 56,"LU, TRAVELING STRANGER"
1430 DATA 62,"HSIAO KUO, THE SMALL"
1440 DATA 53,"CHIEN, THE GRADUAL"
1450 DATA 39,"CHIEN, OBSTRUCTION"
1460 DATA 52,"KEN, STILLNESS"
1470 DATA 15,"CH'IEN, MODESTY"
1480 DATA 12,"P'I, STAGNATION"
1490 DATA 45,"TS'UI, ASSEMBLING"
1500 DATA 35,"CHIN, PROGRESS"
1510 DATA 16,"YU, ENTHUSIASM"
1520 DATA 20,"KUAN, CONTEMPLATION"
1530 DATA 8,"PI, HOLDING TOGETHER"
1540 DATA 23,"PO, SPLITTING APART"
1550 DATA 2,"K'UN, THE RECEPTIVE"
```

GOLDEN DAYS— BIORHYTHMS

Some days, everything goes wrong. We feel out of sorts, thick-headed, ir-ritable. Other days are golden. We sail through situations which on other days would reduce us to rage, and feel good, in control, and happy.

Many people believe that there are cycles within our lives which—to a large extent—govern how we think, feel and react. These major cycles are called "biorhythms." This isn't a brand new idea. The Greek physician and founder of the school of medicine named after him, Hippocrates (460–377 B.C.), wrote of the "rhythms of life." However, only in recent years has the theory been given a "scientific" basis.

The name comes from the Greek words for life (*bios*) and for measured, regular motion (*rhythmos*). The cycles which are generally considered as biorhythms are a 23-day physical cycle, a 28-day emotional cycle and a 33-day intellectual cycle. If the three cycles peak at once, you're in for a golden day. When they are all low, you'll be at your least effective. The "zero point," where a plotted biorhythm curve crosses a line drawn midway between the highest peak and the lowest trough, is known as a "critical day." This is when things are most likely to get fouled up. This is the day when—so followers of biorhythms claim—you're most likely to fall ill.

Studies show that around 70 percent of accidents occur on just 20 per-cent of the days of our lives. Clark Gable died of a heart attack on a "critical" day, and Judy Garland and Marilyn Monroe both committed suicide on days which, in their charts, were critical.

The modern study of biorhythms began at the start of this century when Dr. Wilhelm Fliess in Germany and Hermann Swoboda in Austria in-dependently discovered the physical (23-day) and emotional (28-day) cycles. Professor Alfred Teltscher found the 33-day intellectual cycle in the early 1930s at the University of Innsbruck in Austria.

A Swiss businessman, George Thommen, first heard of biorhythms in 1946. He didn't think much of them until two catastrophic train smashes changed his mind. One of Thommen's friends, Hans Frueh, plotted the bio-rhythm charts of the drivers and firemen on both trains in the first accident, and discovered that of the four men, three were on critical days. The fourth one had all his cycles at their lowest point. Thommen took little notice of his

friend's work until, following an almost identical rail accident a year later, he decided to plot the charts for the firemen and drivers involved in this second accident. He found, somewhat surprisingly, that three of the men were on critical days (one driver was double critical) and the fourth man had a triple low. Thommen started to study biorhythms in detail and wrote the first, and one of the most popular, books on the subject: *Is This Your Day?* (Crown Publishers, Inc., New York, 1973).

Working out your own biorhythms without the aid of a dedicated calculator or computer program is a formidable project. The process begins by multiplying your age by 365 and then adding the integer portion of one quarter of that number to it . . . and so on. The following, written by Ian Hutt, not only works out your biorhythms, but plots them for you on a chart:

```
PLEASE ENTER YOUR DATE OF BIRTH:

    MONTH [1 to 12]? 12
    DAY   [1 to 31]? 31
    YEAR  (AS 1988)? 1964


PLEASE ENTER THE CURRENT MONTH, YEAR:

    MONTH [1 TO 12]? 7
    YEAR  (AS 1988)? 1985



PLEASE STAND BY WHILE I WORK IT OUT...
  3.278181  18.84954  2.468392  9.42477


= PHYSICAL   * MENTAL   . EMOTIONAL
```



```
—I—-I—-I--I—-I—-I—-I—-I—-I—-I—-I—-I—-I—-I--I—-I—-I---I—-I---I—-I—-I—-I--I—
```

You'll see in lines 190 and 200 that the program can be adjusted simply to make the best use of your computer's display potential. The screen is mapped into a two-dimensional array, with each element holding the character at that position. When the screen needs to be printed, the whole array is output.

Enter and run the listing now, and see if tomorrow would be a bad day to drive a train, or whether you're headed for a golden day.

```
10 REM GOLDEN DAYS - BIORHYTHMS
20 REM *********
30 GOSUB 140:REM INITIALISE
40 GOSUB 340:REM ENTER DETAILS
50 GOSUB 470:REM CALCULATE
60 GOSUB 780:REM PLOT
70 GOSUB 680:REM ASK AGAIN
80 REM ****************
90 IF A$="Y" THEN RUN
100 PRINT:PRINT "OK, BYE..."
110 END
120 REM *********
130 REM INITIALISE
140 CLS:PRINT:PRINT
150 PRINT TAB(14);"BIORHYTHMS"
160 PRINT:PRINT:PRINT TAB(11);"PLEASE ST
AND BY..."
170 REM *PUT THE VALUES OF YOUR OWN*
180 REM *SYSTEM IN THE NEXT TWO LINES*
190 LL=80:REM LINE LENGTH
200 PL=24:REM PAGE LENGTH
210 PL=PL-2
220 SX=LL/255
230 SY=PL/170
240 DIM S$(LL,PL)
250 FOR X=1 TO LL
260 FOR Y=1 TO PL
270 S$(X,Y)=" ":REM ONE SPACE
280 NEXT Y
290 NEXT X
300 RESTORE
310 RETURN
320 REM ************
330 REM ENTER DETAILS
340 CLS:PRINT:PRINT
```

```
350  PRINT "PLEASE ENTER YOUR DATE OF BIR
TH:":PRINT
360  PRINT TAB(5);"MONTH (1 to 12)";:INPU
T B
370  IF B<1 OR B>12 THEN 360
380  PRINT TAB(5);"DAY   (1 to 31)";:INPU
T A
390  IF A<1 OR A>31 THEN 380
400  PRINT TAB(5);"YEAR  (AS 1988)";:INPU
T C
410  PRINT:PRINT "PLEASE ENTER THE CURREN
T MONTH, YEAR:":PRINT
420  PRINT TAB(5);"MONTH (1 TO 12)";:INPU
T D
430  IF D<1 OR D>12 THEN 420
440  PRINT TAB(5);"YEAR  (AS 1988)";:INPU
T E
450  RETURN
460  REM *********
470  REM CALCULATE
480  PRINT:PRINT
490  PRINT "PLEASE STAND BY WHILE I WORK
IT OUT..."
500  T=INT(((E-C)*365.25)+((D-B)*30.35)-A
)
510  FOR R=1 TO 255
520  IF S$(SX*R,1)=" " THEN S$(SX*R,1)="-
"
530  IF R=INT(R/B)*B THEN S$(SX*R,1)="I"
540  NEXT R
550  FOR R=1 TO 3
560  READ U,C$
570  L=2*3.14159*(T-(INT(T/U)*U))/U
580  K=2*3.14159*(33-U)*.3
590  PRINT L;K;
600  FOR A=L TO K+L+(2*3.14159) STEP .1
610  X=SX*((A-L)*(35-28+U))
620  Y=SY*(90+SIN(A)*60)
630  IF X>0 AND Y>0 AND X<=LL AND Y<=PL T
HEN  S$(X,Y)=C$
640  NEXT A
650  NEXT R
660  RETURN
670  REM *********
```

```
680 REM ASK AGAIN
690 REM  * PRESS A KEY FOR END *
700 IF INKEY$<>"" THEN 700
710 IF INKEY$="" THEN 710
720 PRINT:PRINT "DO YOU WANT ANOTHER GO
(Y OR N)?"
730 A$=INKEY$
740 IF A$<>"N" AND A$<>"Y" THEN 730
750 RETURN
760 REM **************
770 REM PLOT SUBROUTINE
780 CLS
790 PRINT "= PHYSICAL   * MENTAL   . EMO
TIONAL"
800 FOR Y=PL TO 1 STEP -1
810 FOR X=1 TO LL
820 PRINT S$(X,Y);
830 NEXT X
840 NEXT Y
850 RETURN
860 REM **************
870 REM DATA FOR CYCLES
880 DATA 23,"+",28,".",33,"*"
```

YEAR OF THE MONKEY

Many people believe that the "astrological sign" under which a person is born can have a marked effect on the personality and fortunes of the individual. A widespread belief among many Chinese people is that the *year* of birth is important in determining a person's fortune.

The Chinese zodiac is made up of a 12-year cycle. Each year within the cycle is named after an animal which is believed to sum up the physical, intellectual and emotional characteristics of people born in that year. The different images that a sheep and a tiger evoke suggest this is a particularly vivid way to crystallize an image.

In this program, you simply enter your year of birth, and the computer will tell you which sign you were born under, and the characteristics you embody. As well, it will give you some insights into the signs of people with whom you'll find yourself most compatible (and add a few warnings, in some cases, as to those you should avoid). When I ran the program for myself I discovered I was "aggressive, courageous, candid and sensitive." The Chinese are certainly great judges of personality!

Here's the program in action:

```
-----------------------------------
ENTER THE YEAR YOU WERE BORN

IN THE FORM 1965? 1967

YOU WERE BORN IN YEAR OF THE SHEEP

YOU PREFER TO STAY OUT OF THE LIMELIGHT
WHERE YOU CAN EXERCISE YOUR CREATIVE
GIFTS FAR FROM THE PUBLIC GAZE...
YOU POSSESS THAT CERTAIN SOMETHING
CALLED 'STYLE' AND GET ON BEST WITH
RABBITS AND BOARS, AND FIND THAT THE
OX DOES NOT MAKE A GOOD COMPANION.
```

PRESS 'Y' IF YOU'D LIKE TO TRY
ANOTHER DATE, 'N' TO END

ENTER THE YEAR YOU WERE BORN

IN THE FORM 1965? 1957

YOU WERE BORN IN THE YEAR OF THE COCK

YOU ARE A HARD WORKER, AND RESEARCHER,
DELVING INTO AREAS THAT DO NOT ATTRACT
MOST OTHER PEOPLE. HOWEVER, YOUR
INTERESTS HAVE MADE YOU SELFISH, AND
MANY OTHERS FIND YOU A LITTLE ODD. A
SNAKE OR OX WILL MAKE THE BEST FRIEND,
WHILE THE RABBIT IS TO BE AVOIDED.

PRESS 'Y' IF YOU'D LIKE TO TRY
ANOTHER DATE, 'N' TO END

ENTER THE YEAR YOU WERE BORN

IN THE FORM 1965? 1962

YOU WERE BORN IN THE YEAR OF THE TIGER

YOU ARE FULL OF COURAGE. YOUR
AGGRESSIVENESS, AND THE TENDENCY YOU
HAVE TO SPEAK YOUR MIND CAN GET YOU
INTO TROUBLE. YOU FEEL THINGS FAIRLY
DEEPLY. YOU'LL FIND THAT WHILE YOU
DO NOT GET ON WELL WITH THOSE BORN IN
A YEAR OF THE MONKEY, THOSE FROM THE
HORSE AND DOG YEARS CAN BE FIRM FRIENDS

PRESS 'Y' IF YOU'D LIKE TO TRY
ANOTHER DATE, 'N' TO END

OK, THANKS FOR YOUR TIME...

Here is the listing so that you find out if you are a sheep, an ox or a rat:

```
10 REM YEAR OF THE MONKEY
20 CLS
30 PRINT "-----------------------------
--------"
40 PRINT "ENTER THE YEAR YOU WERE BORN"
50 PRINT
60 INPUT "IN THE FORM 1965";N
70 IF N<1890 OR N>1990 THEN 60
80 IF N<1924 THEN N=N+12:GOTO 80
90 IF N>1971 THEN N=N-12:GOTO 90
100 PRINT:PRINT "YOU WERE BORN IN ";
110 IF N=1924 OR N=1936 OR N=1948 OR N=1
960 THEN GOSUB 350
120 IF N=1925 OR N=1937 OR N=1949 OR N=1
961 THEN GOSUB 450
130 IF N=1926 OR N=1938 OR N=1950 OR N=1
962 THEN GOSUB 560
140 IF N=1927 OR N=1939 OR N=1951 OR N=1
963 THEN GOSUB 680
150 IF N=1928 OR N=1940 OR N=1952 OR N=1
964 THEN GOSUB 790
160 IF N=1929 OR N=1941 OR N=1953 OR N=1
965 THEN GOSUB 900
170 IF N=1930 OR N=1942 OR N=1954 OR N=1
966 THEN GOSUB 1030
180 IF N=1931 OR N=1943 OR N=1955 OR N=1
967 THEN GOSUB 1150
190 IF N=1932 OR N=1944 OR N=1956 OR N=1
968 THEN GOSUB 1260
200 IF N=1933 OR N=1945 OR N=1957 OR N=1
969 THEN GOSUB 1380
210 IF N=1934 OR N=1946 OR N=1958 OR N=1
970 THEN GOSUB 1490
220 IF N=1935 OR N=1947 OR N=1959 OR N=1
971 THEN GOSUB 1620
230 PRINT:PRINT
240 FOR J=1 TO 2000:NEXT J
250 IF INKEY$<>"" THEN 250
260 PRINT "PRESS 'Y' IF YOU'D LIKE TO TR
Y"
270 PRINT "ANOTHER DATE, 'N' TO END"
```

```
280 N$=INKEY$
290 IF N$<>"N" AND N$<>"Y" THEN 280
300 IF N$="Y" THEN 20
310 PRINT:PRINT
320 PRINT "OK, THANKS FOR YOUR TIME..."
330 PRINT:PRINT
340 END
350 REM **************
360 PRINT "THE YEAR OF THE RAT"
370 PRINT
380 PRINT "YOU ARE AN HONEST PERSON, AND
 FAIRLY"
390 PRINT "AMBITIOUS. YOU TEND TO BE A B
IT OF A"
400 PRINT "SPENDTHRIFT, AND ARE UNLIKELY
 TO MAKE"
410 PRINT "FRIENDSHIPS WHICH ENDURE. YOU
 GET ON"
420 PRINT "WELL WITH MONKEYS AND DRAGONS
, BUT DO"
430 PRINT "NOT FIND THAT HORSES ARE GOOD
 COMPANY"
440 RETURN
450 REM ************
460 PRINT "THE YEAR OF THE OX"
470 PRINT
480 PRINT "YOU SET AN EXAMPLE WHICH OTHE
RS WANT TO"
490 PRINT "FOLLOW, AND ARE USUALLY PATIE
NT AND"
500 PRINT "FULL OF ENERGY. YOU SELDOM FE
EL LONELY"
510 PRINT "AS YOU CAN OCCUPY YOURSELF HA
PPILY."
520 PRINT "YOU MAKE A GOOD PARENT, AND W
OULD FIND"
530 PRINT "A GOOD MATE IN A SNAKE OR A C
OCK."
540 PRINT "YOU ARE NOT COMPATIBLE WITH S
HEEP."
550 RETURN
560 REM ************
570 PRINT "THE YEAR OF THE TIGER"
580 PRINT
```

```
590 PRINT "YOU ARE FULL OF COURAGE. YOUR
"
600 PRINT "AGGRESSIVENESS, AND THE TENDE
NCY YOU"
610 PRINT "HAVE TO SPEAK YOUR MIND CAN G
ET YOU"
620 PRINT "INTO TROUBLE. YOU FEEL THINGS
 FAIRLY"
630 PRINT "DEEPLY. YOU'LL FIND THAT WHIL
E YOU"
640 PRINT "DO NOT GET ON WELL WITH THOSE
 BORN IN"
650 PRINT "A YEAR OF THE MONKEY, THOSE F
ROM THE"
660 PRINT "HORSE AND DOG YEARS CAN BE FI
RM FRIENDS"

670 RETURN
680 REM **************
690 PRINT "THE YEAR OF THE RABBIT"
700 PRINT
710 PRINT "YOU ARE AN ARTICULATE AND FAV
ORED"
720 PRINT "PERSON, BEING BORN UNDER THE
LUCKIEST"
730 PRINT "SIGN. YOU AVOID STRESS AND AL
THOUGH YOU"
740 PRINT "LIKE PEOPLE A LOT, YOU ARE HE
SISTANT TO"
750 PRINT "EXPRESS YOUR FEELINGS. YOU GE
T ON WELL"
760 PRINT "WITH BOARS AND SHEEP, BUT NOT
 SO WELL"
770 PRINT "WITH THOSE BORN IN THE SIGN O
F THE COCK"
780 RETURN
790 REM **************
800 PRINT "THE YEAR OF THE DRAGON"
810 PRINT
820 PRINT "YOU HAVE A COMPLICATED LIFE,
AS A"
830 PRINT "RESULT OF YOUR EXASPERATING"
840 PRINT "INDIVIDUALITY. YOU ARE BLESSE
D WITH"
```

```
850 PRINT "GOOD HEALTH AND TEND TO GET I
NVOLVED"
860 PRINT "DEEPLY WITH PEOPLE AND CAUSES
. YOU"
870 PRINT "MARRY LATE IN LIFE, PREFERABL
Y WITH A"
880 PRINT "RAT OR MONKEY. STAY AWAY FROM
 DOGS"
890 RETURN
900 REM ***************
910 PRINT "THE YEAR OF THE SNAKE"
920 PRINT
930 PRINT "MANY IN THIS SIGN ARE BLESSED
 WITH"
940 PRINT "GOOD LOOKS. YOU GET INVOLVED
INTENSELY"
950 PRINT "WITH LIFE, AND THINK DEEPLY A
BOUT MANY"
960 PRINT "SUBJECTS. YOUR LOOKS HAVE MAD
E YOU A"
970 PRINT "LITTLE VAIN, AND YOUR QUICK T
EMPER"
980 PRINT "CAN LEAD YOU INTO TROUBLE. TR
OUBLE CAN"
990 PRINT "COME ALSO FROM ASSOCIATING WI
TH BOARS,"
1000 PRINT "WHILE THOSE FROM COCK OR OX
YEARS GET"
1010 PRINT "ON WELL WITH YOU, AND ENHANC
E YOUR LIFE"
1020 RETURN
1030 REM ***************
1040 PRINT "THE YEAR OF THE HORSE"
1050 PRINT
1060 PRINT "ALTHOUGH YOU OFTEN BEHAVE RA
SHLY, YOU"
1070 PRINT "LEARN EARLY IN LIFE THAT YOU
 ARE"
1080 PRINT "CONSIDERED A VERY ATTRACTIVE
 PERSON."
1090 PRINT "YOU GET ON WELL WITH MOST PE
OPLE, AND"
1100 PRINT "FEEL THE NEED FOR CONSTANT C
OMPANY."
```

```
1110 PRINT "DO NOT GET EMOTIONALLY INVOL
VED WITH A"
1120 PRINT "RAT. IF YOU MUST MARRY, DO I
T EARLY IN"
1130 PRINT "LIFE WITH A DOG OR A TIGER."
1140 RETURN
1150 REM *********************
1160 PRINT "YEAR OF THE SHEEP"
1170 PRINT
1180 PRINT "YOU PREFER TO STAY OUT OF TH
E LIMELIGHT"
1190 PRINT "WHERE YOU CAN EXERCISE YOUR
CREATIVE"
1200 PRINT "GIFTS FAR FROM THE PUBLIC GA
ZE..."
1210 PRINT "YOU POSSESS THAT CERTAIN SOM
ETHING"
1220 PRINT "CALLED 'STYLE' AND GET ON BE
ST WITH"
1230 PRINT "RABBITS AND BOARS, AND FIND
THAT THE"
1240 PRINT "OX DOES NOT MAKE A GOOD COMP
ANION."
1250 RETURN
1260 REM ****************
1270 PRINT "YEAR OF THE MONKEY"
1280 PRINT
1290 PRINT "SUCCESS OFTEN COMES EARLY TO
 THOSE BORN"
1300 PRINT "IN THE SIGN OF THE MONKEY, A
LTHOUGH"
1310 PRINT "A FALSE MOVE, OR A CHANGE IN
 LUCK, CAN"
1320 PRINT "SEND THOSE IN THIS SIGN INTO
 CONFUSION"
1330 PRINT "AND DEPRESSION. YOU FIND YOU
 CAN EASILY"
1340 PRINT "GET THOSE AROUND YOU TO FOLL
OW YOUR"
1350 PRINT "LEAD. TIGERS DO NOT GET ON W
ELL WITH"
1360 PRINT "YOU, BUT DRAGONS AND RATS AR
E FRIENDLY"
1370 RETURN
```

```
1380 REM ***************
1390 PRINT "THE YEAR OF THE COCK"
1400 PRINT
1410 PRINT "YOU ARE A HARD WORKER, AND R
ESEARCHER,"
1420 PRINT "DELVING INTO AREAS THAT DO N
OT ATTRACT"
1430 PRINT "MOST OTHER PEOPLE. HOWEVER,
YOUR"
1440 PRINT "INTERESTS HAVE MADE YOU SELF
ISH, AND"
1450 PRINT "MANY OTHERS FIND YOU A LITTL
E ODD. A"
1460 PRINT "SNAKE OR OX WILL MAKE THE BE
ST FRIEND,"
1470 PRINT "WHILE THE RABBIT IS TO BE AV
OIDED."
1480 RETURN
1490 REM *****************
1500 PRINT "THE YEAR OF THE DOG"
1510 PRINT
1520 PRINT "ALTHOUGH YOU ARE SOMETIMES A
 LITTLE"
1530 PRINT "SELFISH, YOU ARE A HARD WORK
ER, AND"
1540 PRINT "GET ON WELL WITH OTHERS. YOU
R LOYALTY"
1550 PRINT "AND HONESTY ATTRACT OTHERS T
O YOU,"
1560 PRINT "ESPECIALLY HORSES AND TIGERS
 WHO WILL"
1570 PRINT "MAKE THE MOST RELIABLE FRIEN
DS. DO NOT"
1580 PRINT "LET YOUR LIFE BECOME INTWINE
D WITH"
1590 PRINT "DRAGONS...THEY WILL IMPOSE O
N YOU"
1600 PRINT "AND YOUR GENEROUS NATURE"
1610 RETURN
1620 REM ****************
1630 PRINT "THE YEAR OF THE BOAR"
1640 PRINT
1650 PRINT "SUCCESS IS ALMOST INEVITABLE
 FOR YOU"
```

```
1660 PRINT "BECAUSE YOU CHASE AFTER GOAL
S WITH A"
1670 PRINT "TENACIOUS SPIRIT. YOU HAVE A
 STRONG"
1680 PRINT "CHARACTER, AND BEHAVE WITH S
TYLE AND"
1690 PRINT "THOUGHTFULNESS TO THOSE AROU
ND YOU."
1700 PRINT "THE SNAKE IS NOT YOUR FRIEND
, WHILE"
1710 PRINT "THOSE FROM THE RABBIT OR SHE
EP SIGNS"
1720 PRINT "WILL PROVE LIFELONG COMPANIO
NS"
1730 RETURN
```

The Sporting Challenge
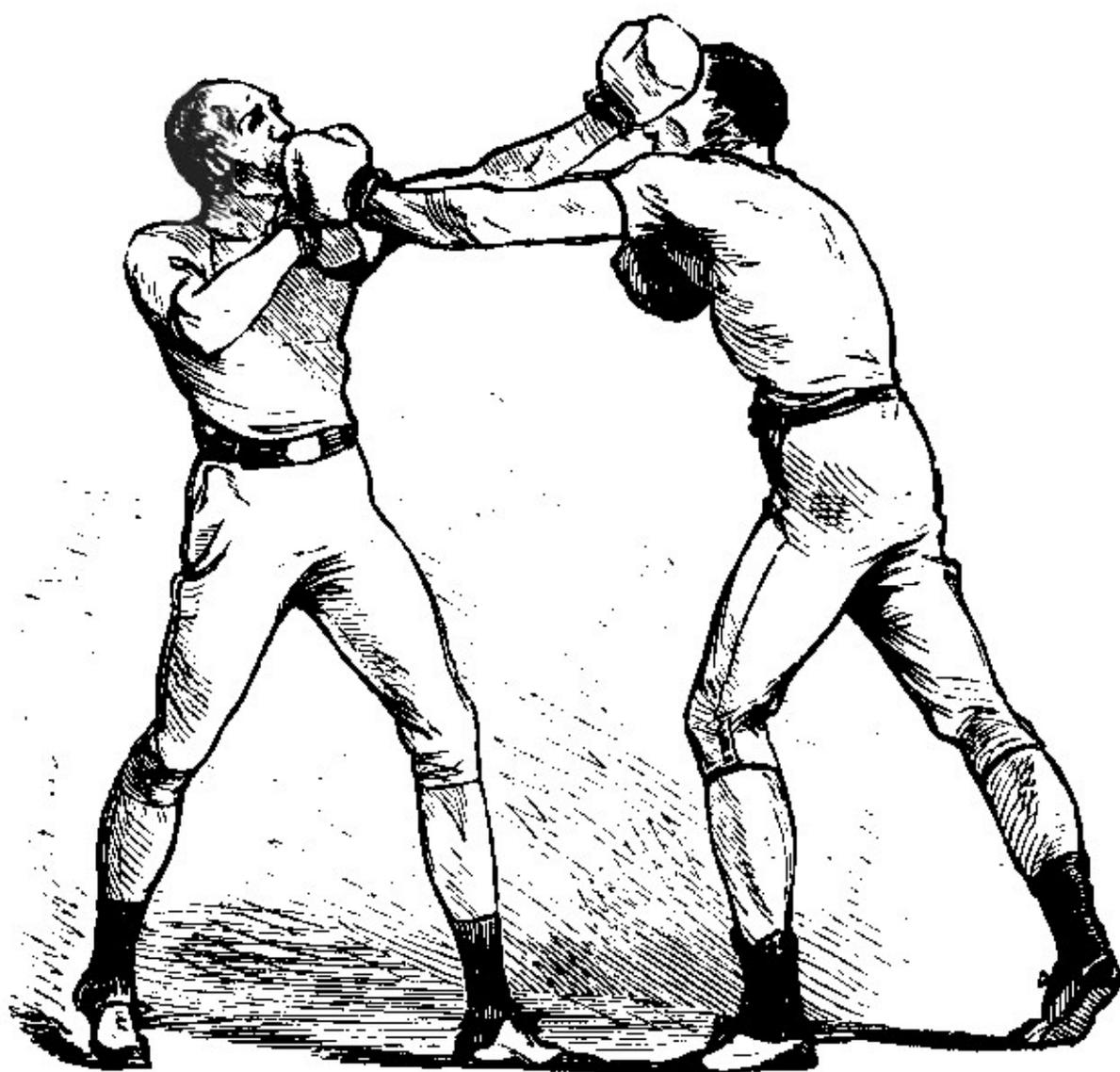
Sports can be a lot of fun, but they are also really hard work. How much simpler it would be if you could get your computer to do all the strenuous athletic bits, and just let you savor the cheers of the crowd. This section of the book will allow you to do just that.

The sporting action begins at THE KENTUCKY DERBY, where the five top thoroughbreds in U.S. racing history meet together in the premier race of the year.. HOME RUN! lets you play baseball against a friend, or against your computer (and it plays a very mean game, let me tell you). A few sacrificial throws in the JUDO program, and a left hook or two with BOXING, and you'll be an expert at contact sports. Stretch your knowledge of games with a quarter or four of AUSTRALIAN RULES FOOTBALL, smash a little white ball around in GOLF or simulate the smack of leather against willow in CRICKET. All these sports are here for you and your computer to enjoy.

THE KENTUCKY DERBY

The top of the bill in most sports is a clash between the current champions. The two best football teams fight it out in the Super Bowl; the top two baseball teams play against each other in the World Series to see who really is the best; and in horse racing, the very best compete in the Kentucky Derby.

Held on the first Saturday in May at Churchill Downs in Louisville, Kentucky, this event determines which of the best three-year-old thoroughbreds in the country will be awarded a permanent place in racing's hall of fame.

With this program, you can experience some of the excitement of the Kentucky Derby without actually visiting Louisville. It's a program for two punters, or horseplayers, that actually lets you see your horse race across the screen. As you'll see when you run this program (by Philip Coates of Sunbury, on the outskirts of Melbourne, Australia), the odds remain constant for each race. The payout for picking a winner is, of course, related to the odds on the horse which you've decided to back, and to the amount you have actually bet on that horse.

Let's see the program in action:

```
WELCOME TO THE KENTUCKY DERBY...


ENTER THE NAME OF THE FIRST PUNTER
        ? TIMMO


AND NOW THE NAME OF THE SECOND ONE
        ? IBMPC
```

```
RACE NUMBER 1 OVER 10 FURLONGS...

    HORSE NAME      ODDS
  1 KELSO           5/1
  2 FOREGO          9/1
  3 ROUND TABLE     7/1
  4 DAHLIA          4/1
  5 SECRETARIAT     6/1

TIMMO'S BANK IS $ 84

WHICH HORSE WILL YOU BET ON? 3

HOW MUCH WILL YOU BET ON ROUND TABLE? 50




IBMPC'S BANK IS $ 84

WHICH HORSE WILL YOU BET ON? 5

HOW MUCH WILL YOU BET ON SECRETARIAT? 20



            ---------------FINISH
            HORSE   ODDS      LINE
                    ----------
            KELSO   5/1    >
                    ----------*
            FOREGO  9/1    *
                    ----------*
            ROUND   7/1]
                    ----------*
            DAHLIA  4/1     +
                    ----------*
            SECRET  6/1  )
                    ----------*
```

```
------------FINISH
HORSE   ODDS      LINE
        ----------
KELSO   5/1       >
        ---------^
FOREGO  9/1       *
        ---------^
ROUND   7/1       ]
        ---------^
DAHLIA  4/1        +
        ---------^
SECRET  6/1       )
        ----------
```

```
------------FINISH
HORSE   ODDS      LINE
        ----------
KELSO   5/1       >
        ---------^
FOREGO  9/1       *
        ---------^
ROUND   7/1        ]
        ---------^
DAHLIA  4/1        +
        ---------^
SECRET  6/1        )
        ---------^
```

```
------------FINISH
HORSE   ODDS      LINE
        ----------
KELSO   5/1       >
        ---------^
FOREGO  9/1       *
        ---------^
ROUND   7/1        ]
        ---------^
DAHLIA  4/1        +
        ---------^
SECRET  6/1
```

```
--------------FINISH
HORSE  ODDS      LINE
          ----------
KELSO  5/1         >
          -----------^
FOREGO  9/1         *
          -----------^
ROUND  7/1              ]
          -----------^
DAHLIA 4/1             +
          ----------^
SECRET 6/1            ]
          ----------^
```

CONGRATULATIONS...ROUND TABLE

TIMMO'S BANK IS $ 384
IBMPC'S BANK IS $ 44

PRESS A KEY FOR NEW RACE [Q TO QUIT]?

The horses in our version of the derby have been selected from the Thoroughbred Racehorse Hall of Fame. *Lady Luck's Companion* (Berger, A. J., and Bruning, Nancy, Media Projects Inc., 1979) points out that Kelso raced for eight years, and won just a shade short of two million dollars. He went to the post 63 times, coming in the victor 39 times, was second 12 times, and came in third twice. Forego was in action for six years, and in that time clocked up winnings of $1,938,900. In only four years on the track, Round Table won $1,749,000. Dahlia amassed winnings of $1,500,000 in five years. Our fifth horse, *Secretariat*, won a purse of $1,316,000 in just two years of racing. *Secretariat* won $860,000 of his total in just one year (1973).

When you're ready to experience the excitement of the Kentucky Derby, reach for one of the 50,000 mint juleps sold each Derby Day at Churchill Downs, and settle down to run this program:

```
10 REM KENTUCKY DERBY
20 GOSUB 880:REM INITIALISE
30 H=0:A=0:Q=0
40 H=H+1
50 H1=0:H2=0:H3=0:H4=0:H5=0
60 PRINT:PRINT "RACE NUMBER"H"OVER 10 FU
RLONGS..."
```

```
70 PRINT:PRINT "    HORSE NAME      ODDS"
80 PRINT 1;H$(1);"          5/1"
90 PRINT 2;H$(2);"          9/1"
100 PRINT 3;H$(3);"     7/1"
110 PRINT 4;H$(4);"           4/1"
120 PRINT 5;H$(5);"     6/1"
130 A=A+1
140 IF A=2 THEN 220
150 PRINT:PRINT A$;"'S BANK IS $"AA
160 PRINT:INPUT "WHICH HORSE WILL YOU BE
T ON";AB
170 IF AB<1 OR AB>5 THEN 160
180 PRINT:PRINT "HOW MUCH WILL YOU BET O
N ";H$(AB);
190 INPUT AC
200 IF AC>AA THEN 190
210 CLS:GOTO 60
220 PRINT:PRINT B$;"'S BANK IS $"BB
230 PRINT:INPUT "WHICH HORSE WILL YOU BE
T ON";BD
240 IF BD<1 OR BD>5 THEN 230
250 PRINT:PRINT "HOW MUCH WILL YOU BET O
N ";H$(BD);
260 INPUT BE
270 IF BE>BB THEN 190
280 A=0
290 E=INT(RND(1)*2+1)
300 Q=Q+1
310 IF Q<>1 THEN 340
320 IF E=2 THEN H1=H1+1:IF H1=10 THEN D(
1)=5:W$=H$(1)
330 GOTO 290
340 IF Q<>2 THEN 370
350 IF E=2 THEN H2=H2+1:IF H2=10 THEN D(
2)=9:W$=H$(2)
360 GOTO 290
370 IF Q<>3 THEN 400
380 IF E=2 THEN H3=H3+1:IF H3=10 THEN D(
3)=7:W$=H$(3)
390 GOTO 290
400 IF Q<>4 THEN 430
410 IF E=2 THEN H4=H4+1:IF H4=10 THEN D(
4)=4:W$=H$(4)
420 GOTO 290
```

```
430 IF E=2 THEN H5=H5+1:IF H5=10 THEN D(
5)=6:W$=H$(5)
440 Q=0
450 CLS:PRINT
460 PRINT "-------------FINISH":REM
         FOURTEEN -'S
470 PRINT "HORSE   ODDS      LINE"
480 PRINT TAB(11);"----------"
490 PRINT K$(1);" 5/1";
500 FOR J=1 TO H1:PRINT " ";:NEXT J
510 PRINT ">"
520 PRINT TAB(11);"----------^"
530 PRINT K$(2);" 9/1";
540 FOR J=1 TO H2:PRINT " ";:NEXT J
550 PRINT "#"
560 PRINT TAB(11);"----------^"
570 PRINT K$(3);" 7/1";
580 FOR J=1 TO H3:PRINT " ";:NEXT J
590 PRINT "]"
600 PRINT TAB(11);"----------^"
610 PRINT K$(4);" 4/1";
620 FOR J=1 TO H4:PRINT " ";:NEXT J
630 PRINT "+"
640 PRINT TAB(11);"----------^"
650 PRINT K$(5);" 6/1";
660 FOR J=1 TO H5:PRINT " ";:NEXT J
670 PRINT ")"
680 PRINT TAB(11);"----------^"
690 IF H1=10 OR H2=10 OR H3=10 OR H4=10
OR H5=10 THEN 710
700 GOTO 290
710 PRINT "CONGRATULATIONS...";W$
720 IF W$=H$(AB) THEN AA=AA-AC+(AC*D(AB))
:GOTO 740
730 BB=BB-BE+(BE*D(BD))
740 IF AA<1 THEN PRINT "I'M AFRAID ";A$;
" IS NOW BROKE...":GOTO 830
750 IF BB<1 THEN PRINT "I'M AFRAID ";B$;
" IS NOW BROKE...":GOTO 830
760 PRINT:PRINT A$;"'S BANK IS $"AA
770 PRINT B$;"'S BANK IS $"BB
780 IF H>9 THEN 830
790 PRINT:INPUT "PRESS A KEY FOR NEW RAC
E (Q TO QUIT)";T$
800 IF T$="Q" THEN END
```

```
810 CLS
820 GOTO 40
830 PRINT:PRINT
840 PRINT "THAT'S THE END OF THE RACE ME
ETING..."
850 PRINT:PRINT TAB(7);"SEE YOU AGAIN SO
METIME!"
860 END
870 REM **************
880 REM INITIALISATION
890 CLS
900 RANDOMIZE VAL(RIGHT$(TIME$,2))
910 DIM H$(5),K$(5),D(5)
920 FOR J=1 TO 5
930 READ H$(J)
940 K$(J)=LEFT$(H$(J),6)
950 D(J)=-1
960 PRINT
970 NEXT J
980 PRINT "WELCOME TO THE KENTUCKY DERBY
..."
990 PRINT:PRINT
1000 PRINT "ENTER THE NAME OF THE FIRST
PUNTER"
1010 INPUT "               ";A$
1020 PRINT:PRINT "AND NOW THE NAME OF TH
E SECOND ONE"
1030 INPUT "               ";B$
1040 AA=INT(RND(1)*100)+1
1050 BB=AA
1060 PRINT:PRINT "STARTING BANK IS $"BB"
EACH."
1070 FOR X=1 TO 1000:NEXT X
1080 CLS
1090 RETURN
1100 REM **********
1110 REM HORSE NAMES
1120 DATA "KELSO ","FOREGO ","ROUND TABL
E","DAHLIA","SECRETARIAT"
```

HOME RUN!

The game of baseball evolved from "rounders," a nine-to-a-side bat-and-ball field game made up of two innings per team. Baseball is mainly played here in the United States, in Japan, and in Latin America. The object of the game—in both real life and in this computer simulation—is to score as many runs as you can while batting, and to prevent the opposition from doing the same while you're in the field.

In HOME RUN! (based on a program by Philip Coates), there are nine innings. The game will also end if one team achieves a 10-run lead, after both teams have batted an equal number of times. You can play this game against another human being, or against your computer, as I chose to do for this sample run:

```
ONE PLAYER OR TWO? 1


ENTER NAME OF VISITING TEAM? TIMMO'S TERRORS



PROGRESSIVE SCOREBOARD:

   > HOME    : COMPUTER
 0

   TOTAL 0


   > VISITORS: TIMMO'S TERRORS
 0

 TOTAL IS 0    .
```

```
INNINGS NUMBER: 1
    COMPUTER BATTING
     0   OUT


    RUNS THIS INNINGS: 0


    STRIKE 0      BALL 0


THE PITCHER MAY THROW:
     1 - A FAST CURVE
     2 - A FAST STRAIGHT
     3 - A SLOW CURVE
     4 - A SLOW STRAIGHT




HERE IT COMES, COMPUTER...


- HIT <RETURN> ON 0 TO PLAY -
  10
   9
    8
     7
      6
       5
        4
         3
          2
           1
            0
           -1


    BALL 1
```

As you can see, the pitcher can choose from four different pitches: a fast curve, a fast straight pitch, a slow curve and a slow straight pitch. The batter waits for the ball to arrive (watching an on-screen countdown), and must "hit" the ball (by hitting the "Return" key) when the count reaches zero. Any swing at the ball before the zero results in a strike.

```
INNINGS NUMBER: 1
    COMPUTER BATTING
    0   OUT

    RUNS THIS INNINGS: 0

    STRIKE 1     BALL 1

THE PITCHER MAY THROW:
    1 - A FAST CURVE
    2 - A FAST STRAIGHT
    3 - A SLOW CURVE
    4 - A SLOW STRAIGHT


HERE IT COMES, COMPUTER...

- HIT <RETURN> ON 0 TO PLAY -
 10
   9
    8
     7
      6
       5
        4
         3
          2
           1
            0
WHAT A HIT!
   WHAT A HIT!
      WHAT A HIT!
         WHAT A HIT!

THE CROWD ROARS!!

YOU'VE SCORED A HOME RUN!!
```

The program is weighted (or "adjusted") in many ways, in order to make playing it as realistic as possible. As you'd expect, a fast pitch will arrive more quickly than a slow pitch, making it more difficult to hit. If the batter swings at a fast pitch, he will usually hit it farther than he will a slow ball.

This means that the batter is rewarded—as he or she should be—for hitting the more difficult pitches. The batter can also choose not to strike at a ball.

```
          2
           1
            0
WHAT A HIT!
   WHAT A HIT!
      WHAT A HIT!


INNINGS NUMBER: 9
    COMPUTER BATTING
     1   OUT

    RUNS THIS INNINGS: 2

    STRIKE 0     BALL 0

    BASE 3 LOADED



          1
           0
           -1


           STRIKE 3

YOU'RE OUT!

INNINGS NUMBER: 9
    TIMMO'S TERRORS BATTING
     2   OUT

    RUNS THIS INNINGS: 0

    STRIKE 0     BALL 0

    BASE 1 LOADED
```

```
        ALL OUT!



     PROGRESSIVE SCOREBOARD:


       > HOME    : COMPUTER
     4  7  4  6  12  9  13  3  12


        TOTAL 70



        > VISITORS: TIMMO'S TERRORS
     3  6  2  9  10  4  17  1  0


     TOTAL IS 52


     THAT'S THE END OF THE GAME



     WELL DONE, COMPUTER
```

You'll discover that the chances of a pitch being called a "ball" are related to the speed of the pitch, so a fast curve has a greater chance of being called a "ball" than a slow one.

When you're ready to take on your computer in the World Series, power up your machine, feed in HOME RUN! and make sure your reflexes are at their best.

```
10  REM HOME RUN!
20  CLS
30  RANDOMIZE VAL(RIGHT$(TIME$,2))
40  DIM A(10),B(10),Z(10)
50  S=0:B=0:OX=0
60  FB=0:SB=0:TB=0
70  REM **************
80  PRINT:PRINT:PRINT
90  INPUT "ONE PLAYER OR TWO";X
100  IF X<1 OR X>2 THEN 90
110  IF X=1 THEN A$="COMPUTER":VC=1:GOTO
200
120  GOTO 180
```

```
130 REM *********
140 GOSUB 1780
150 GOSUB 1780
160 GOSUB 1780
170 RETURN
180 PRINT:PRINT
190 INPUT "ENTER NAME OF HOME TEAM";A$
200 PRINT:PRINT
210 INPUT "ENTER NAME OF VISITING TEAM";
B$
220 Z$=A$
230 Z=0:IX=1
240 GOTO 450
250 REM *********
260 AT=0:BT=0

270 PRINT:PRINT:PRINT
280 PRINT "PROGRESSIVE SCOREBOARD:"
290 PRINT:PRINT TAB(4);"> HOME    :  ";A$
300 FOR X=1 TO IX-1
310 PRINT A(X);
320 AT=AT+A(X)
330 NEXT X
340 PRINT:PRINT:PRINT TAB(4);"TOTAL"AT
350 PRINT:PRINT:PRINT TAB(4);"> VISITORS
:  ";B$
360 FOR X=1 TO IX-1
370 PRINT B(X);
380 BT=BT+B(X)
390 NEXT X
400 PRINT:PRINT:PRINT "TOTAL IS"BT
410 IF Z$=A$ AND ABS(AT-BT)>9 THEN 1120
420 IF IX<>10 THEN PRINT:INPUT "
     PRESS <RETURN>   ";X$
430 RETURN
440 REM ***************
450 GOSUB 260
460 PRINT:PRINT "INNINGS NUMBER:"IX
470 PRINT TAB(4);Z$;" BATTING"
480 PRINT TAB(4);OX;" OUT"
490 PRINT:PRINT TAB(4);"RUNS THIS INNING
S:"Z(IX)
500 PRINT:PRINT TAB(4);"STRIKE"S"    BALL
"R
```

184

```
510 IF FB<>1 AND SB<>1 AND TB<>1 THEN 57
0
520 PRINT:PRINT TAB(4);"BASE ";
530 IF FB<>0 THEN PRINT "1 ";
540 IF SB<>0 THEN PRINT "2 ";
550 IF TB<>0 THEN PRINT "3 ";
560 PRINT "LOADED"
570 PRINT:PRINT "THE PITCHER MAY THROW:"
580 PRINT TAB(4);"1 - A FAST CURVE"
590 PRINT TAB(4);"2 - A FAST STRAIGHT"
600 PRINT TAB(4);"3 - A SLOW CURVE"
610 PRINT TAB(4);"4 - A SLOW STRAIGHT"
620 IF Z$=B$ AND VC=1 THEN P=INT(RND(1)*
4+1):GOSUB 140:GOTO 690
630 REM ***********************
640 IF INKEY$<>"" THEN 640
650 P$=INKEY$
660 IF P$<"1" OR P$>"4" THEN 650
670 PRINT TAB(16);"OK"
680 P=VAL(P$)
690 IF P=1 THEN BA=2:T=12
700 IF P=2 THEN BA=3:T=12
710 IF P=3 THEN BA=4:T=8
720 IF P=4 THEN BA=5:T=8
730 CLS
740 PRINT:PRINT "HERE IT COMES, ";Z$;"..
."
750 IF INKEY$<>"" THEN 750
760 REM ***********************
770 PRINT:PRINT "- HIT <RETURN> ON 0 TO
PLAY -"
780 IF Z$=A$ AND VC=1 THEN Y=INT(RND(1)*
2+1)-1
790 GOSUB 1780:GOSUB 1780
800 E=10
810 PRINT TAB(11-E);E
820 A=1
830 S$=INKEY$
840 IF (S$<>"" AND E=0) OR (VC=1 AND Z$=
A$ AND Y=1 AND E=0) THEN 1370
850 IF S$<>"" THEN 950
860 IF A<P THEN A=A+1:GOTO 830
870 E=E-1
880 IF E<-1 THEN 900
```

```
890  GOTO 810
900  A=INT(RND(1)*BA+1)
910  IF A=1 THEN 950
920  GOTO 1180
930  REM ********************
940  REM STRIKE
950  S=S+1
960  PRINT:PRINT TAB(12);"STRIKE"S
970  GOSUB 1780
980  IF S=3 THEN PRINT:PRINT "YOU'RE OUT!
":OX=OX+1:S=0:R=0
990  GOSUB 1780
1000 IF OX=3 THEN PRINT:PRINT TAB(4);"AL
L OUT!"
1010 GOSUB 1780
1020 IF OX<3 THEN 460
1030 REM ********************
1040 REM ALL OUT
1050 S=0:OX=0:R=0
1060 TB=0:SB=0:FB=0
1070 IF Z=0 THEN A(IX)=Z(IX):Z$=B$:Z=1:Z
(IX)=0:GOTO 450
1080 Z$=A$:Z=0:B(IX)=Z(IX)
1090 Z(IX)=0:IX=IX+1
1100 IF IX<>10 THEN 450
1110 IF IX=10 THEN GOSUB 260
1120 PRINT:PRINT "THAT'S THE END OF THE
GAME":PRINT:PRINT
1130 IF AT>BT THEN PRINT TAB(4);"WELL DO
NE, ";A$:END
1140 IF BT>AT THEN PRINT TAB(4);"WELL DO
NE, ";B$:END
1150 PRINT TAB(4);"HEY, IT'S A DRAW!":EN
D
1160 REM ********************
1170 REM BALL
1180 R=R+1
1190 PRINT:PRINT TAB(4);"BALL"R
1200 GOSUB 1780
1210 IF R=3 THEN PRINT:PRINT "TAKE A WAL
K TO BASE!":Q=1
1220 GOSUB 1780:GOSUB 1780
1230 IF R<>3 THEN 460
1240 GOSUB 1290
```

```
1250 R=0:S=0
1260 GOTO 460
1270 REM **********************
1280 REM BASES LOADED
1290 IF TB<>0 THEN Z(IX)=Z(IX)+1:TB=0
1300 IF TB<>1 AND SB<>0 THEN TB=1:SB=0
1310 IF SB<>1 AND FB<>0 THEN SB=1:FB=0
1320 IF Q=1 THEN FB=1:Q=0
1330 S=0:R=0
1340 RETURN
1350 REM **********************
1360 REM HIT THE BALL
1370 SC=INT(RND(1)*T+1)
1380 IF P=4 AND SC=1 OR P=3 AND SC<3 THE
N WH=1:S=3:GOSUB 1680:GOTO 980
1390 IF P=2 AND SC<5 OR P=1 AND SC<6 THE
N WH=1:S=3:GOSUB 1680:GOTO 980
1400 IF P=4 AND SC<6 AND SC>1 THEN WH=2:
GOSUB 1540:GOTO 460
1410 IF P=3 AND SC<6 AND SC>2 THEN WH=2:
GOSUB 1540:GOTO 460
1420 IF P=2 AND SC<9 AND SC>4 THEN WH=2:
GOSUB 1540:GOTO 460
1430 IF P=1 AND SC<9 AND SC>5 THEN WH=2:
GOSUB 1540:GOTO 460
1440 IF P=4 AND SC=6 OR P=3 AND SC<8 AND
 SC>5 THEN WH=3:GOSUB 1540:GOTO 460
1450 IF P=2 AND SC>8 AND SC<11 THEN WH=3
:GOSUB 1540:GOTO 460
1460 IF P=1 AND SC<11 AND SC>8 THEN WH=3
:GOSUB 1540:GOTO 460
1470 IF (P=2 OR P=1) AND SC=11 THEN WH=4
:GOSUB 1540:GOTO 460
1480 IF P=1 AND SC=12 THEN WH=5:GOSUB 15
40:GOSUB 1740:GOTO 460
1490 PRINT:PRINT TAB(4);"FOUL BALL!!!"
1500 GOSUB 1780:GOSUB 1780
1510 GOTO 460
1520 REM **********************
1530 REM SCORING RUNS
1540 FOR X=1 TO WH-1
1550 PRINT TAB(2*X);"WHAT A HIT!"
1560 GOSUB 1780
1570 NEXT X
```

```
1580 IF TB<>1 AND SB<>1 AND FB<>1 AND WH
=2 THEN FB=1:S=0:R=0:RETURN
1590 IF TB<>1 AND SB<>1 AND FB<>1 AND WH
=3 THEN SB=1:S=0:R=0:RETURN
1600 IF TB<>1 AND SB<>1 AND FB<>1 AND WH
=4 THEN TB=1:S=0:R=0:RETURN
1610 Q=1
1620 FOR A=1 TO WH-1
1630 GOSUB 1290
1640 NEXT A
1650 RETURN
1660 REM *********************
1670 REM CAUGHT
1680 PRINT:PRINT "YOU SKIED THE BALL!"
1690 GOSUB 1780:GOSUB 1780
1700 PRINT:PRINT TAB(4);"> WELL CAUGHT!
<"
1710 RETURN
1720 REM *********************
1730 REM HOME RUN
1740 PRINT:PRINT TAB(4);"THE CROWD ROARS
!!"
1750 PRINT:PRINT TAB(4);"YOU'VE SCORED A
 HOME RUN!!"
1760 REM *********************
1770 REM DELAY
1780 FOR A=1 TO 500:NEXT A
1790 RETURN
```

JUDO

Authorities differ when describing the history of judo. Some claim it began in China, India or Japan. It is now almost impossible to tell where judo actually originated, although there is no doubt that it reached its present high standard in Japan. There, the history of judo and the history of the Japanese nation are closely entwined.

At about the same time as the beginning of the Christian era in the West, there were already a number of fighting arts in Japan; with names like Shubaku, Kempo and Taijustsu. The *Nihon Shoki*, the first book published in Japan, includes a chapter on a form of wrestling called Chikara Kurabe ("superior strength") which certainly sounds like an early form of judo.

The history of modern judo really dates from 1882, when a Dr. Jigoro Kana became interested in the arts of unarmed combat, and founded a school—*Kodokwan*—which is now famous among judoka (the name given to people who practice judo) the world over. He banned some of the more dangerous holds, and made it possible for judo to be enjoyed as a sport.

It takes years of training and practice to properly enjoy judo. This program allows you to take part in the sport against your computer just as soon as you read these instructions and enter the program into your machine.

When you run the program, you'll see this on your screen:

```
SILICON SAN: 0   FLESHLY SAN: 0

       * * * * * * * * * * * * * * * *
       *    A      B      C      *
       *                          *
       *      #                   *
       *                          *
       *                     $    *
       *                          *
       *    D      E      F      *
       * * * * * * * * * * * * * * * *


ENTER POSITION TO MOVE TO (A TO F)
```

This is the judo mat. You are Fleshly San (the "$") and your opponent is Silicon San (the "#"). You enter the position on the map you wish to move into (by entering the letter A, B, C, D, E or F). The computer may also move. Once you are both in the same sixth of the mat, either the computer or you will have the initiative.

In this case the computer has the upper hand:

```
SILICON SAN: 0   FLESHLY SAN: 0

        * * * * * * * * * * * * * *
        *    A     B     C     *
        *                      *
        *    $#                *
        *                      *
        *                      *
        *                      *
        *    D     E     F     *
        * * * * * * * * * * * * * *

   COMPUTER TRIES A TAI OTOSHI, BODY DROP
```

You have a choice of six responses:

```
CHOOSE YOUR RESPONSE:
1 - KNEE WHEEL     2 - DOUBLE ANKLE SWEEP
3 - SIDE DROP      4 - FLOATING THROW
5 - OUTER HOOK     6 - CORNER DROP
```

The lower the number of your response, the more likely the defense is to work, but the smaller the number of points you will gain for a successful defense:

```
             OK, 4
   >>   6   DEFENSE FAILED
```

Silicon San gets four points for this failure. If you had selected "1" as your option, it almost certainly would have been successful, but you would only have gained one point. If you'd selected defense "6," your chance of success would be small, but you'd get a score of six points if it was successful.

In the next example you are dominant:

```
SILICON SAN: 4  FLESHLY SAN: 0

        ***************
        *  A    B    C  *
        *              *
        *              *
        *              *
        *  $#           *
        *              *
        *  D    E    F  *
        ***************
```

WHAT THROW WOULD YOU LIKE TO TRY:
1 - ASHU GURUMA (LEG WHEEL)
2 - YOKO GAKE (SIDE BODY DROP)
3 - SUMI GAESHI (CORNER THROW)
4 - TAI OTOSHI (BODY DROP)
5 - KO UCHI GARI (INNER REAPING THROW)
6 - KATA HA JIME (SINGLE WING NECKLOCK)

Again, the higher the number you choose, the lower your chance of success, but the higher your score if you do succeed:

```
              OK, 5
   6   YOU DEFEATED COMPUTER THAT TIME


   SILICON SAN: 4   FLESHLY SAN: 5

        ***************
        *  A    B    C  *
        *              *
        *              *
        *              *
        *      $    #   *
        *              *
        *  D    E    F  *
        ***************
```

ENTER POSITION TO MOVE TO (A TO F)

And so the match continues:

```
       SILICON SAN: 10   FLESHLY SAN: 5

            ****************
            *   A    B    C   *
            *                 *
            *                 *
            *                 *
            *   $#            *
            *                 *
            *   D    E    F   *
            ****************
```

WHAT THROW WOULD YOU LIKE TO TRY:
1 - ASHU GURUMA (LEG WHEEL)
2 - YOKO GAKE (SIDE BODY DROP)
3 - SUMI GAESHI (CORNER THROW)
4 - TAI OTOSHI (BODY DROP)
5 - KO UCHI GARI (INNER REAPING THROW)
6 - KATA HA JIME (SINGLE WING NECKLOCK)
                    OK, 5
        5   COMPUTER SAN DEFEATS YOU

       SILICON SAN: 26   FLESHLY SAN: 27

```
            ****************
            *   A    B    C   *
            *                 *
            *                 *
            *                 *
            *            $#   *
            *                 *
            *   D    E    F   *
            ****************
```

     NOW COMPUTER SAN MOVES WITH A YOKO
            GURUMA, A SIDE WHEEL

CHOOSE YOUR RESPONSE:
1 - KNEE WHEEL   2 - DOUBLE ANKLE SWEEP
3 - SIDE DROP   4 - FLOATING THROW
5 - OUTER HOOK   6 - CORNER DROP
                    OK, 3
        >>   6   DEFENSE FAILED

The winner is the first person to score 32 points unless you're tied with the computer. In the case of a tie, the match continues until someone is dominant:

```
SILICON SAN: 37   FLESHLY SAN: 27

          ****************
          *   A    B    C   *
          *                 *
          *    #    $        *
          *                 *
          *                 *
          *                 *
          *   D    E    F   *
          ****************


        THE CONTEST IS OVER

        THE WINNER IS COMPUTER-SAN!
```

Here's the listing so you can become a judoka:

```
  10 REM JUDO
  20 GOSUB 1310:REM INITIALISE
  30 REM ***************
  40 GOSUB 1100:REM PRINT OUT MAT
  50 GOSUB 220:REM FIGHT IT OUT
  60 REM WINNER IS FIRST TO EXCEED
            32 POINTS
  70 REM IF POINTS EQUAL, FIGHT CONTINUES
  80 IF (CS>32 OR HS>32) AND HS<>CS THEN 1
  20
  90 IF RND(1)<1/4 THEN 990:REM RANDOM
  MOVES BY JUDOKAS
  100 GOTO 40
  110 REM ***************
  120 GOSUB 1100
  130 PRINT:PRINT
  140 PRINT TAB(7);"THE CONTEST IS OVER"
  150 GOSUB 1470
  160 PRINT
```

```
170 PRINT TAB(5);"THE WINNER IS ";
180 IF CS>HS THEN PRINT "COMPUTER-SAN!"
190 IF CS<HS THEN PRINT "FLESHLY-SAN!"
200 END
210 REM ************
220 REM FIGHT IT OUT
230 H(HP)=32
240 IF RND(1)>2/3 THEN C(CP)=32:CP=INT(R
ND(1)*6)+1
250 IF INKEY$<>"" THEN 250
260 PRINT:PRINT "ENTER POSITION TO MOVE
TO (A TO F)"
270 Y$=INKEY$
280 IF Y$="" THEN 270
290 IF ASC(Y$)<65 OR ASC(Y$)>70 THEN 270
300 HP=ASC(Y$)-64
310 GOSUB 1100:REM PRINT OUT
320 IF CP<>HP THEN RETURN
330 IF RND(1)>1/2 THEN 360:REM COMPUTER
ATTACKS
340 GOTO 720:REM HUMAN ATTACKS
350 REM ****************
360 REM COMPUTER ATTACKS
370 HIT=INT(RND(1)*6)
380 IF HIT=0 THEN PRINT "COMPUTER SAN AT
TEMPTS AN O GOSHI,"
390 IF HIT=0 THEN PRINT TAB(9);"A MAJOR
HIP THROW"
400 IF HIT=1 THEN PRINT "HUMAN IS TARGET
 OF AN OKURI ASHI BARAI,"
410 IF HIT=1 THEN PRINT TAB(7);"A DOUBLE
 ANKLE SWEEP"
420 IF HIT=2 THEN PRINT "COMPUTER TRIES
A TAI OTOSHI, BODY DROP"
430 IF HIT=3 THEN PRINT "COMPUTER SAN PR
EPARES FOR TSURI"
440 IF HIT=3 THEN PRINT TAB(4);"GOSHI, A
 LIFTING HIP THROW"
450 IF HIT=4 THEN PRINT "NOW COMPUTER SA
N MOVES WITH A YOKO"
460 IF HIT=4 THEN PRINT TAB(9);"GURUMA,
A SIDE WHEEL"
470 IF HIT=5 THEN PRINT "NOW COMPUTER SA
N GRABS YOU WITH A GYAKU"
```

```
480 IF HIT=5 THEN PRINT "     KESA GATAME
, A REAR SCARF HOLD"
490 GOSUB 1470
500 IF RND(1)>4/5 THEN 370
510 C(CP)=32:H(HP)=32
520 CP=INT(RND(1)*6)+1
530 HP=INT(RND(1)*6)+1
540 PRINT
550 IF INKEY$<>"" THEN 550
560 PRINT "CHOOSE YOUR RESPONSE:"
570 PRINT "1 - KNEE WHEEL   2 - DOUBLE A
NKLE SWEEP"
580 PRINT "3 - SIDE DROP    4 - FLOATING
  THROW"
590 PRINT "5 - OUTER HOOK   6 - CORNER D
ROP"

600 T$=INKEY$
610 IF T$<"1" OR T$>"6" THEN 600
620 TS=VAL(T$)
630 PRINT TAB(20);"OK, ";T$
640 GOSUB 1470
650 RE=INT(RND(1)*6)+1
660 IF TS<=RE THEN 680
670 PRINT TAB(7);RE;" SUCCESSFUL DEFENSE
":HS=HS+TS:GOTO 690
680 PRINT TAB(7);">> ";RE;" DEFENSE FAIL
ED":CS=CS+(8-TS)
690 GOSUB 1470
700 RETURN
710 REM *************
720 REM HUMAN ATTACKS
730 C(CP)=32:H(HP)=32
740 CP=INT(RND(1)*6)+1
750 HP=INT(RND(1)*6)+1
760 IF INKEY$<>"" THEN 760
770 PRINT "WHAT THROW WOULD YOU LIKE TO
TRY:"
780 PRINT "1 - ASHU GURUMA (LEG WHEEL)"
790 PRINT "2 - YOKO GAKE (SIDE BODY DROP
)"
800 PRINT "3 - SUMI GAESHI (CORNER THROW
)"
810 PRINT "4 - TAI OTOSHI (BODY DROP)"
```

```
820 PRINT "5 - KO UCHI GARI (INNER REAPI
NG THROW)"
830 PRINT "6 - KATA HA JIME (SINGLE WING
 NECKLOCK)"
840 T$=INKEY$
850 IF T$<"1" OR T$>"6" THEN 840
860 PRINT TAB(20);"OK, ";T$
870 TS=VAL(T$)
880 GOSUB 1470
890 RE=INT(RND(1)*6)+1
900 IF RE<=TS THEN 940
910 PRINT RE;" YOU DEFEATED COMPUTER THA
T TIME"
920 HS=HS+TS
930 GOTO 960
940 PRINT TAB(6);RE;" COMPUTER SAN DEFEA
TS YOU"
950 CS=CS+(7-TS)
960 GOSUB 1470
970 RETURN
980 REM ************
990 REM RANDOM MOVES
1000 C(CP)=32:H(HP)=32
1010 IF RND(1)>.4 THEN CP=INT(RND(1)*6)+
1
1020 IF RND(1)>.3 THEN HP=INT(RND(1)*6)+
1
1030 C(CP)=ASC("#")
1040 H(HP)=ASC("$")
1050 GOSUB 1100
1060 IF CP=HP THEN 50
1070 IF RND(1)<2/5 THEN 1000

1080 GOTO 40
1090 REM **************
1100 REM PRINT OUT RING
1110 CLS
1120 C(CP)=ASC("#"):H(HP)=ASC("$")
1130 PRINT TAB(3);"SILICON SAN:";CS;" FL
ESHLY SAN:";HS
1140 PRINT
1150 PRINT TAB(9);"*****************"
1160 PRINT TAB(9);"*   A    B    C   *"
1170 PRINT TAB(9);"*                 *"
```

```
1180 PRINT TAB(9);"*   ";CHR$(H(1));CHR$(
C(1));
1190 PRINT "   ";CHR$(H(2));CHR$(C(2));
1200 PRINT "   ";CHR$(H(3));CHR$(C(3));"
*"
1210 PRINT TAB(9);"*                *"
1220 PRINT TAB(9);"*   ";CHR$(H(4));CHR$(
C(4));
1230 PRINT "   ";CHR$(H(5));CHR$(C(5));
1240 PRINT "   ";CHR$(H(6));CHR$(C(6));"
*"
1250 PRINT TAB(9);"*                *"
1260 PRINT TAB(9);"*   D   E   F  *"
1270 PRINT TAB(9);"****************"
1280 PRINT
1290 RETURN
1300 REM **********
1310 REM INITIALISE
1320 CLS
1330 RANDOMIZE VAL(RIGHT$(TIME$,2))
1340 DIM C(6),H(6)
1350 CS=0:REM COMPUTER SCORE
1360 HS=0:REM HUMAN SCORE
1370 CP=1:REM COMPUTER POSITION
1380 HP=6:REM HUMAN POSITION
1390 FOR J=1 TO 6
1400 C(J)=32:H(J)=32
1410 NEXT J
1420 REM COMPUTER IS #, HUMAN IS $
1430 C(1)=ASC("#")
1440 H(6)=ASC("$")
1450 RETURN
1460 REM *****
1470 REM DELAY
1480 FOR J=1 TO 1200:NEXT J
1490 RETURN
```

BOXING

Boxing is somewhat similar to the judo program, and evolved from the same "parent program." You are Hairy Human (the "H" on the display) and your computer is King Komputer (the "C").

Here are some "snapshots" of a fight underway:

```
ROUND NUMBER 1

KING KOMPUTER: 0
 HAIRY HUMAN: 0


+-----------------+
!   1     2     3  !
!                 !
!   CH            !
!                 !
!                 (
!                 !
!   4     5     6  !
+-----------------+


      HAIRY GOES FOR KING!!
  ANGRY HUMAN MOVES IN FOR THE KILL!

        >> HIT '1' OR '2'
        >> POINT TO HAIRY
```

```
        ROUND NUMBER 2

        KING KOMPUTER: 0
          HAIRY HUMAN: 2


        +--------------+
        !  1    2    3  !
        !              !
        (         CH  !
        !              !
        !              !
        !              !
        !  4    5    6  !
        +--------------+


A SLOGGING MATCH; KOMPUTER IN ATTACK

        >> HIT '1' OR '2'
        >> POINT TO HAIRY



        ROUND NUMBER 2

        KING KOMPUTER: 1
          HAIRY HUMAN: 3


        +--------------+
        !  1    2    3  !
        !              !
        !         CH  !
        !              !
        !              !
        !              !
        !  4    5    6  !
        +--------------+


GO FOR A KNOCKOUT (1, 2 OR 3)
        >> DOWN FOR THE COUNT...
10 KOMPUTER STRUGGLES TO HIS FEET...
```

```
            ROUND NUMBER 8

         KING KOMPUTER: 16
          HAIRY HUMAN: 19

     +---------------+
     !  1    2    3  !
     !               !
     !  CH           !
     !               !
     !               !
     !               !
     !  4    5    6  !
     +---------------+


   HAIRY HUMAN UNDER ATTACK!!

      >> HIT '1' OR '2'
      >> POINT TO HAIRY
```

You can win either by a knockout, or on points:

```
         ROUND NUMBER 8

      KING KOMPUTER: 17
       HAIRY HUMAN: 20

     +---------------+
     !  1    2    3  !
     !               !
     !  CH           !
     !               !
     !               !
     !               !
     !  4    5    6  !
     +---------------+


  GO FOR A KNOCKOUT (1, 2 OR 3)
       >> DOWN FOR THE COUNT...
    10   9   8   7
  KOMPUTER STRUGGLES TO HIS FEET...
```

```
ROUND NUMBER 8

KING KOMPUTER: 17
  HAIRY HUMAN: 23
```

```
+-------------------+
!    1    2    3    !
!                   !
!         CH        !
!                   !
!                   !
!                   !
!    4    5    6    !
+-------------------+
```

THE REFEREE DECLARES THE FIGHT IS OVER

THE WINNER ON POINTS IS HAIRY HUMAN!

When you're ready to box, enter this listing, put on your boxing gloves, and let the fight begin:

```
10  REM BOXING
20  GOSUB 1550:REM INITIALISE
30  REM **************
40  GOSUB 1310:REM PRINT OUT RING
50  IF RND(1)>.7 THEN ROUND=ROUND+1
60  IF ROUND=0 THEN ROUND=1
70  GOSUB 230:REM FIGHT IT OUT
80  REM WINNER IS FIRST TO EXCEED 19
         POINTS
90  REM IF POINTS EQUAL, FIGHT CONTINUES
100 IF (CS>19 OR HS>19) AND HS<>CS THEN
140
110 IF RND(1)<.15 THEN 1200:REM RANDOM
    MOVES BY BOXERS
120 GOTO 40
130 REM ***************
```

```
140 GOSUB 1310
150 PRINT:PRINT
160 PRINT "THE REFEREE DECLARES THE FIGH
T IS OVER"
170 PRINT
180 PRINT "THE WINNER ON POINTS IS ";
190 IF CS>HS THEN PRINT "KING KOMPUTER!"
200 IF CS<HS THEN PRINT "HAIRY HUMAN!"
210 END
220 REM ************
230 REM FIGHT IT OUT
240 H(HP)=32
250 IF RND(1)>.6 THEN C(CP)=32:CP=INT(RN
D(1)*6)+1
260 IF INKEY$<>"" THEN 260
270 PRINT:PRINT "ENTER POSITION YOU WISH
 TO MOVE TO"
280 Y$=INKEY$
290 IF Y$<"1" OR Y$>"6" THEN 280
300 HP=VAL(Y$)
310 GOSUB 1310:REM PRINT OUT
320 IF CP<>HP THEN RETURN
330 IF RND(1)>.4 THEN 370:REM COMPUTER A
TTACKS
340 HS=HS+1
350 GOTO 1070:REM HUMAN ATTACKS
360 REM ******************
370 REM COMPUTER ATTACKS
380 CS=CS+1
390 HIT=INT(RND(1)*6)
400 IF HIT=0 THEN PRINT "KING KOMPUTER H
ITS OUT AT HAIRY HUMAN"
410 IF HIT=1 THEN PRINT "     HUMAN COMES
 UNDER ATTACK!"
420 IF HIT=2 THEN PRINT "    KOMPUTER MOV
ES IN FOR THE KILL!"
430 IF HIT=3 THEN PRINT " A SLOGGING MAT
CH; KOMPUTER IN ATTACK"
440 IF HIT=4 THEN PRINT "     KING GOES
FOR HAIRY!!"
450 IF HIT=5 THEN PRINT "   HAIRY HUMAN
UNDER ATTACK!!"
460 IF RND(1)>.8 THEN 390
470 GOSUB 1710
```

```
480 PRINT
490 IF INKEY$<>"" THEN 490
500 PRINT TAB(9);">> HIT '1' OR '2'"
510 T$=INKEY$
520 IF T$<"1" OR T$>"2" THEN 510
530 RESULT=INT(RND(1)*2)+1
540 IF RND(1)>.9 THEN 560
550 IF RESULT=VAL(T$) THEN PRINT TAB(9);
">> POINT TO HAIRY":HS=HS+1:GOTO 800
560 PRINT TAB(6);">> POINT TO KING KOMPU
TER":CS=CS+1
570 GOSUB 1710
580 GOSUB 1310
590 PRINT "  >> KOMPUTER GOES FOR A KNOC
KOUT!"
600 GOSUB 1710
610 C(CP)=32:H(HP)=32
620 CP=INT(RND(1)*6)+1
630 HP=INT(RND(1)*6)+1
640 ATTEMPT=INT(RND(1)*3)+1
650 RESULT=INT(RND(1)*3)+1
660 IF RESULT<>ATTEMPT THEN PRINT TAB(9)
;">> BUT HE FAILS":GOSUB 1710:RETURN
670 PRINT "DOWN FOR THE COUNT..."
680 CS=CS+3
690 TY=11
700 TY=TY-1
710 PRINT TY;
720 GOSUB 1710
730 IF RND(1)<.67 THEN 750
740 PRINT "HUMAN STRUGGLES TO HIS FEET..
.":FOR J=1 TO 1400:NEXT J:RETURN
750 IF TY>1 THEN 700
760 PRINT:PRINT TAB(12);"AND IT'S A KNOC
KOUT!"
770 PRINT:PRINT TAB(9);"THE WINNER IS KI
NG KOMPUTER!!"
780 END
790 REM *************************
800 REM HUMAN TRIES FOR KNOCKOUT
810 GOSUB 1710
820 GOSUB 1310
830 PRINT "GO FOR A KNOCKOUT (1, 2 OR 3)
"
```

```
840 IF INKEY$<>"" THEN 840
850 S$=INKEY$
860 IF S$<"1" OR S$>"3" THEN 850
870 C(CP)=32:H(HP)=32
880 CP=INT(RND(1)*6)+1
890 HP=INT(RND(1)*6)+1
900 RESULT=INT(RND(1)*3)+1
910 IF RESULT<>VAL(S$) THEN PRINT "BUT Y
OU COULDN'T DO IT":GOSUB 1710:RETURN
920 PRINT TAB(9);">> DOWN FOR THE COUNT.
.."
930 HS=HS+3
940 TY=11
950 TY=TY-1
960 PRINT TY;
970 GOSUB 1710
980 IF RND(1)<.6 THEN 1000
990 PRINT "KOMPUTER STRUGGLES TO HIS FEE
T...":GOSUB 1710:RETURN
1000 IF TY>1 THEN 950
1010 PRINT
1020 PRINT TAB(9);">> AND YOU DID IT!!"
1030 PRINT "HAIRY HUMAN DEFEATS KING COM
PUTER WITH"
1040 PRINT TAB(10);"A MASSIVE KNOCKOUT!!
 <<"
1050 END
1060 REM *************
1070 REM HUMAN ATTACKS
1080 HIT=INT(RND(1)*6)
1090 IF HIT=0 THEN PRINT "HAIRY HUMAN HI
TS OUT AT KING KOMPUTER"
1100 IF HIT=1 THEN PRINT "     HAIRY COM
ES UNDER ATTACK!"
1110 IF HIT=2 THEN PRINT "   ANGRY HUMAN
MOVES IN FOR THE KILL!"
1120 IF HIT=3 THEN PRINT "   A SLOGGING M
ATCH; HAIRY IN ATTACK"
1130 IF HIT=4 THEN PRINT "        HAIRY G
OES FOR KING!!"
1140 IF HIT=5 THEN PRINT "     KING KOMPU
TER UNDER ATTACK!!"
1150 IF RND(1)>.8 THEN 1080
1160 GOSUB 1710
```

```
1170  PRINT
1180  GOTO 490
1190  REM ***********
1200  REM RANDOM MOVES
1210  C(CP)=32:H(HP)=32
1220  IF RND(1)>.4 THEN CP=INT(RND(1)*6)+
      1
1230  IF RND(1)>.3 THEN HP=INT(RND(1)*6)+
      1
1240  C(CP)=ASC("C")
1250  H(HP)=ASC("H")
1260  GOSUB 1310
1270  IF CP=HP THEN 70
1280  IF RND(1)<.6 THEN 1210
1290  GOTO 40
1300  REM **************
1310  REM PRINT OUT RING
1320  CLS
1330  PRINT:PRINT
1340  C(CP)=ASC("C"):H(HP)=ASC("H")
1350  PRINT TAB(9);"ROUND NUMBER";ROUND:P
RINT
1360  PRINT TAB(9);"KING KOMPUTER:";CS
1370  PRINT TAB(11);"HAIRY HUMAN:";HS
1380  PRINT:PRINT
1390  PRINT TAB(9);"+-------------+
1400  PRINT TAB(9);"I   1   2   3   I"
1410  PRINT TAB(9);"I               I"
1420  PRINT TAB(9);"I   ";CHR$(C(1));CHR$(
H(1));
1430  PRINT "   ";CHR$(C(2));CHR$(H(2));
1440  PRINT "   ";CHR$(C(3));CHR$(H(3));"
I"
1450  PRINT TAB(9);"I               I"
1460  PRINT TAB(9);"I   ";CHR$(C(4));CHR$(
H(4));
1470  PRINT "   ";CHR$(C(5));CHR$(H(5));
1480  PRINT "   ";CHR$(C(6));CHR$(H(6));"
I"
1490  PRINT TAB(9);"I               I"
1500  PRINT TAB(9);"I   4   5   6   I"
1510  PRINT TAB(9);"+-------------+
1520  PRINT:PRINT
1530  RETURN
```

```
1540 REM **********
1550 REM INITIALISE
1560 CLS
1570 RANDOMIZE VAL(RIGHT$(TIME$,2))
1580 DIM C(6),H(6)
1590 CS=0:REM COMPUTER SCORE
1600 HS=0:REM HUMAN SCORE
1610 ROUND=0
1620 CP=1:REM COMPUTER POSITION
1630 HP=6:REM HUMAN POSITION
1640 FOR J=1 TO 6
1650 C(J)=32:H(J)=32
1660 NEXT J
1670 C(1)=ASC("C")
1680 H(6)=ASC("H")
1690 RETURN
1700 REM *****
1710 REM DELAY
1720 FOR J=1 TO 1200:NEXT J
1730 RETURN
```

AUSTRALIAN RULES FOOTBALL

This sport has been getting a lot of exposure lately on cable TV. In contrast to standard American football, the players in Australian rules football are unprotected by body padding. The raw physical nature of the game, where the ability to jump to "mark"—that is, to catch the ball in mid-air—is as important as the strength to kick the ball accurately for long distances, makes it an exciting and very popular spectator sport.

Instead of waiting for one of your local cable channels to start carrying the game, you can enjoy a match or two against your computer now. You can also play the game against a friend. If you decide to play against the computer, it takes control of a team known as the *Micro Meanies*. You get to choose the name of your own team.

Football is played over four 25-minute quarters. When you get control of the ball, you can either kick or punch ("handball") it. The game is designed to simulate the real game so that kicks will normally travel farther than handballs.

The program assumes you are shooting for goal if you are within scoring distance, and you kick the ball the required distance. If you are, for example, 30 meters from goal, and you kick the ball 35 meters, the program will assume that you've shot on goal.

There are four "goal posts" at each end of the playing oval. The center two posts are taller than the outside pair. If the ball goes between the two center posts, a goal is scored. If the ball hits one of the posts, or goes between a tall post and a shorter one, only a point is scored. At the end of the game, the number of goals is multiplied by six, the single points added, to get the total number of the strangely named "behinds." The winning team—naturally enough—is the one which scores the most behinds.

The chances of your team retaining possession of the ball are linked to whether you are in the clear (that is, no opposing players are in your immediate area) or are being tackled by another player, and by whether you decide to kick or to handball. You have a greater chance of retaining possession if you are in the clear than you will if being tackled, and a handball is more accurate than a kick, although it will not travel as far.

Here are some heart-stopping moments from one round of AUSTRA-

LIAN RULES FOOTBALL, produced by a program based on one written by Philip Coates:

```
        WELCOME TO THE GAME OF AUSTRALIAN

              RULES FOOTBALL



        REMEMBER THAT A KICK TRAVELS A MAXIMUM
        OF 50 METERS, AND A HANDBALL CAN COVER
        MAXIMUM OF 20 METERS.  YOU HAVE A
        GREATER CHANCE OF RETAINING POSSESSION
             WITH A HANDBALL...GOOD LUCK...


        ONE PLAYER, OR TWO?
                        1

        WHAT IS THE NAME OF THE VISITING TEAM?
        ? BOMBERS




        THE BALL IS BOUNCED...

        THE MICRO MEANIES HAVE THE BALL..

        THE MICRO MEANIES PLAYER IS IN THE CLEAR


        MICRO MEANIES: CHOOSE NOW TO KICK (1),
                OR HANDBALL (2)

        PREMIERSHIP FOOTBALL...THE CROWD ROARS!

        >> THE MICRO MEANIES HAVE
         KICKED THE BALL
                25 METERS

        THE BALL IS ON THE HALF FORWARD LINE
```

YOU ARE 85 METERS FROM THE GOAL

THE MICRO MEANIES PLAYER IS IN THE CLEAR

MICRO MEANIES: CHOOSE NOW TO KICK (1),
        OR HANDBALL (2)

YOU HAVE LOST THE BALL
THE BOMBERS HAVE THE BALL..

THE BOMBERS PLAYER IS BEING TACKLED

BOMBERS: CHOOSE NOW TO KICK (1),
        OR HANDBALL (2)
                        OK, KICK...

                WOW...!!

>> THE BOMBERS HAVE KICKED THE BALL
        30 METERS

THE BALL IS IN THE CENTER

YOU ARE 105 METERS FROM THE GOAL

THE BOMBERS PLAYER IS IN THE CLEAR

BOMBERS: CHOOSE NOW TO KICK (1),
        OR HANDBALL (2)
                        OK, KICK...

                !! SHOOT !!

>> THE BOMBERS HAVE KICKED THE BALL
        45 METERS

THE BALL IS ON THE HALF FORWARD LINE

YOU ARE 60 METERS FROM THE GOAL

THE BOMBERS PLAYER IS IN THE CLEAR

BOMBERS: CHOOSE NOW TO KICK (1),
        OR HANDBALL (2)
                        OK, KICK...

                SHOOT!

>> THE BOMBERS HAVE KICKED THE BALL
        40 METERS

THE BALL IS ON THE FORWARD LINE

YOU ARE 20 METERS FROM THE GOAL

THE BOMBERS PLAYER IS IN THE CLEAR

BOMBERS: CHOOSE NOW TO KICK (1),
        OR HANDBALL (2)
                        OK, KICK...

YOU ARE SHOOTING FOR GOAL...

YOU HAVE SCORED A POINT...

        MICRO MEANIES   0 - 0 - 0

        BOMBERS   0 - 1 - 1

        _____

PRESS ANY KEY TO PLAY ON...

THE BALL IS ON THE FORWARD LINE

YOU ARE 30 METERS FROM THE GOAL

THE MICRO MEANIES PLAYER IS IN THE CLEAR

MICRO MEANIES: CHOOSE NOW TO KICK [1],
        OR HANDBALL [2]

YOU ARE SHOOTING FOR GOAL...

YOU HAVE SCORED A POINT...

        MICRO MEANIES   0 - 1 - 1

            BOMBERS   1 - 1 - 7

_____

PRESS ANY KEY TO PLAY ON...

YOU ARE 110 METERS FROM THE GOAL

THE BOMBERS PLAYER IS BEING TACKLED

BOMBERS: CHOOSE NOW TO KICK [1],
        OR HANDBALL [2]
                    OK, KICK...
...SIREN...
 ...SIREN...
  ...SIREN...
   ...SIREN...
    ...SIREN...
     ...SIREN...

THAT IS THE END OF THE FIRST
  QUARTER

        MICRO MEANIES   0 - 1 - 1

            BOMBERS   1 - 1 - 7

YOU ARE SHOOTING FOR GOAL...

YOU HAVE SCORED A GOAL!!

              MICRO MEANIES   8 - 11 - 59

                  BOMBERS   7 - 13 - 55

THE BALL IS ON THE FORWARD LINE

YOU ARE 5 METERS FROM THE GOAL

THE MICRO MEANIES PLAYER IS
 BEING TACKLED

MICRO MEANIES: CHOOSE NOW TO KICK [1],
        OR HANDBALL [2]

YOU ARE SHOOTING FOR GOAL...

YOU HAVE SCORED A GOAL!!

              MICRO MEANIES   9 - 11 - 65

                  BOMBERS   7 - 13 - 55

PRESS ANY KEY TO PLAY ON...

                ...SIREN...
               ...SIREN...
              ...SIREN...
               ...SIREN...
              ...SIREN...
               ...SIREN...
                ...SIREN...
                 ...SIREN...
                  ...SIREN...

THAT IS THE END OF THE FINAL
 QUARTER

```
           MICRO MEANIES   9 - 11 - 65

             BOMBERS   7 - 13 - 55


         CONGRATULATIONS, MICRO MEANIES

         YOU DEFEATED THE BOMBERS
         BY 10 BEHINDS
```

The "Bombers," by the way, is the name of the major football team from the Melbourne suburb of Essendon. Here's the listing to enable you to demonstrate your handball skill:

```
10 REM AUSTRALIAN RULES FOOTBALL
20 REM    BASED ON PROGRAM BY
30 REM        PHILIP J COATES
40 RANDOMIZE VAL(RIGHT$(TIME$,2))
50 CLS
60 PRINT:PRINT:PRINT
70 PRINT TAB(3);"WELCOME TO THE GAME OF
AUSTRALIAN"
80 PRINT:PRINT TAB(12);"RULES FOOTBALL"
90 PRINT:PRINT:PRINT
100 PRINT "REMEMBER THAT A KICK TRAVELS
A MAXIMUM"
110 PRINT "OF 50 METERS, AND A HANDBALL
CAN COVER"
120 PRINT TAB(2);"MAXIMUM OF 20 METERS.
 YOU HAVE A"
130 PRINT "GREATER CHANCE OF RETAINING P
OSSESSION"
140 PRINT TAB(5);"WITH A HANDBALL...GOOD
 LUCK..."
150 GOSUB 1510
160 PRINT:PRINT
170 PRINT "ONE PLAYER, OR TWO?"
180 A$=INKEY$
190 IF A$<"1" OR A$>"2" THEN 180
200 A=VAL(A$)
210 PRINT TAB(20);A:PRINT
220 IF A=2 THEN 240
```

```
230 A$="MICRO MEANIES":AA=1:GOTO 270
240 PRINT "WHAT IS THE NAME OF THE HOME
TEAM?"
250 INPUT A$:IF LEN(A$)<1 THEN 250
260 PRINT
270 PRINT "WHAT IS THE NAME OF THE VISIT
ING TEAM?"
280 INPUT B$:IF LEN(B$)<1 THEN 280
290 CLS:PRINT:PRINT
300 W=0:D=0:QA=9
310 A=INT(RND(1)*2)+1
320 IF A=1 THEN F$=A$:Z=0:GOTO 340
330 F$=B$:Z=1
340 T=0
350 PRINT:PRINT "THE BALL IS BOUNCED..."
360 GOSUB 1480
370 PRINT "THE ";F$;" HAVE THE BALL.."
380 E=INT(RND(1)*2)+1
390 GOSUB 1480
400 IF E=1 THEN D$=" BEING TACKLED":GOTO
  420
410 D$=" IN THE CLEAR"
420 PRINT "THE ";F$;" PLAYER IS";D$
430 GOSUB 1480
440 PRINT F$;": CHOOSE NOW TO KICK (1),"

450 PRINT TAB(9);"OR HANDBALL (2)"
460 IF AA<>1 OR Z=1 THEN 500
470 IF E=1 THEN K=2:GOTO 490
480 K=1
490 GOTO 550
500 K$=INKEY$
510 IF K$<"1" OR K$>"2" THEN 500
520 K=VAL(K$)
530 IF K=1 THEN PRINT TAB(25);"OK, KICK.
.."
540 IF K=2 THEN PRINT TAB(25);"OK, HANDB
ALL..."
550 W=W+1
560 IF W=20 OR W=40 OR W=60 OR W=80 THEN
  1120
570 IF E=1 THEN F=INT(RND(1)*3)+1:G=INT(
RND(1)*4)+1:GOTO 590
580 F=INT(RND(1)*4)+1:G=INT(RND(1)*5)+1
```

```
590 IF K=1 AND F=2 THEN 630
600 IF K=2 AND G=2 THEN 630
610 IF K=1 THEN QA=QA+1:GOTO 700
620 IF K=2 THEN QA=QA+1:GOTO 720
630 E$="YOU HAVE LOST THE BALL"
640 T=-T:QA=9
650 IF Z=0 THEN F$=B$:Z=1:GOTO 670
660 F$=A$:Z=0
670 GOSUB 1480:PRINT E$:GOTO 370
680 GOTO 370
690 REM ------------------
700 D=INT(RND(1)*5)+5
710 G$=" KICKED THE BALL":GOTO 740
720 D=INT(RND(1)*4)+1
730 G$=" HANDBALLED"
740 Y=5*D
750 T=T+Y
760 IF T<-71 THEN T$="ON THE BACK LINE"
770 IF T>-70 AND T<-20 THEN T$="ON THE H
ALF BACK LINE"
780 IF T>-20 AND T<21 THEN T$="IN THE CE
NTER"
790 IF T>20 AND T<71 THEN T$="ON THE HAL
F FORWARD LINE"
800 IF T>70 AND T<110 THEN T$="ON THE FO
RWARD LINE"
810 IF T>109 THEN 1000
820 GOSUB 1480
830 IF D=1 THEN PRINT ,"NICE PASS"
840 IF D=2 THEN PRINT ,"ANOTHER NICE PAS
S"
850 IF D=3 THEN PRINT ,"GOOD FOOTBALL
860 IF D=4 THEN PRINT ,"GREAT TEAMWORK!"

870 IF D=5 THEN PRINT "PREMIERSHIP FOOTB
ALL...THE CROWD ROARS!"
880 IF D=6 THEN PRINT ,"WOW...!!"
890 IF D=7 THEN PRINT ,"INCREDIBLE!!"
900 IF D=8 THEN PRINT ,"SHOOT!"
910 IF D=9 THEN PRINT ,"!! SHOOT !!"
920 IF D>9 THEN PRINT ,"!!!! SHOOT !!!!"

930 GOSUB 1480
940 PRINT ">> THE ";F$;" HAVE";G$
```

```
950  PRINT TAB(6);Y;"METERS"
960  PRINT:PRINT "THE BALL IS ";T$
970  GOSUB 1480
980  PRINT "YOU ARE";110-T;"METERS FROM T
HE GOAL"
990  GOTO 380
1000  B=INT(RND(1)*2)+1
1010  IF B=1 THEN H$="GOAL!!":GOTO 1030
1020  H$="POINT..."
1030  IF Z=0 AND B=1 THEN GA=GA+1:GOTO 10
70
1040  IF Z=0 THEN BA=BA+1:GOTO 1070
1050  IF Z=1 AND B=1 THEN GB=GB+1:GOTO 10
70
1060  BB=BB+1
1070  QA=9
1080  GOSUB 1480
1090  PRINT "YOU ARE SHOOTING FOR GOAL...
"
1100  GOSUB 1480
1110  PRINT "YOU HAVE SCORED A ";H$:GOTO
1220
1120  FOR M=1 TO 20
1130  PRINT TAB(M);"...SIREN..."
1140  NEXT M
1150  B=1
1160  PRINT:PRINT "THAT IS THE END OF THE
 ";
1170  IF W=20 THEN PRINT "FIRST"
1180  IF W=40 THEN PRINT "SECOND"
1190  IF W=60 THEN PRINT "THIRD"
1200  IF W=80 THEN PRINT "FINAL"
1210  PRINT " QUARTER"
1220  GOSUB 1480
1230  PRINT TAB(20-LEN(A$));A$;"   ";GA;"-
";BA;"-";6*GA+BA
1240  PRINT:PRINT TAB(20-LEN(B$));B$;"   "
;GB;"-";BB;"-";6*GB+BB
1250  GOSUB 1480
1260  IF W=80 THEN 1410
1270  IF INKEY$<>"" THEN 1270
1280  PRINT "--------------------------------"
1290  PRINT "PRESS ANY KEY TO PLAY ON..."
1300  IF INKEY$="" THEN 1300
```

```
1310 PRINT TAB(20);">>> OK"
1320 GOSUB 1480
1330 IF B=1 THEN 340
1340 PRINT "THE KICK-IN IS TAKEN..."
1350 GOSUB 1480
1360 E=INT(RND(1)*2)+1
1370 IF E=1 THEN T=-50
1380 T=50:GOTO 370
1390 IF Z=1 THEN F$=A$:Z=0:GOTO 370
1400 F$=B$:Z=1:GOTO 370
1410 IF 6*GA+BA>6*GB+BB THEN F$=A$:G$=B$
:GOTO 1430
1420 F$=B$:G$=A$
1430 GOSUB 1480
1440 PRINT "CONGRATULATIONS, ";F$
1450 PRINT:PRINT "YOU DEFEATED THE ";G$
1460 PRINT "BY";ABS((6*GA+BA)-(6*GB+BB))
;"BEHINDS"
1470 END
1480 REM DELAY/SPACE
1490 PRINT:PRINT
1500 REM ADJUST DELAY TO YOUR SYSTEM
1510 FOR M=1 TO 700:NEXT M
1520 RETURN
```

GOLF

The word "golf" is generally believed to come from a fifteenth-century Dutch word, "colf," which meant a club. Although many, many people enjoy the sport, it is not universally popular. Sir Max Beerbohm, an English wit and caricaturist, was one of those who did not love the game. He is reported (in *Carr's Dictionary of Extraordinary Cricketers*) to have said, when giving money to a fund for a famous cricketer, that the money was "not in support of cricket but as an earnest protest against golf."

Perhaps Sir Max would have looked more kindly on this computer implementation of the game. There's no need to go out in the wind and rain to hit a little white ball around. With this program you can play the game by remote control.

This is a two-player game. With each shot you make, you need to choose which club (out of 12) you will use, and the amount of power you're going to use to hit the ball. There are a number of combinations which will get you similar results. For example, to hit a ball 200 meters you could use a 1 iron at power 1 (full), or a 2 wood at power 0.85, and so on. You can see a list of the clubs at your disposal by entering zero when asked to choose your club.

The chance of a ball varying from center is related to the club you've chosen. A 1 wood may vary up to 15 degrees, while a 5 iron is more likely to vary by eight or less degrees.

Once you've reached the green, you can work out your putting force by dividing the distance to the green by two. This would mean you'd be most likely to sink a 10-meter putt with a putting force of 5. You'll discover that, with practice, most of your scores will be at—or just above—the course par of 72. The best score we've achieved is a 3 under, 69. GOLF is based on a program by Philip Coates.

Here are some snapshots of the game in action:

```
        ENTER NAME OF THE FIRST PLAYER? TIM


        AND THE SECOND ONE? MARYANNE



               ** HOLE NUMBER 1 **


           ** DISTANCE 333    PAR 4 **
```

```
     THIS          CUMULATIVE      PLAYER
     HOLE            TOTAL
      0               0            TIM
      0               0            MARYANNE


     TIM TO PLAY...
     > 333 METERS FROM PIN



>>> WHICH CLUB? 0



     YOU HAVE TWELVE CLUBS TO CHOOSE FROM:


     CLUB        DISTANCE      ENTER
     1 WOOD      240-270        1
     2 WOOD      220-250        2
     3 WOOD      200-230        3
     1 IRON      180-210        4
     2 IRON      160-190        5
     3 IRON      140-170        6
     4 IRON      120-150        7
     5 IRON      100-130        8
     6 IRON       80-110        9
     7 IRON       60-90        10
     8 IRON       40-70        11
     SAND WEDGE 20-50          12
                > PRESS ANY KEY TO CONTINUE



          ** HOLE NUMBER 1 **


        ** DISTANCE 333   PAR 4 **

     THIS          CUMULATIVE      PLAYER
     HOLE            TOTAL
      0               0            TIM
      0               0            MARYANNE


   TIM HAS HIT THE BALL 240 METERS
     > 333 METERS FROM PIN



>>> WHICH CLUB? 1
```

```
>>> WHAT FORCE? 0
YOU CAN HIT THE BALL WITH ANY FORCE
FROM HALF POWER (0.5) TO FULL
                    POWER (1.0)


>>> WHAT FORCE? .95


       ** HOLE NUMBER 1 **

     ** DISTANCE 333    PAR 4 **

     THIS          CUMULATIVE    PLAYER
     HOLE            TOTAL
      4               0          TIM
      0               0          MARYANNE


TIM HAS HIT THE BALL 149 METERS
  AT 13 DEGREES FROM CENTER
  > 56.9 METERS FROM PIN



>>> WHICH CLUB? 9


>>> WHAT FORCE? .6


WELL DONE, YOU ARE ON THE GREEN


       ** HOLE NUMBER 1 **

     ** DISTANCE 333    PAR 4 **

     THIS          CUMULATIVE    PLAYER
     HOLE            TOTAL
      6               0          TIM
      0               0          MARYANNE


TIM HAS HIT THE BALL 14 METERS
  AT 2 DEGREES FROM CENTER
  > 5.4 METERS FROM PIN

WHAT PUTTING FORCE? 5
```

```
                 ** HOLE NUMBER 1 **

              ** DISTANCE 333   PAR 4 **

        THIS          CUMULATIVE      PLAYER
        HOLE            TOTAL
         9               0            TIM
         0               0            MARYANNE


    TIM HAS HIT THE BALL 6.600001 METERS
      AT 2 DEGREES FROM CENTER
      > 2.1 METERS FROM PIN

    WHAT PUTTING FORCE? 1



                 ** HOLE NUMBER 1 **

              ** DISTANCE 333   PAR 4 **

        THIS          CUMULATIVE      PLAYER
        HOLE            TOTAL
         10              0            TIM
         0               0            MARYANNE


        MARYANNE TO PLAY...
        > 333 METERS FROM PIN



    >>> WHICH CLUB? 2


    >>> WHAT FORCE? 1

    YOU HAVE LANDED IN THE ROUGH

    ON YOUR NEXT SHOT YOU MAY BE PENALIZED
            15 METERS...PRESS ANY KEY...



                 ** HOLE NUMBER 9 **

              ** DISTANCE 300   PAR 4 **
```

```
         THIS        CUMULATIVE     PLAYER
         HOLE          TOTAL
          1             96          TIM
          0             80          MARYANNE
```

TIM HAS HIT THE BALL 264 METERS
  AT 1 DEGREES FROM CENTER
  > 36.3 METERS FROM PIN

>>> WHICH CLUB? 9

>>> WHAT FORCE? .4

         ** HOLE NUMBER 9 **

        ** DISTANCE 300   PAR 4 **

```
         THIS        CUMULATIVE     PLAYER
         HOLE          TOTAL
          4             96          TIM
          6             80          MARYANNE
```

MARYANNE HAS HIT THE BALL 4.8 METERS
  AT 5 DEGREES FROM CENTER
  > 2.5 METERS FROM PIN

WHAT PUTTING FORCE? 1

         ** HOLE NUMBER 18 **

        ** DISTANCE 138   PAR 3 **

```
         THIS        CUMULATIVE     PLAYER
         HOLE          TOTAL
          0            145          TIM
          0            141          MARYANNE
```

   TIM TO PLAY...
   > 138 METERS FROM PIN

```
              >>> WHICH CLUB? 3


              >>> WHAT FORCE? .7



         72 COURSE PAR
         _____

          155 TIM  83
          149 MARYANNE  77



           GAME OVER
         _____
```

Note that if you're playing GOLF on a 40-column screen you may have to adjust the display. Do this by changing the TAB(X) parts of the PRINT statements. Here's the listing for your own 18 holes:

```
10  REM            GOLF
20  REM  BASED ON PROGRAM BY
30  REM     PHILIP J COATES
40  CLS
50  RANDOMIZE VAL(RIGHT$(TIME$,2))
60  INPUT "ENTER NAME OF THE FIRST PLAYER
";A$
70  Z$=A$
80  PRINT:PRINT
90  INPUT "AND THE SECOND ONE";B$
100  CLS
110  DEF FN A(X)=INT(RND(1)*X+1)
120  H=0
130  H=H+1:SAH=0:SBH=0
140  HA=0:HB=0
150  DH=0:ANG=0
160  FOR A=1 TO H
170  READ TG
180  NEXT A
190  RESTORE
200  HL=TG
```

```
210  FOR A=1 TO H+18
220  READ P
230  NEXT A
240  RESTORE
250  GOSUB 1300
260  REM --------------
270  PRINT:PRINT
280  INPUT ">>> WHICH CLUB";C
290  IF C=0 THEN 1450
300  FOR A=1 TO C+36
310  READ DH
320  NEXT A
330  RESTORE
340  IF R=2 THEN DH=DH-15
350  PRINT:PRINT
360  INPUT ">>> WHAT FORCE";F
370  IF F=0 THEN 1660
380  IF Z$=A$ THEN HA=HA+1:GOTO 400
390  HB=HB+1
400  X=FN A(20)
410  IF X>10 THEN 430
420  ON X GOTO 450,450,460,460,460,470,47
0,470,470
430  X=X-10
440  ON X GOTO 470,470,470,470,470,480,48
0,480,490,490
450  EX=FN A(5):GOTO 500
460  EX=FN A(5)+5:GOTO 500
470  EX=FN A(10)+10:GOTO 500
480  EX=FN A(5)+20:GOTO 500
490  EX=FN A(5)+25
500  IF C<4 THEN E=5:GOTO 540
510  IF C<7 AND C>3 THEN E=4:GOTO 540
520  IF C<10 AND C>6 THEN E=3:GOTO 540
530  IF C>9 THEN E=2
540  X=FN A(10)
550  ON X GOTO 560,570,580,570,580,580,58
0,570,560
560  ANG=FN A(5)+2*E:GOTO 590
570  ANG=FN A(5)+E:GOTO 590
580  ANG=FN A(5)
590  DH=(DH+EX)*F
600  TG=((DH^2)+(TG^2)-(2*TG*DH*COS(ANG/1
80*3.143)))^(1/2)
```

```
610 IF TG<21 THEN 930
620 IF TG>20 AND TG<26 AND ANG>5 THEN 78
0
630 IF C<6 AND ANG>8 THEN 670
640 R=1
650 GOTO 250
660 REM ----------------
670 R=FN A(2)
680 PRINT
690 PRINT "YOU HAVE LANDED IN THE ROUGH"
700 PRINT
710 IF INKEY$<>"" THEN 710
720 PRINT "ON YOUR NEXT SHOT YOU MAY BE
PENALIZED"
730 PRINT TAB(8);"15 METERS...PRESS ANY
KEY..."
740 IF INKEY$="" THEN 740
750 PRINT TAB(20);"> OK"
760 GOTO 250
770 REM --------------
780 PRINT
790 PRINT "YOU HAVE HIT THE BALL INTO TH
E BUNKER"
800 PRINT
810 PRINT "YOU HAVE NO OPTION BUT TO BLA
ST OUT!!"
820 IF INKEY$<>"" THEN 820
830 PRINT TAB(12);"> PRESS ANY KEY"
840 IF INKEY$="" THEN 840
850 PRINT TAB(20);"> OK"
860 IF Z$=A$ THEN HA=HA+1:GOTO 880
870 HB=HB+1
880 B=FN A(4)
890 IF B=1 THEN 780
900 IF B=2 THEN TG=15:DH=7:GOTO 930
910 IF B=3 THEN TG=10:DH=12:GOTO 930
920 TG=5:DH=17
930 PRINT
940 PRINT "WELL DONE, YOU ARE ON THE GRE
EN"
950 FOR A=1 TO 700:NEXT A
960 GOSUB 1300
970 PRINT
980 INPUT "WHAT PUTTING FORCE";F
```

```
990  IF F=0 THEN 1720
1000 X=FN A(5)
1010 FOR A=1 TO X+48
1020 READ FE
1030 NEXT A
1040 RESTORE
1050 DH=2*F*FE
1060 TG=TG-DH
1070 IF Z$=A$ THEN HA=HA+1:GOTO 1090
1080 HB=HB+1
1090 IF -.3<TG AND TG<.3 THEN 1130
1100 TG=ABS(TG)
1110 GOTO 960
1120 REM ----------
1130 IF Z$=B$ THEN 1150
1140 Z$=B$:GOTO 150
1150 SA=SA+HA
1160 SB=SB+HB
1170 IF H=18 THEN 1190

1180 GOTO 130
1190 PRINT:PRINT
1200 PRINT TAB(4);"72 COURSE PAR"
1210 PRINT TAB(3);"----------------"
1220 PRINT
1230 PRINT TAB(3);SA;A$;" ";SA-72
1240 PRINT TAB(3);SB;B$;" ";SB-72
1250 PRINT:PRINT
1260 PRINT TAB(4);"  GAME OVER  "
1270 PRINT TAB(3);"----------------"
1280 END
1290 REM ------------------
1300 CLS
1310 PRINT:PRINT TAB(6);"** HOLE NUMBER"
;H;"**"
1320 PRINT:PRINT TAB(4);"** DISTANCE";HL
;"  PAR";P;"**"
1330 PRINT
1340 PRINT TAB(3);"THIS","CUMULATIVE","P
LAYER"
1350 PRINT TAB(3);"HOLE","  TOTAL"
1360 PRINT TAB(4);HA,"   ";SA,A$
1370 PRINT TAB(4);HB,"   ";SB,B$
1380 PRINT
```

```
1390 IF DH=0 THEN PRINT TAB(4);Z$;" TO P
LAY..."
1400 IF DH>0 THEN PRINT Z$;" HAS HIT THE
 BALL";DH;"METERS"
1410 IF ANG<>0 THEN PRINT "  AT";ANG;"DE
GREES FROM CENTER"
1420 PRINT TAB(3);">";(INT(ABS(TG*10)))/
10;"METERS FROM PIN"
1430 RETURN
1440 REM -----------------
1450 PRINT:PRINT
1460 PRINT "YOU HAVE TWELVE CLUBS TO CHO
OSE FROM:"
1470 PRINT
1480 PRINT " CLUB      DISTANCE      ENTER"
1490 PRINT "1 WOOD      240-270        1"
1500 PRINT "2 WOOD      220-250        2"
1510 PRINT "3 WOOD      200-230        3"
1520 PRINT "1 IRON      180-210        4"
1530 PRINT "2 IRON      160-190        5"
1540 PRINT "3 IRON      140-170        6"
1550 PRINT "4 IRON      120-150        7"
1560 PRINT "5 IRON      100-130        8"
1570 PRINT "6 IRON       80-110        9"
1580 PRINT "7 IRON       60-90        10"
1590 PRINT "9 IRON       40-70        11"
1600 PRINT "SAND WEDGE 20-50          12"
1610 IF INKEY$<>"" THEN 1610
1620 PRINT TAB(10);"> PRESS ANY KEY TO C
ONTINUE"
1630 IF INKEY$="" THEN 1630
1640 GOTO 250
1650 REM ------------------
1660 PRINT "YOU CAN HIT THE BALL WITH AN
Y FORCE"
1670 PRINT "FROM HALF POWER (0.5) TO FUL
L"
1680 PRINT TAB(20);"POWER (1.0)"
1690 FOR M=1 TO 1000:NEXT M
1700 GOTO 250
1710 REM --------------
1720 PRINT "YOU MAY PUTT THE BALL WITH A
NY FORCE"
1730 PRINT TAB(12);"FROM 0 TO 10"
```

```
1740 PRINT
1750 PRINT TAB(5);"EXPECTED RESULTS:"
1760 PRINT
1770 PRINT TAB(5);"FORCE   DISTANCE"
1780 PRINT TAB(5);"  10    20 METERS"
1790 PRINT TAB(5);"   2     4 METERS"
1800 PRINT TAB(5);"   .5     1 METER"
1810 FOR M=1 TO 1000:NEXT M
1820 GOTO 960
1830 REM ---------------
1840 DATA 333,317,369,148,393,442,179,47
7,300
1850 DATA 138,327,465,269,320,434,157,33
6,402
1860 DATA 4,4,4,3,4,5,3,5,4
1870 DATA 3,4,5,4,4,5,3,4,4
1880 DATA 240,220,200,180,160,140,120,10
0,80,60
1890 DATA 40,20
1900 DATA 0.8,0.9,1,1.1,1.2
```

CRICKET

One of England's lasting contributions to the world is the game of cricket. Its origins are vague, as the 1935 *Encyclopedia of Sports, Games and Pastimes* ("The History, Principles and Practice of All Outdoor and Indoor Sports and Pastimes, with Rules and Regulations, and their Up-to-date Records alphabetically arranged for Ready Reference") points out:

> There are several theories about the origin of cricket, but no one of them is conclusively proved. It may come from an old Saxon word *cryce*, a stick, or from a cognate word that described a form of stool that was used as the wicket in the earliest games. . . . It is almost certain that the game originated in England, though pastimes not unlike it probably existed in other countries before 1200, the date given by some authorities for the first playing of cricket on English soil. . . . Taken up by gentlemen of the titled and wealthy classes, cricket became very popular in the 18th century. A record of a match played on Clapham Common in 1700 is in existence, and in 1719 there was a match between London and Kent. . . .

The encyclopedia goes on to explain that matches are played between two teams of eleven players each, with one, two or more "innings" being played. This computer version, based on a program by Philip Coates, allows you to play over one or two innings, either against another human being or against your computer.

The computer's team is called the *Ramrom Slammers*. In this example I've called my own team *Hartnell's Hammers*. Let's take a look at the program in action:

```
        ONE OR TWO PLAYERS?
                 OK


        ONE INNINGS OR TWO?
                 OK



        WHAT IS THE NAME OF THE HUMAN TEAM?
        ? HARTNELL'S HAMMERS
```

```
     0 FOR 0

RAMROM SLAMMERS BOWLING...
     > STAND BY AS I BOWL...


HARTNELL'S HAMMERS BATTING

HARTNELL'S HAMMERS ARE FACING A BOUNCER

DO YOU WANT TO
          HOOK...1
          DRIVE..2
          CUT....3
          LEAVE..4
                         2



WHAT SORT OF BATTING
IS THAT? TRY AGAIN...

HARTNELL'S HAMMERS BATTING

HARTNELL'S HAMMERS ARE FACING A BOUNCER

DO YOU WANT TO
          HOOK...1
          DRIVE..2
          CUT....3
          LEAVE..4
                         3



HARTNELL'S HAMMERS BATSMAN...CAUGHT!


     _____


     0 FOR 1

RAMROM SLAMMERS BOWLING...
     > STAND BY AS I BOWL...
```

HARTNELL'S HAMMERS BATTING

HARTNELL'S HAMMERS ARE FACING A YORKER

DO YOU WANT TO
          HOOK...1
          DRIVE..2
          CUT....3
          LEAVE..4

                    1

          > BAD MISTAKE...
          > YOU'RE OUT||

_____

28 FOR 8

RAMROM SLAMMERS BOWLING...
     > STAND BY AS I BOWL...

HARTNELL'S HAMMERS BATTING

HARTNELL'S HAMMERS ARE FACING A
SHORT LENGTH

DO YOU WANT TO
          HOOK...1
          DRIVE..2
          CUT....3
          LEAVE..4
          LEAVE..4
                    3

HARTNELL'S HAMMERS SCORED TWO RUNS

---

4 FOR 1

HARTNELL'S HAMMERS BOWLING...

DO YOU WANT TO BOWL A
        BOUNCER.......1
        SHORT LENGTH..2
        GOOD LENGTH...3
        YORKER........4
        FULL TOSS....

                        2

RAMROM SLAMMERS BATTING

RAMROM SLAMMERS ARE FACING A
SHORT LENGTH
SLAMMER BATSMAN RESPONDS BY LEAVING IT

RAMROM SLAMMERS BATSMAN - NO SCORE!

RAMROM SLAMMERS ARE FACING A FULL TOSS
SLAMMER BATSMAN RESPONDS BY LEAVING IT

        > BAD MISTAKE...
        > YOU'RE OUT!!

>>> ALL OUT FOR 90 RUNS!

HARTNELL'S HAMMERS 30 RUNS

RAMROM SLAMMERS 90 RUNS

RAMROM SLAMMERS WON BY 60 RUNS

As with most of these sports simulations, the program is designed so that it resembles, to some extent, the real game. If you've never played, or watched, a game of cricket, half of the fun of playing this game will be in discovering the correct strategies and responses. For example, if the batsman attacks the "bowling," by, for instance, hooking a bouncer, he has a greater chance of scoring fast runs, but also is more likely to go out. A batsman who plays defensively by leaving a good length ball, for example, has less chance of going out. However, he will also score runs more slowly.

The "smack of leather upon willow" (the sound made when the ball hits the cricket bat) has been extolled in English stories. Perhaps you could program your computer to add this feature to the following listing for CRICKET:

```
10 REM CRICKET
20 REM BASED ON PROGRAM BY
30 REM  PHILIP J COATES
40 RANDOMIZE VAL(RIGHT$(TIME$,2))
50 CLS
60 V=0
70 IF INKEY$<>"" THEN 70
80 PRINT:PRINT "ONE OR TWO PLAYERS?"
90 A$=INKEY$
100 IF A$<"1" OR A$>"2" THEN 90
110 PRINT ,"OK"
120 IF A$="1" THEN B$="RAMROM SLAMMERS":
V=1
130 PRINT:PRINT "ONE INNINGS OR TWO?"
140 A$=INKEY$
150 IF A$<"1" OR A$>"2" THEN 140
160 PRINT ,"OK"
170 Z=VAL(A$)
180 PRINT:PRINT
190 IF V=1 THEN PRINT "WHAT IS THE NAME
OF THE HUMAN TEAM?":GOTO 220
200 PRINT:PRINT "PLEASE ENTER THE NAME O
F THE TEAM"
210 PRINT "WHICH IS BATTING FIRST"
220 INPUT A$
230 IF V=1 THEN 260
240 PRINT "AND THE NAME OF THE SECOND TE
AM?"
250 INPUT B$
260 Z$=B$:Y$=A$:S=1
```

```
270 CLS
280 PRINT:PRINT
290 PRINT "------------------------"
300 PRINT:PRINT
310 PRINT T;"FOR";W
320 PRINT:PRINT Z$;" BOWLING..."
330 IF Z$=A$ THEN PRINT:PRINT "DO YOU WA
NT TO BOWL A"
340 IF Z$<>A$ THEN PRINT TAB(4);"> STAND
 BY AS I BOWL...":GOTO 420
350 PRINT TAB(6);"BOUNCER.......1"
360 PRINT TAB(6);"SHORT LENGTH..2"
370 PRINT TAB(6);"GOOD LENGTH...3"
380 PRINT TAB(6);"YORKER........4"
390 PRINT TAB(6);"FULL TOSS.....5"
400 IF V=1 AND Z$=B$ THEN 420
410 GOTO 440
420 FOR B=1 TO 500:NEXT B
430 B=INT(RND(1)*5)+1:GOTO 490
440 I$=INKEY$
450 IF I$<"1" OR I$>"5" THEN 440
460 B=VAL(I$)
470 PRINT TAB(24);B
480 FOR M=1 TO 200:NEXT M
490 IF B=1 THEN C$="BOUNCER"
500 IF B=2 THEN C$="SHORT LENGTH"
510 IF B=3 THEN C$="GOOD LENGTH"
520 IF B=4 THEN C$="YORKER"
530 IF B=5 THEN C$="FULL TOSS"
540 PRINT
550 PRINT:PRINT Y$;" BATTING"
560 PRINT:PRINT Y$;" ARE FACING A ";C$
570 IF Y$="RAMROM SLAMMERS" THEN PRINT "
SLAMMER BATSMAN RESPONDS ";:GOTO 650
580 PRINT:PRINT "DO YOU WANT TO"
590 PRINT TAB(9);"HOOK...1"
600 PRINT TAB(9);"DRIVE..2"
610 PRINT TAB(9);"CUT....3"
620 PRINT TAB(9);"LEAVE..4"
630 IF V=1 AND Y$=B$ THEN 650
640 GOTO 730
650 FOR H=1 TO 500:NEXT H
660 IF B=4 THEN H=2:GOTO 690
670 H=INT(RND(1)*4)+1
```

```
680 IF H=1 THEN PRINT "WITH A HOOK"
690 IF H=2 THEN PRINT "WITH A STRONG DRI
VE"
700 IF H=3 THEN PRINT "WITH A SOLID CUT
710 IF H=4 THEN PRINT "BY LEAVING IT"

720 GOTO 780
730 I$=INKEY$
740 IF I$<"1" OR I$>"4" THEN 730
750 H=VAL(I$)
760 PRINT TAB(20);H
770 FOR M=1 TO 200:NEXT M
780 X=B+(H-1)*5
790 IF X>10 THEN 810
800 ON X GOTO 830,940,850,940,850,940,94
0,900,870,850
810 X=X-10
820 ON X GOTO 830,850,850,940,850,960,96
0,920,940,940
830 E=INT(RND(1)*4)+1
840 ON E GOTO 1010,1000,1030,1000
850 E=INT(RND(1)*6)+1
860 ON E GOTO 980,980,1000,1030,980,980
870 E=INT(RND(1)*11)+1
880 ON X GOTO 970,980,960,970,990,1030,9
60,970,960,990
890 GOTO 960
900 E=INT(RND(1)*9)+1
910 ON E GOTO 960,980,990,960,1030,1000,
970,980,960
920 PRINT:PRINT "WHAT SORT OF BATTING"
930 PRINT "IS THAT? TRY AGAIN...":GOTO 5
50
940 PRINT:PRINT TAB(9);"> BAD MISTAKE...
"
950 PRINT TAB(9);"> YOU'RE OUT!!":W=W+1:
GOTO 1050
960 PRINT:PRINT Y$;" BATSMAN - NO SCORE!
":GOTO 280
970 T$="ONE":T=T+1:GOTO 1040
980 T$="TWO":T=T+2:GOTO 1040
990 T$="THREE":T=T+3:GOTO 1040
1000 T$="FOUR":T=T+4:GOTO 1040
1010 T$="SIX":T=T+6:GOTO 1040
```

```
1020 PRINT:PRINT Y$;" BATSMAN...CAUGHT!"
:W=W+1:GOTO 1050
1030 PRINT:PRINT Y$;" BATSMAN...CAUGHT!"
:W=W+1:GOTO 1050
1040 PRINT:PRINT Y$;" SCORED ";T$;" RUNS
":GOTO 280
1050 IF W<10 THEN 280
1060 PRINT "----------------------------":P
RINT ">>> ALL OUT FOR";T;"RUNS!"
1070 FOR M=1 TO 600:NEXT M
1080 IF S=1 AND Z=1 THEN 1100
1090 GOTO 1120
1100 Y=T:T=0:W=0:S=S+1
1110 Z$=A$:Y$=B$:GOTO 280
1120 IF S=2 AND Z=1 THEN 1140
1130 GOTO 1150
1140 Q=T:GOTO 1240
1150 IF (S=1 OR S=3) AND Z=2 THEN 1210
1160 GOTO 1190
1170 Y=Y+T:T=0:W=0:S=S+1
1180 Z$=A$:Y$=B$:GOTO 280
1190 IF (S=2 OR S=4) AND Z=2 THEN 1210
1200 GOTO 1230
1210 Q=Q+T:S=S+1:T=0:W=0
1220 IF S>3 THEN 1240
1230 Z$=B$:Y$=A$:GOTO 280
1240 PRINT:PRINT:PRINT A$;Y;"RUNS"
1250 PRINT:PRINT B$;Q;"RUNS"
1260 IF Y>Q THEN X$=A$:GOTO 1280
1270 X$=B$
1280 PRINT:PRINT
1290 PRINT X$;" WON BY";ABS(Y-Q);"RUNS"
```

A
Touch of
Magic

Put your computer up for membership in the exclusive Magician's Circle with the three games in this section. In the first, ORTMAN THE MIND-READER, your computer develops E.S.P., while the second, CARTE DE GUET, programs your computer to excel in a "pick a card, any card" trick. In RHABDOMANCY, your computer shows off its ability to predict the future—this time in a number-guessing game. Abracadabra! Zim-zalla-bim! And all that . . . .

ORTMAN THE MIND-READER

As this program was written by David Ortman of Seattle, Washington, I thought it only fair that it be named after him. It's a computer-assisted card trick you can do *without* a deck of cards. The idea behind the program comes from John Scarne's entertaining book *Scarne on Card Tricks* (Signet, Crown Publishers, New York, 1950, p. 227).

Here's ORTMAN in action:

```
YOUR COMPUTER IS NOW DISGUISED AS
ORTMAN THE MIND--READER, FAMED THRU'
THE MID-WEST FOR EXTRAORDINARY POWERS!


              . > PRESS A KEY


I WANT YOU TO THINK OF ANY CARD IN A
           DECK OF CARDS....


                > PRESS A KEY


NOW, DOUBLE ITS VALUE [WITH AN ACE
COUNTING AS ONE, JACK IS ELEVEN, THE
QUEEN IS TWELVE AND THE KING THIRTEEN]


                > PRESS A KEY


NOW, ADD ONE AND MULTIPLY THIS TOTAL
           BY FIVE....


                > PRESS A KEY


NOW, IF THE CARD YOU'RE THINKING OF IS
A SPADE, ADD NINE TO THE LAST TOTAL...
```

```
          IF IT'S A CLUB, ADD SIX; ADD EIGHT IF
          IT'S A HEART, & FOR A DIAMOND ADD SEVEN


                    > PRESS A KEY


     OK, TYPE IN YOUR NUMBER NOW:

     ENTER THE FIRST DIGIT? 1

     AND NOW THE SECOND ONE? 2

     IS THERE A THIRD DIGIT (Y OR N)? Y

                    > PRESS A KEY


     WHAT'S THE THIRD DIGIT? 2

                    > PRESS A KEY

     YOUR CARD IS THE JACK OF DIAMONDS!

                    > PRESS A KEY

     AIN'T I THE CLEVER ONE?
```

As you can see, full instructions are provided for your friends to follow
when you run this program for them. If you want your computer to be "famed
throughout the Midwest," give it this listing and see what it can do:

```
10 REM ORTMAN THE MIND-READER
20 GOSUB 630
30 PRINT "YOUR COMPUTER IS NOW DISGUISED
   AS"
40 PRINT "ORTMAN THE MIND-READER, FAMED
THRU'"
50 PRINT "THE MID-WEST FOR EXTRAORDINARY
   POWERS!"
60 GOSUB 650
70 PRINT "I WANT YOU TO THINK OF ANY CAR
D IN A"
80 PRINT TAB(8);"DECK OF CARDS...."
```

```
90 GOSUB 650
100 PRINT "NOW, DOUBLE ITS VALUE (WITH A
N ACE"
110 PRINT "COUNTING AS ONE, JACK IS ELEV
EN, THE"
120 PRINT "QUEEN IS TWELVE AND THE KING
THIRTEEN)"
130 GOSUB 650
140 PRINT "NOW, ADD ONE AND MULTIPLY THI
S TOTAL"
150 PRINT TAB(8);"BY FIVE...."
160 GOSUB 650
170 PRINT "NOW, IF THE CARD YOU'RE THINK
ING OF IS"
180 PRINT "A SPADE, ADD NINE TO THE LAST
 TOTAL..."
190 PRINT:PRINT "IF IT'S A CLUB, ADD SIX
; ADD EIGHT IF"
200 PRINT "IT'S A HEART, & FOR A DIAMOND
 ADD SEVEN"
210 GOSUB 650
220 PRINT "OK, TYPE IN YOUR NUMBER NOW:"

230 PRINT:INPUT "ENTER THE FIRST DIGIT";
F
240 PRINT:INPUT "AND NOW THE SECOND ONE"
;U
250 PRINT:INPUT "IS THERE A THIRD DIGIT
(Y OR N)";A$
260 IF A$<>"Y" AND A$<>"N" THEN 250
270 GOSUB 650
280 IF A$="Y" THEN 380
290 F=F-1
300 PRINT "YOUR CARD IS THE"F"OF ";
310 IF U=1 THEN 350
320 IF U=2 THEN 360
330 IF U=3 THEN 370
340 PRINT "SPADES":GOTO 580
350 PRINT "CLUBS":GOTO 580
360 PRINT "DIAMONDS":GOTO 580
370 PRINT "HEARTS":GOTO 580
380 PRINT:INPUT "WHAT'S THE THIRD DIGIT"
;N
390 GOSUB 650
```

```
400 S=F+U+8
410 IF S=13 THEN 460
420 IF S=12 THEN 470
430 IF S=11 THEN 480
440 IF S=10 THEN 490
450 F=9:U=N:GOTO 310
460 S$="KING":GOTO 500
470 S$="QUEEN":GOTO 500
480 S$="JACK":GOTO 500
490 S$="TEN"
500 IF N=1 THEN 550
510 IF N=2 THEN 560
520 IF N=3 THEN 570
530 PRINT "YOUR CARD IS THE ";S$;" OF SP
ADES!":GOTO 580
540 PRINT "YOUR CARD IS THE ";S$;" OF SP
ADES!":GOTO 580
550 PRINT "YOUR CARD IS THE ";S$;" OF CL
UBS!":GOTO 580
560 PRINT "YOUR CARD IS THE ";S$;" OF DI
AMONDS!":GOTO 580
570 PRINT "YOUR CARD IS THE ";S$;" OF HE
ARTS!"
580 GOSUB 650
590 PRINT "AIN'T I THE CLEVER ONE?"
600 GOSUB 650
610 END
620 REM **************
630 REM CLS AND PRINT
640 CLS
650 FOR J=1 TO 1000:NEXT J
660 PRINT:PRINT TAB(20);"> PRESS A KEY"
670 IF INKEY$="" THEN 670
680 PRINT:PRINT:PRINT
690 RETURN
```

CARTE DE GUET

This program allows your computer to be the magician, in the old "pick a card, any card" tradition. All you have to do is to follow the instructions:

```
Hi!

Can you believe I can do magic?

Just watch....

All you have to do is follow this set
of instructions:

    1 - THINK of a 4-digit number

    2 - ADD the four digits together

    3 - SUBTRACT this from the first one

    [For example: 3333   3+3+3+3=12
                  3333-12=3321 )

    4 - Now you take a deck of cards
        and remove any FOUR cards
        whose values correspond to the
        final total.

    5 - Each card must be a different
        suit. Use a Queen for zero.

    6 - Place ONE card in your pocket

    7 - Type in the 3 cards left using
        S for spades; D for diamonds;
```

```
H for hearts; and C for clubs
[So it's 5D for five of diamonds
 and QH for queen of hearts]

Enter your first card  3H

Now what's the second one? 7C

What is your third card? 6D




Your card is the 2 of Spades!



Enter 'Y' for a new game,
   or 'N' to quit
                   ? Y




Enter your first card  8D

Now what's the second one? 4H

What is your third card? 6S




Your card is the Queen of Clubs!



Enter 'Y' for a new game,
   or 'N' to quit
                   ? N
See you around, sucker!
```

If the instructions scroll by too quickly to read, adjust the timing loop that starts at line 1170.

David Ortman, who wrote the program, says it's not 100% infallible, but you'll find it works in the vast majority of cases. On the odd occasion when the computer is wrong, you can say: "That only goes to show that you shouldn't trust computers."

Get yourself a deck of cards, power up your computer with this program and go into the magic business for yourself:

```
10 REM CARTE DE GUET
20 REM Engage CAPS LOCK before playing
30 CLS
40 C1=18:C2=27:C3=36
50 GOSUB 1180
60 PRINT "Hi!":GOSUB 1180
70 PRINT "Can you believe I can do magic
?":GOSUB 1180
80 PRINT "Just watch....":GOSUB 1180
90 PRINT "All you have to do is follow t
his set"
100 PRINT "of instructions:"
110 GOSUB 1180
120 PRINT TAB(3);"1 - THINK of a 4-digit
 number":GOSUB 1180
130 PRINT TAB(3);"2 - ADD the four digit
s together":GOSUB 1180
140 PRINT TAB(3);"3 - SUBTRACT this from
 the first one":GOSUB 1180
150 PRINT TAB(3);"(For example: 3333  3+
3+3+3=12"
160 PRINT TAB(17);"3333-12=3321)"
170 GOSUB 1180
180 PRINT TAB(3);"4 - Now you take a dec
k of cards"
190 PRINT TAB(7);"and remove any FOUR ca
rds"
200 PRINT TAB(7);"whose values correspon
d to the"
210 PRINT TAB(7);"final total.":GOSUB 11
80
220 PRINT TAB(3);"5 - Each card must be
a different"
```

```
230 PRINT TAB(7);"suit. Use a Queen for
zero.":GOSUB 1180
240 PRINT TAB(3);"6 - Place ONE card in
your pocket":GOSUB 1180
250 PRINT TAB(3);"7 - Type in the 3 card
s left using"
260 PRINT TAB(7);"S for spades; D for di
amonds;"
270 PRINT TAB(7);"H for hearts; and C fo
r clubs"
280 PRINT TAB(7);"(So it's 5D for five o
f diamonds"
290 PRINT TAB(8);"and QH for queen of he
arts)"
300 FOR Z=1 TO 23:PRINT:FOR J=1 TO 100:N
EXT J:NEXT Z
310 INPUT "Enter your first card  ",X$
320 F$=LEFT$(X$,1)
330 IF F$="Q" THEN F=0:GOTO 350
340 F=VAL(F$)
350 X$=RIGHT$(X$,1)
360 GOSUB 1180
370 INPUT "Now what's the second one";Y$

380 U$=LEFT$(Y$,1)
390 IF U$="Q" THEN U=0:GOTO 410
400 U=VAL(U$)
410 Y$=RIGHT$(Y$,1)
420 GOSUB 1180
430 INPUT "What is your third card";Z$
440 FOR J=1 TO 1000:NEXT J
450 N$=LEFT$(Z$,1)
460 IF N$="Q" THEN N=0:GOTO 480
470 N=VAL(N$)
480 Z$=RIGHT$(Z$,1)
490 S=F+U+N
500 REM COMPARE TO FIRST CONSTANT
510 N1=C1-S:N2=C2-S:N3=C3-S
520 IF N1>=0 THEN 550
530 M=N2:IF N2>=0 THEN M=N3
540 GOTO 620
550 IF N1=0 THEN 900
560 IF N1=9 THEN M=9:GOTO 620
570 IF N1>=10 THEN 610
```

```
580  IF N1>=N2 THEN 600
590  M=N1:GOTO 620
600  M=N2:GOTO 620
610  M=N1-9
620  C$="C":A$="H":R$="S":D$="D"
630  IF M>=9 THEN M=M-9
640  IF C$=X$  THEN 680
650  IF C$=Y$  THEN 670
660  IF C$<>Z$ THEN 760
670  IF A$=X$  THEN 710
680  IF A$=Y$  THEN 700
690  IF A$<>Z$ THEN 790
700  IF R$=X$  THEN 740
710  IF R$=Y$  THEN 730
720  IF R$<>Z$ THEN 820
730  IF D$=X$  THEN 850
740  IF D$=Y$  OR D$<>Z$ THEN 850
750  IF D$=Z$  THEN 1100
760  GOSUB 1230
770  IF M<>1 THEN PRINT "Your card is the
     "M"of Clubs!":GOTO 1100
780  IF M=1 THEN PRINT "Your card is the
     Ace of Clubs!":GOTO 1100
790  GOSUB 1230
800  IF M<>1 THEN PRINT "Your card is the
     "M"of Hearts!":GOTO 1100
810  IF M=1 THEN PRINT "Your card is the
     Ace of Hearts!":GOTO 1100
820  GOSUB 1230
830  IF M<>1 THEN PRINT "Your card is the
     "M"of Spades!":GOTO 1100
840  IF M=1 THEN PRINT "Your card is the
     Ace of Spades!":GOTO 1100
850  GOSUB 1230
860  IF M<>1 THEN PRINT "Your card is the
     "M"of Diamonds!":GOTO 1100
870  IF M=1 THEN PRINT "Your card is the
     Ace of Diamonds!":GOTO 1100
880  REM *****
890  REM QUEEN
900  C$="C":A$="H":R$="S":D$="D"
910  B$="1"
920  GOSUB 1230
930  IF C$=X$ THEN 970
```

```
940 IF C$=Y$ THEN 960
950 IF C$<>Z$ THEN 1060
960 IF A$=X$ THEN 1000
970 IF A$=Y$ THEN 990
980 IF A$<>Z$ THEN 1070
990 IF R$=X$ THEN 1030
1000 IF R$=Y$ THEN 1020
1010 IF R$<>Z$ THEN 1080
1020 IF D$=X$ THEN 1090
1030 IF D$=Y$ THEN 1090
1040 IF D$=Z$ THEN 1100
1050 GOTO 1090
1060 PRINT "Your card is the Queen of Cl
ubs!":GOTO 1100
1070 PRINT "Your card is the Queen of He
arts!":GOTO 1100
1080 PRINT "Your card is the Queen of Sp
ades!":GOTO 1100
1090 PRINT "Your card is the Queen of Di
amonds!"
1100 GOSUB 1230
1110 PRINT "Enter 'Y' for a new game,"
1120 PRINT "   or 'N' to quit"
1130 INPUT "                    ";W$
1140 IF W$="Y" THEN 300
1150 PRINT "See you around, sucker!"
1160 END
1170 REM ********
1180 REM delay
1190 FOR J=1 TO 800:NEXT J
1200 PRINT
1210 RETURN
1220 REM *******
1230 REM SPACING
1240 PRINT:PRINT:PRINT:PRINT
1250 RETURN
```

RHABDOMANCY

The word *rhabdomancy* was in current use in seventeenth-century England. It means "divination for water or mineral ore by means of a rod or wand" (*Collins English Dictionary*, Wm. Collins Publishers, Glasgow, 1979). In this program, you won't be searching for "water or mineral ore," but will be attempting to outguess your computer opponent.

When this game is played by two people, they start by putting their hands behind their backs. Both players bring out a hand at once, extending either one, two or three fingers as they shout the number they guess their opponent will show. If both are correct, or both are wrong, then no points are scored. If only one of the players manages to guess correctly, that person scores the total number of fingers extended by *both* players.

Mathematician John Von Neumann, who first conceived of the idea of a "stored program computer" such as the one you now own, was quite happy to concentrate on more important things, like how to win the game of RHABDOMANCY. He worked out a strategy which, if played correctly, gives one side the advantage. The trick is to subtract the number of fingers you are showing from four for your guess of your opponent's finger total. You also need to show one finger five times, two fingers four times and three fingers three times during any round of *twelve* games.

This strategy, of course, is very hard for mere humans to remember in the heat of battle. This is not true for computers, who can be relied upon never to lose their heads, except during power failures.

Let's take a look at the program (written by David Ortman) in action:

Rhabdomancy....

Rhabdomancy....

Rhabdomancy....

Rhabdomancy....

```
11      2222    3333
 1     2    2   3    3
 1          2        3
 1          2      333
 1         2         3
 1        2      3    3
111     22222    3333
```

If I guess your number, I get the value
of your number, plus mine. If you guess
 my number, your score is increased by
your number, plus the one I thought of.

My score is 0 and youre is 0

Press the RETURN key when you've thought
of a number between 1 and 3

Do you think MY number is 1, 2 or 3? 2

My number was 1

I guess your number is 3

Am I correct [Y or N]
? Y

Am I correct [Y or N]
? Y

No points that time

My score is 4 and yours is 0

```
Press the RETURN key when you've thought
of a number between 1 and 3



My score is 13 and yours is 13



Press the RETURN key when you've thought
of a number between 1 and 3



Do you think MY number is 1, 2 or 3? 3

My number was 1



I guess your number is 3

Am I correct (Y or N)
? Y

_____


I'm the winner!
```

Since computers are generally pretty poor at shouting, you may wish to write down your first few guesses, so you don't get confused. First you guess the computer's number, and then it will guess yours. The plucky computer will keep track of the score, even when it is losing. The first player to reach 15 points is the winner. Von Neumann's winning strategy is discussed in John Fisher's book *Never Give a Sucker an Even Break* (Pantheon Books, New York, 1976, page 88).

```
10  REM RHABDOMANCY
20  REM DAVID E ORTMAN
30  RANDOMIZE VAL(RIGHT$(TIME$,2))
40  CLS
50  PRINT:PRINT:PRINT
60  FOR J=1 TO 20
70  PRINT TAB(J);"Rhabdomancy...."":PRINT
80  FOR M=1 TO 200:NEXT M
```

```basic
90 NEXT J
100 FOR J=1 TO 18:PRINT
110 FOR M=1 TO 200:NEXT M:NEXT J
120 PRINT TAB(9);"11      2222    3333"
130 PRINT TAB(9);" 1      2   2   3   3"
140 PRINT TAB(9);" 1         2        3"
150 PRINT TAB(9);" 1        2       333"
160 PRINT TAB(9);" 1       2         3"
170 PRINT TAB(9);" 1      2      3   3"
180 PRINT TAB(9);"111     22222   3333"
190 FOR J=1 TO 1500:NEXT J
200 PRINT:PRINT "If I guess your number,
 I get the value"
210 PRINT "of your number, plus mine. If
 you guess"
220 PRINT " my number, your score is inc
reased by"
230 PRINT "your number, plus the one I t
hought of."
240 FOR J=1 TO 2000:NEXT J
250 FOR J=1 TO 20:PRINT
260 FOR M=1 TO 400:NEXT M
270 NEXT J
280 T=0:S=0
290 PRINT:PRINT "My score is"T"and yours
 is"S:PRINT:PRINT:PRINT
300 PRINT "Press the RETURN key when you
've thought";
310 INPUT "of a number between 1 and 3",
A$
320 PRINT:PRINT
330 GOSUB 490
340 PRINT "Do you think MY number is 1,
2 or 3";
350 INPUT B
360 IF B<1 OR B>3 THEN 350
370 PRINT:PRINT "My number was"X:PRINT
380 IF X=B THEN PRINT "Well done!"
390 PRINT:PRINT "I guess your number is"
Y
400 PRINT:PRINT "Am I correct (Y or N)"
410 INPUT A$
420 IF A$<>"Y" AND A$<>"y" AND A$<>"N" A
ND A$<>"n" THEN 410
```

```
430 IF (A$="n" OR A$="N") AND X=B THEN P
RINT "What was your number";:INPUT C
440 IF A$="y" OR A$="Y" THEN C=Y
450 PRINT:PRINT "-------------------------
----------------":PRINT
460 GOSUB 560
470 GOTO 290
480 REM *************
490 REM CHOOSE NUMBER
500 Z=INT(RND(1)*100)+1
510 X=3:Y=1
520 IF Z<=42 THEN X=1:Y=3
530 IF Z>42 AND Z<=75 THEN X=2:Y=2
540 RETURN
550 REM ************
560 REM UPDATE SCORE
570 IF X=B AND (A$="y" OR A$="Y") THEN P
RINT "No points that time":GOTO 650
580 IF X<>B AND (A$="n" OR A$="N") THEN
PRINT "No points that time":GOTO 650
590 IF X<>B AND (A$="y" OR A$="Y") THEN
620:REM Computer guesses correctly
600 S=S+X+C
610 GOTO 630
620 T=T+X+C
630 IF T>14 THEN PRINT "I'm the winner!"
:END
640 IF S>14 THEN PRINT "You're the winne
r, human!":END
650 RETURN
```

Just for Fun

Now we can get down to the serious business of having fun. THE CREA-TIVE PROCESS promotes your computer to a poet, with the ability to write lines such as the following memorable verse:

> *More than shields, carpets and silversmiths,*
>   *Instead of voices,*
> *I get angry over . . .*
>   *Your lurking glossaries.*

Once you've survived that contact with the electronic muse, you can unscramble a few cities with CITIGRAMS, try to trick your personal computer numerically in RECEDIVI and encode your secret thoughts with the aid of THE POLYBIUS CIPHER.

The next program in this section is THE PATENTED LIMERICK MACHINE, which should give you a giggle or two ("There was a bald geezer from Rome . . ."). We follow this with ROMINOES, a computerized version of the game Dominoes, and HEADACHES, where your computer proves that flipping coins for profit is not as simple as you might have thought. Finally, you can enjoy STORY BOARD, which uses words you've entered to write marvelous short stories (". . . Tim gets furious and stretches Greg with an orange yellow jigsaw between the nose . . .").

THE CREATIVE PROCESS

"Most poets are dead by their late twenties," observed Robert Graves in a newspaper interview, commenting on the fact that the poetic gift often leaves people as they grow older. If their poetic skills had been encapsulated in a wonderful program like this, they could churn out memorable verse—at the press of a button—for the rest of their lives.

However, there is one problem. Computer poetry has a special stamp on it. What but a machine would be able to producing verses like these?

```
IN PLACE OF CASTLES, COINS
          AND LIGHTHOUSES,
    INSTEAD OF MISTAKES,
  I LOVE...
        YOUR FRUGAL COINS.
```

```
TOUCH YOUR UNCONDITIONAL CASTLES,
 HASTEN AFTER YOUR CANNY CASTLES.
IN PREFERENCE TO LATENT POSTS,
   LOVE YOUR SERVILE CASTLES.
```

```
IN SPITE OF MISTAKES, SHIELDS
          AND DREAMERS,
    IN ANGUISH FOR FINISHES,
  I PURSUE...
        YOUR ENDURING GLOSSARIES.
```

```
MORE THAN WORKMEN, FOG-SIGNALS
          AND TRANSACTIONS,
    IN PLACE OF LIGHTHOUSES,
  I PURSUE...
        YOUR ABSOLUTE POSTS.



IN PREFERENCE TO DREAMERS, TOTEMS
          AND LOAFERS,
    LESS THAN SHIELDS,
  I BURN...
        YOUR SECRET ALARM-CLOCKS.



MORE THAN IDIOSYNCRASIES, LOAFERS
          AND DREAMERS,
    IN PLACE OF PENS,
  I HASTEN AFTER...
        YOUR PRIVATE HIEROGLYPHICS.



MORE THAN SHIELDS, CARPETS
          AND SILVERSMITHS,
    INSTEAD OF VOICES,
  I GET ANGRY OVER...
        YOUR LURKING GLOSSARIES.



IN SPITE OF FOG-SIGNALS, LIGHTHOUSES
          AND GIFTS,
    IN ANGUISH FOR VOICES,
  I SHAKE...
        YOUR DORMANT LOAFERS.



YEARN FOR YOUR DORMANT AUTOGRAPHS,
  GET ANGRY OVER YOUR UNCONDITIONAL AUTOGRAPHS.
AS WELL AS SECRET DREAMERS,
    WASH YOUR PRIVATE AUTOGRAPHS.
```

Type in the program, then run it, and sit back to enjoy reams of really terrible poetry. When you've taken as much as you can, modify the DATA statements to help create an original masterpiece or two of your own:

```
10  REM THE CREATIVE PROCESS
20  GOSUB 490:REM INITIALISE
30  R=INT(RND(1)*4)
40  IF R>0 THEN GOSUB 100:REM PATTERN ONE

50  IF R=0 THEN GOSUB 280:REM PATTERN TWO

60  FOR J=1 TO 2000:NEXT J
70  PRINT:PRINT:PRINT
80  GOTO 30
90  REM **********
100 REM PATTERN ONE
110 E1=INT(RND(1)*8)+1
120 E2=INT(RND(1)*8)+1
130 IF E1=E2 THEN 120
140 F1=INT(RND(1)*40)+1
150 F2=INT(RND(1)*40)+1
160 F3=INT(RND(1)*40)+1
170 F4=INT(RND(1)*40)+1
180 F5=INT(RND(1)*40)+1
190 G=INT(RND(1)*12)+1
200 H=INT(RND(1)*20)+1
210 PRINT A$(E1);" ";B$(F1);", ";B$(F2)
220 PRINT TAB(12);"AND ";B$(F3);","
230 PRINT TAB(5);A$(E2);" ";B$(F4);","
240 PRINT TAB(3);"I ";C$(G);"..."
250 PRINT TAB(8);"YOUR ";D$(H);" ";B$(F5
);"."
260 RETURN
270 REM **********
280 REM PATTERN TWO
290 E1=INT(RND(1)*12)+1
300 E2=INT(RND(1)*12)+1
310 E3=INT(RND(1)*12)+1
320 IF E1=E2 OR E2=E3 OR E3=E1 THEN 300
330 F1=INT(RND(1)*20)+1
340 F2=INT(RND(1)*20)+1
350 F3=INT(RND(1)*20)+1
360 F4=INT(RND(1)*20)+1
```

```
370 IF F1=F2 OR F2=F3 OR F3=F4 OR F2=F4
OR F3=F1 OR F4=F1 THEN 340
380 G1=INT(RND(1)*40)+1
390 G2=INT(RND(1)*40)+1
400 IF G1=G2 THEN 390
410 H=INT(RND(1)*8)+1
420 Z$=B$(G1)
430 PRINT C$(E1);" YOUR ";D$(F1);" ";Z$;
","
440 PRINT TAB(2);C$(E2);" YOUR ";D$(F2);
" ";Z$;"."
450 PRINT A$(H);" ";D$(F3);" ";B$(G2);",
"
460 PRINT TAB(4);C$(E3);" YOUR ";D$(F4);
" ";Z$;"."
470 RETURN
480 REM **********
490 REM INITIALISE
500 CLS
510 RANDOMIZE VAL(RIGHT$(TIME$,2)):REM R
EPLACE WITH 'RANDOMIZE' OR OMIT
520 DIM A$(8),B$(40),C$(12),D$(20)
530 FOR J=1 TO 8
540 READ Z$:A$(J)=Z$
550 NEXT J
560 FOR J=1 TO 40
570 READ Z$:B$(J)=Z$
580 NEXT J
590 FOR J=1 TO 12
600 READ Z$:C$(J)=Z$
610 NEXT J
620 FOR J=1 TO 20
630 READ Z$:D$(J)=Z$
640 NEXT J
650 RETURN
660 REM ****
670 REM DATA
680 REM A$

690 DATA "MORE THAN","LESS THAN","AS WEL
L AS","INSTEAD OF"
700 DATA "IN PLACE OF","IN PREFERENCE TO
","IN SPITE OF","IN ANGUISH FOR"
710 REM B$
```

```
720 DATA "SYMBOLS","IDIOSYNCRASIES","AUT
OGRAPHS","SHIELDS","TOTEMS"
730 DATA "POSTS","LIGHTHOUSES","ROCKETS"
,"ALARM-CLOCKS","FOG-SIGNALS"
740 DATA "PENS","PENCILS","SILVERSMITHS"
,"SKETCHES","HIEROGLYPHICS"
750 DATA "NAMES","DENOMINATIONS","DICTIO
NARIES","GLOSSARIES","VOICES"
760 DATA "SLEEPERS","LOAFERS","WAKERS","
DREAMERS","CARPETS"
770 DATA "WORKMEN","TRANSACTIONS","EVOLU
TION","CASTLES","FRECKLES"
780 DATA "GIFTS","FACULTIES","GUIDES","H
ANDBOOKS","COINS"
790 DATA "COSSACKS","MISTAKES","FINISHES
","ENDINGS","PROCRASTINATIONS"
800 REM C$
810 DATA "LOVE","HATE","NEED","WASH","TO
UCH","YEARN FOR","HASTEN AFTER"
820 DATA "PURSUE","FOLLOW","GET ANGRY OV
ER","SHAKE","BURN"
830 REM D$
840 DATA "ABSOLUTE","UNCONDITIONAL","DEP
RECATING","PROHIBITIVE","DISCOUNTED"
850 DATA "FRUGAL","CANNY","FEELING","SUF
FERING","ENDURING"
860 DATA "EXCITABLE","STAID","MILD","SER
VILE","REVENGEFUL"
870 DATA "LATENT","LURKING","SECRET","PR
IVATE","DORMANT"
```

CITIGRAMS

Here's a neat little game which will help you with spelling the names of cities.
The computer prints up the name of a city, with the letters all jumbled up.
You have to try and sort them into order:

```
YOUR MOVE        EAOAMTRNCS

    ? SACREMENTA
      ^^^^  ^^^^
MOVE NUMBER 1
```

Once you've entered what you think the spelling should be, your com-
puter will put a little arrow underneath the letters which are in the right
position. The game continues until you get the spelling right:

```
YOUR MOVE        EAOAMTRNCS

    ? SACRANEMTO
      ^^^^^ ^ ^^
MOVE NUMBER 3
```

```
YOUR MOVE        EAOAMTRNCS

    ? SACRAMENTO
      ^^^^^^^^^^
MOVE NUMBER 4

WELL DONE, CITY EXPERT.

YOU DID IT IN JUST 4 GOES

THE BEST SCORE SO FAR IS 4
```

As you can see from the DATA statements (in lines 530 through 600), there are many, many cities the computer can choose from:

```
-------------------------------------
YOUR MOVE           HOCGACI

    ? CHAGCOI
      ^^

MOVE NUMBER 2


-------------------------------------
YOUR MOVE           HOCGACI

    ? CHICAGO
      ^^^^^^^

MOVE NUMBER 3

WELL DONE, CITY EXPERT

YOU DID IT IN JUST 3 GOES

THE BEST SCORE SO FAR IS 3
```

By all means, change the words within the DATA lines to any you want. And when you're ready to tackle a CITIGRAM or two (in this program based on one by Neal Cavalier-Smith), enter and run the following listing:

```
10  REM CITIGRAMS
20  CLS:RANDOMIZE VAL(RIGHT$(TIME$,2))
30  DIM A(35),B$(35)
40  H=999
50  RESTORE
60  C$=""
70  G=0
80  PRINT:PRINT:PRINT "PLEASE STAND BY"
90  FOR X=1 TO INT(RND(1)*39)+1
100  READ A$
110  NEXT X
120  Z=0
130  REM **************
140  REM MIX UP LETTERS
150  FOR C=1 TO 35
```

```
160 A(C)=0
170 NEXT C
180 LE=LEN(A$)
190 FOR R=1 TO LE
200 F=0
210 Z=INT(RND(1)*LE)+1
220 FOR X=1 TO LE
230 IF A(X)=Z THEN F=1
240 NEXT X
250 IF F=1 THEN 200
260 A(R)=Z
270 C$=C$+MID$(A$,Z,1)
280 NEXT R
290 CLS
300 REM ************
310 REM PLAY THE GAME
320 PRINT:PRINT
330 PRINT "----------------------------"

340 PRINT "YOUR MOVE        ";C$
350 PRINT
360 INPUT "    ";D$
370 FOR X=1 TO LE
380 IF MID$(A$,X,1)=MID$(D$,X,1) THEN PR
INT TAB(X+5);"^";
390 NEXT X
400 G=G+1
410 PRINT:PRINT "MOVE NUMBER"G
420 IF A$<>D$ THEN 320
430 REM ************
440 REM WIN ROUTINE
450 PRINT:PRINT "WELL DONE, CITY EXPERT"
460 PRINT:PRINT "YOU DID IT IN JUST"G"GO
ES"
470 IF G<H THEN H=G
480 PRINT:PRINT "THE BEST SCORE SO FAR I
S"H
490 FOR X=1 TO 2000:NEXT X
500 GOTO 50
510 REM *********
520 REM CITY DATA
530 DATA "ANCHORAGE","NOME","FAIRBANKS"
540 DATA "SEATTLE","SPOKANE","SHELBY","M
INOT","DULUTH","DETROIT"
```

```
550 DATA "PORTLAND","BILLINGS","MINNEAPO
LIS","MILWAUKEE","CHICAGO"
560 DATA "SACRAMENTO","ALBUQUERQUE","AMA
RILLO","LINCOLN"
570 DATA "DALLAS","BIRMINGHAM","CLEVELAN
D","PITTSBURGH","BALTIMORE"
580 DATA "WASHINGTON","PHILADELPHIA","RI
CHMOND","CHARLESTON","JACKSONVILLE"
590 DATA "MOBILE","TAMPA","WACO","AUSTIN
","PHOENIX","PHOENIX"
600 DATA "CHEYENNE","WICHITA","OMAHA","M
EMPHIS","TULSA"
```

If you find guessing city names too easy, try the program with these DATA statements replacing the original ones:

```
530 DATA "NAIAD","GASTROENTERIC","CORROB
ORATE"
540 DATA "KANAMYCIN","OSSEOUS","APPREHEN
SION","CONTINUUM","MEDUSA","ISLAM"
550 DATA "IRRETRIEVABLE","RELAPSING","TE
MPERATURE","HEXACHLOROPHENE"
560 DATA "PREMEDITATION","THERMOPLASTIC"
,"EQUIPOTENTIAL","DENUNCIATE","COMMON"
570 DATA "CAMPHIRE","PROFILE","SARDONIC"
,"TERYLENE","VINDICTIVE"
580 DATA "CHAFE","COLUMN","HARDNESS","MI
NNOW","PURIFY"
590 DATA "SCLEROUS","TERTIARY","UGANDA",
"BIFOCAL","DENOUNCE"
600 DATA "GORGE","NOMINATIVE","PLACARD",
"PYTHON","REFORMATION","JAPANESE"
```

RECEDIVI

The name of this program comes from the Latin root *recidivus* (or "falling back") of the word "recidivism," which means an habitual relapse into crime. In this case, it's not a crime we're relapsing into, but a numeric palindrome.

A palindrome is a number which, when reversed, reads the same forward as it does backward. For instance, 78987 is a palindrome while 78978 is not. If you take any number, reverse it, add the two numbers together, and keep repeating the process, eventually you'll end up with a palindrome.

In RECEDIVI (based on a program by David Ortman) you have to give your computer a number which it cannot turn into a palindrome in less than five moves. Let's see it in action:

```
        This program will take any number,
      reverse it, then add it to the original
                    number.




      If this number reads the same forwards
      and backwards, the program will end.




      If you are clever enough to pick a
      number which I can't get to read the
      same backwards & forwards in less
            than five moves, you win.



      OK, enter your number        2365



      05632
      05632



      >>> Step number 0

            2365
```

```
                    5632
           07
           079
           0799
           07997
           07997




     >>> Step number 1

             7997




     It took me 1 step
     to get from 2365 to 7997




     You lose, human!
```

You can see that line 410 aborts the program when it gets beyond integer constants. The program shifts to exponential form for larger numbers. You may have to reset this number to get the program to work on your system.

```
10  REM RECEDIVI
20  CLS
30  GOSUB 650
40  PRINT TAB(3);"This program will take
any number,"
50  PRINT "reverse it, then add it to the
 original"
60  PRINT TAB(15);"number."
70  GOSUB 630
80  PRINT " If this number reads the same
 forwards"
90  PRINT TAB(3);"and backwards, the prog
ram will end."
100  GOSUB 630
110  PRINT TAB(3);"If you are clever enou
gh to pick a"
```

```
120 PRINT TAB(3);"number which I can't g
et to read the"
130 PRINT TAB(4);"same backwards & forwa
rds in less"
140 PRINT TAB(7);"than five moves, you w
in."
150 GOSUB 630
160 PRINT TAB(5);"Otherwise, you're the
winner."
170 GOSUB 630
180 FOR Z=1 TO 7:GOSUB 650:NEXT Z
190 X=0:N=0
200 INPUT "OK, enter your number
",N$
210 N$=STR$(INT(VAL(N$)))
220 A$=N$
230 P=LEN(N$)
240 T$="0":REM Zero, not letter O
250 FOR Z=P TO 1 STEP -1
260 T$=T$+MID$(N$,Z,1)
270 PRINT T$
280 NEXT Z
290 GOSUB 650
300 PRINT ">>> Step number"X
310 PRINT

320 PRINT TAB(7);N$
330 Z$=RIGHT$(T$,P)
340 GOSUB 630
350 PRINT TAB(8);Z$
360 A=VAL(N$)
370 B=VAL(Z$)
380 IF A=B THEN 450
390 X=X+1
400 N=VAL(N$)+VAL(Z$)
410 IF N>1000*9999.999 THEN X=-99:GOTO 5
00
420 N$=STR$(N):GOTO 230
430 REM ***********
440 REM END OF GAME
450 GOSUB 630
460 PRINT TAB(5);"It took me"X"step";
470 IF X<>1 THEN PRINT "s":GOTO 490
480 PRINT
```

```
490 IF N<>0 THEN PRINT TAB(5);"to get fr
om";A$;" to";N
500 GOSUB 630
510 IF X<5 AND X>-1 THEN PRINT TAB(5);"Y
ou lose, human!":GOTO 540
520 IF X>4 THEN PRINT TAB(5);"So you're
the winner!":GOTO 540
530 PRINT "The number's too big. I win b
y default"
540 GOSUB 630
550 PRINT "Enter 'Y' to play again, or '
N' to quit"
560 INPUT "      ";Q$
570 IF Q$="y" OR Q$="Y" THEN 170
580 GOSUB 650
590 PRINT TAB(3);"OK, human. See you aga
in sometime!"
600 GOSUB 630
610 END
620 REM ********
630 REM SPACE OUT
640 FOR M=1 TO 1400:NEXT M
650 FOR J=1 TO 3
660 PRINT
670 NEXT J
680 RETURN
```

THE POLYBIUS CIPHER

Polybius was a writer who lived in ancient Greece. He invented an interesting coding method which lies at the heart of many modern cipher systems. This program "translates" your messages into the POLYBIUS CIPHER.

The cipher works like this. A grid, measuring five by five, is drawn up, and the letters of the alphabet (except for Z) are placed within the grid. Each letter can then be referred to by simply giving its grid coordinates.

Here's such a grid, with the letters in place:

	1	2	3	4	5
1	A	B	C	D	E
2	F	G	H	I	J
3	K	L	M	N	O
4	P	Q	R	S	T
5	U	V	W	X	Y

To specify, for example, the "R," we look at its position in the grid. We give the coordinate down the side first (4), then the number across the top (3). This gives us a code of 43 for the letter "R." The other letters of the alphabet can be coded in the same way. "Z" is simply discarded if it appears in a message.

Here's an example of the program in action:

```
ENTER YOUR MESSAGE...
? POLYBIUS WAS A WRITER WHO LIVED IN ANCIENT GREECE
41-35-32-55-12-24-51-44-
53-11-44-
11-
53-43-24-45-15-43-
53-23-35-
32-24-52-15-14-
24-34-
11-34-13-24-15-34-45-
22-43-15-15-13-15-
```

ENTER YOUR MESSAGE...
? HE CRIED AHA!
23-15-
13-43-24-15-14-
11-23-11- !-

ENTER YOUR MESSAGE...
? HE WORKED OUT THE SUBSTITUTION SYSTEM WHICH
23-15-
53-35-43-31-15-14-
35-51-45-
45-23-15-
44-51-12-44-45-24-45-51-45-24-35-34-
44-55-44-45-15-33-
53-23-24-13-23-

ENTER YOUR MESSAGE...
? LIES AT THE HEART OF MANY CODING SYSTEMS
32-24-15-44-
11-45-
45-23-15-
23-15-11-43-45-
35-21-
33-11-34-55-
13-35-14-24-34-22-
44-55-44-45-1

23-15-11-43-45-
35-21-
33-11-34-55-
13-35-14-24-34-22-
44-55-44-45-15-33-44-

ENTER YOUR MESSAGE...
? INCLUDING THIS ONE!
24-34-13-32-51-14-24-34-22-
45-23-24-44-
35-34-15- !-

Here's the (brief) listing for some cipheronic fun of your own:

```
10  REM THE POLYBIUS CIPHER
20  GOSUB 240:REM INITIALISE
30  PRINT:PRINT:PRINT
40  PRINT "ENTER YOUR MESSAGE..."
50  INPUT D$
60  IF D$="SS" THEN END
70  IF LEN(D$)>255 THEN D$=LEFT$(D$,255)
80  CLS
90  FOR J=1 TO LEN(D$)
100 Q=ASC(MID$(D$,J))
110 IF Q=32 THEN PRINT:GOTO 200
120 IF Q<ASC("A") OR Q>ASC("Z") THEN PRI
NT " ";MID$(D$,J,1);"-";:GOTO 200
130 T=0
140 T=T+1
150 S=0
160 S=S+1
170 IF A(T,S)=Q THEN PRINT RIGHT$(STR$(T
),1);RIGHT$(STR$(S),1);"-";:GOTO 200
180 IF S<5 THEN 160
190 IF T<5 THEN 140
200 NEXT J
210 GOTO 30
220 END
230 REM **********
240 REM INITIALISE
250 CLS
260 DIM A(5,5),M$(255)
270 Z=64
280 FOR B=1 TO 5
290 FOR C=1 TO 5
300 Z=Z+1
310 A(B,C)=Z
320 NEXT C
330 NEXT B
340 RETURN
```

THE PATENTED LIMERICK MACHINE

Back in the nineteenth century, the straight-laced Victorians in England had riotous fun at parties singing a comic song that included the refrain line "Will you come up to Limerick?" which was sung between verses. From this has come our use of the word *limerick* to describe a humorous verse of five lines, in which the first, second and fifth lines rhyme with each other, and the second and third lines also rhyme.

You don't have to feel socially inadequate at nineteenth-century parties anymore, even if you can't remember any limericks. Simply take along your PATENTED LIMERICK MACHINE and you'll be the toast of the town. You'll stop the party dead with verses like these:

```
THERE WAS A BALD GEEZER FROM ROME
WHO SAT HIS NEW WATCH IN A GNOME
     WHILE SHAVING HIS TOES
     HE BARTERED HIS NOSE
WHICH MEANT HE COULD NEVER GO HOME


THERE WAS A OLD PUNTER FROM SPAIN
WHO SPRINKLED HIS FIRST WIFE IN A CRANE
     WHILE STROKING HIS EAR
     HE FRACTURED HIS REAR
WHICH MEANT HE COULD NEVER COMPLAIN


THERE WAS A YOUNG WIZARD FROM GREECE
WHO SAT HIS FIRST WIFE IN A FLEECE
     WHILE FEEDING HIS KNEE
     HE SPAT IN HIS TEA
WHICH MEANT HE CALLED THE POLICE
```

```
THERE WAS A OLD PUNTER FROM WALES
WHO SAT HIS NEW WATCH IN A GALE
      WHILE PATTING HIS TOES
      HE FRACTURED HIS NOSE
WHICH MEANT HE WENT VERY PALE
```

When you're ready to generate some randomly awful limericks, get your PATENTED LIMERICK MACHINE into your action with the following listing (and by all means change the words in the DATA statements from line 300 onward to create some original limericks of your own):

```
10  REM THE PATENTED LIMERICK MACHINE
20  GOSUB 160:REM INITIALISE
30  Z=INT(RND(1)*5)+1:Y=INT(RND(1)*5)+1
40  X=INT(RND(1)*5)+1:U=INT(RND(1)*5)+1
50  R=INT(RND(1)*5)+1:V=INT(RND(1)*5)+1
60  S=INT(RND(1)*5)+1:W=INT(RND(1)*5)+1
70  PRINT:PRINT
80  PRINT "THERE WAS A ";A$(Z);" ";B$(Y);
" FROM ";C$(X)
90  PRINT "WHO ";D$(W);" HIS ";E$(S);" IN
 A ";F$(X)
100 PRINT TAB(4);"WHILE ";G$(U);" HIS ";
H$(R)
110 PRINT TAB(4);"HE ";J$(V);" HIS ";K$(
R)
120 PRINT "WHICH MEANT HE ";L$(X)
130 FOR X=1 TO 4000:NEXT X
140 GOTO 30
150 REM *************
160 REM INITIALISATION
170 CLS
180 RANDOMIZE VAL(RIGHT$(TIME$,2))
190 DIM A$(5),B$(5),C$(5),D$(5)
200 DIM E$(5),F$(5),G$(5),H$(5)
210 DIM J$(5),K$(5)
220 FOR E=1 TO 5
230 READ A$(E),B$(E),C$(E),D$(E)
240 READ E$(E),F$(E),G$(E),H$(E)
250 READ J$(E),K$(E),L$(E)
260 NEXT E
270 RETURN
```

```
280 REM ****
290 REM DATA
300 DATA "YOUNG","SAILOR","FRANCE","SAT"
,"NEW WATCH","TRANCE","STROKING"
310 DATA "KNEE","SPAT IN","TEA","DID NOT
 HAVE A CHANCE"
320 DATA "OLD","FELLOW","SPAIN","SANG","
FIRST WIFE","CRANE","PARTING"
330 DATA "EAR","FRACTURED","REAR","COULD
 NEVER COMPLAIN"
340 DATA "WISE","PUNTER","ROME","SMOKED"
,"USED FACE","GNOME","SHAVING"
350 DATA "TOES","SHARPENED","NOSE","COUL
D NEVER GO HOME"
360 DATA "BALD","WIZARD","GREECE","WANGL
ED","YOUNG DOG","FLEECE","PATTING"
370 DATA "GLUE","BATTERED","SHOE","CALLE
D THE POLICE"
380 DATA "FAT","GEEZER","WALES","SPRINKL
ED","BLUE EYES","GALE","FEEDING"
390 DATA "LEGS","BARTERED","EGGS","WENT
VERY PALE"
```

ROMINOES

Our present-day dominoes were probably developed in Italy around 200 years ago. They are based on Chinese dominoes, which were in use many centuries before the Italians got hold of them. Domino sets consist of 28 oblong "stones" or "tiles." Each tile is divided into two sections, and "pips" (like the dots on dice) are placed on each section. The pips range from none (blank) to six, and, if the blanks are excluded, represent all of the possible throws of a pair of dice.

Our computer version of the game—the final program I wrote for this book—uses *rominoes*, which are close cousins of the tiles used in the non-computer world. Each *romino* is a pair of numbers, such as "54" or "30." These are read as if they were the domino tiles "five/four" and "three/blank." The "double blank" domino is represented, naturally enough, as "00."

In this program, you'll find your computer plays a very good game of the most common form of dominoes, the "block game." The dominoes are placed on the table, face downward, and each player selects seven tiles for his or her own use. The others are left on the table as the reserve, or "bone yard," as it is often called.

The computer has the first move (it is simple to modify the program if you want to make the first move), by printing its choice of domino on the screen, like this:

AFTER MY MOVE, THIS IS THE BOARD:

00

As you can see, the computer has played the "double blank." You must respond by placing a *romino* next to the one placed by the computer, with a number which corresponds to one of the numbers on the *romino* which is already in place. For example, if the computer had played "three/four," you could play "two/three" or "three/six" (or any combination which included a three) to the left of the computer's piece, or any piece which included a four (such as "four/six" or "blank/four") to the right of the computer's piece.

Once the computer has played, you are shown your hand:

```
HERE IS YOUR HAND:

1 — 53
2 — 33
3 — 65
4 — 66
5 — 21
6 — 20
7 — 61


ENTER THE NUMBER OF THE PIECE YOU WANT
TO MOVE, 0 TO PASS
           ? 6
AT THE START [S] OR END [E]?
           ? E
```

As you can see, you are asked to select the *number* of the piece you wish to place down. In this case, I chose piece six, which is "20" (two/blank). As the computer had played a double blank, I could put this piece on either side of the computer's title, but I decide to place it at the end.

```
AFTER YOUR MOVE, THIS IS THE BOARD:



00:02

BEFORE THIS MOVE I HAVE 6 TILES...
```

Notice that the program automatically "flips" your piece around so that the two blanks are together. The computer then responds, and the game continues:

```
AFTER MY MOVE, THIS IS THE BOARD:



00:02:22
```

HERE IS YOUR HAND:

```
1 - 53
2 - 33
3 - 65
4 - 66
5 - 21
7 - 61
```

ENTER THE NUMBER OF THE PIECE YOU WANT
TO MOVE, 0 TO PASS
              ? 5
AT THE START (S) OR END (E)?
              ? E

AFTER MY MOVE, THIS IS THE BOARD:

00:02:22:21:11

HERE IS YOUR HAND:

```
1 - 53
2 - 33
3 - 65
4 - 66
7 - 61
```

ENTER THE NUMBER OF THE PIECE YOU WANT
TO MOVE, 0 TO PASS
              ? 7
AT THE START (S) OR END (E)?
              ? E

AFTER MY MOVE, THIS IS THE BOARD:

60:00:02:22:21:11:16

HERE IS YOUR HAND:

```
1 - 53
2 - 33
3 - 65
4 - 66
```

ENTER THE NUMBER OF THE PIECE YOU WANT
TO MOVE, 0 TO PASS
             ? 4
AT THE START (S) OR END (E)?
             ? E

AFTER MY MOVE, THIS IS THE BOARD:

46:60:00:02:22:21:11:16:66

HERE IS YOUR HAND:

```
1 - 53
2 - 33
3 - 65
```

ENTER THE NUMBER OF THE PIECE YOU WANT
TO MOVE, 0 TO PASS
             ? 3
AT THE START (S) OR END (E)?
             ? E

AFTER MY MOVE, THIS IS THE BOARD:

46:60:00:02:22:21:11:16:66:65:55

HERE IS YOUR HAND:

```
1 - 53
2 - 33
```

```
ENTER THE NUMBER OF THE PIECE YOU WANT
TO MOVE, 0 TO PASS
            ? 1
AT THE START (S) OR END (E)?
            ? E
```

The game ends when either one of the players gets rid of all of his or her pieces, or when neither player can move (note that you enter zero [0] when you cannot move, and must "pass"):

```
THIS IS THE BOARD:


46:60:00:02:22:21:11:16:66:65:55:53:31


MY TILES:
::::::::::::::


YOUR TILES:
52:33::::::::::::::


AT THE END OF THAT GAME, YOUR SCORE
      IS 13 AND MINE IS 0


        SO I'M THE WINNER



  1 GAMES TO ME, 0 GAMES TO YOU



ENTER 'Y' FOR A NEW GAME, 'N' TO END
? Y
```

The value of each number on the tiles held at the end of a game is totaled (note that "27" counts as two plus seven, not twenty-seven), and the player with the *lowest* total wins. There are five games in a round, and the winner is the player who wins the majority of those games:

```
AFTER YOUR MOVE, THIS IS THE BOARD:


34:44:46:65:51:11:13:33:32:20:06:66
```

BEFORE THIS MOVE I HAVE 2 TILES...
I CANNOT MOVE...

I'LL TAKE A TILE FROM THE BONEYARD

AFTER MY MOVE, THIS IS THE BOARD:

41:10:05:53:34:44:46:65:51:11:13:33:32:2
0:06:66:62:25:55

HERE IS YOUR HAND:

  1 - 21
  2 - 22

ENTER THE NUMBER OF THE PIECE YOU WANT
TO MOVE, 0 TO PASS
                ? 0
YOU HAVE DRAWN :61:

MY TILES:
::::::::::::::

YOUR TILES:
52:30::00:22::::::::::

AT THE END OF THAT GAME, YOUR SCORE
       IS 14 AND MINE IS 0

        SO I'M THE WINNER

  4 GAMES TO ME, 1 GAMES TO YOU

THAT'S FIVE GAMES WE'VE PLAYED
      AND I'M THE OVERALL WINNER

      OK, THANKS FOR THE GAMES

You'll find the computer a difficult opponent to defeat in this game of ROMINOES:

```
10 REM ROMINOES
20 GOSUB 1600:REM INITIALISE
30 REM **********
40 REM MAIN CYCLE
50 NTFLAG=0
60 TFLAG=0
70 GOSUB 1320:IF CLEFT=14 THEN 200
80 GOSUB 540:REM COMPUTER MOVES
90 IF NTFLAG=1 THEN 120
100 IF TFLAG=0 THEN 130
110 PRINT:PRINT "I'LL TAKE A TILE FROM T
HE BONEYARD":GOSUB 1570
120 MF=9
130 GOSUB 1470:REM PRINTOUT
140 GOSUB 1400:IF HLEFT=14 THEN 200
150 GOSUB 950:REM HUMAN MOVES
160 GOSUB 1470:REM PRINTOUT
170 IF NTFLAG=2 THEN 200:REM GAME OVER
180 GOTO 50
190 REM **********
200 REM END OF GAME
210 PRINT TAB(8);"END OF GAME":PRINT:GOS
UB 1570
220 MF=9
230 GOSUB 1470
240 CS=0:HS=0
250 PRINT "MY TILES:"
260 FOR J=1 TO 14:PRINT C$(J);":";:NEXT
J
270 PRINT:PRINT:PRINT "YOUR TILES:"
280 FOR J=1 TO 14:PRINT H$(J);":";:NEXT
J:PRINT:PRINT
290 FOR J=1 TO 14
300 IF C$(J)<>"" THEN CS=CS+VAL(RIGHT$(C
$(J),1))+VAL(LEFT$(C$(J),1))
310 IF H$(J)<>"" THEN HS=HS+VAL(RIGHT$(H
$(J),1))+VAL(LEFT$(H$(J),1))
320 H$(J)="":C$(J)=""
330 NEXT J
340 PRINT:PRINT "AT THE END OF THAT GAME
, YOUR SCORE"
```

```
350 PRINT TAB(6);"IS"HS"AND MINE IS"CS
360 PRINT:PRINT TAB(8);
370 IF CS=HS THEN PRINT "IT'S A DRAW"
380 IF CS<HS THEN PRINT "SO I'M THE WINN
ER":CGAME=CGAME+1
390 IF HS<CS THEN PRINT "SO YOU'RE THE W
INNER":HGAME=HGAME+1
400 PRINT:PRINT
410 PRINT CGAME"GAMES TO ME,"HGAME"GAMES
 TO YOU"
420 PRINT:PRINT
430 IF CGAME+HGAME<5 THEN 480
440 PRINT "THAT'S FIVE GAMES WE'VE PLAYE
D"
450 IF CGAME>HGAME THEN PRINT TAB(7);"AN
D I'M THE OVERALL WINNER"
460 IF CGAME<HGAME THEN PRINT TAB(5);"AN
D YOU'RE THE OVERALL WINNER"
470 GOTO 510
480 PRINT "ENTER 'Y' FOR A NEW GAME, 'N'
 TO END"
490 INPUT L$
500 IF L$="Y" THEN CLS:GOSUB 1660:GOTO 5
0
510 PRINT:PRINT TAB(8);"OK, THANKS FOR T
HE GAMES"
520 END
530 REM **************
540 REM COMPUTER MOVES
550 MF=1
560 IF P$="" THEN 780:REM FIRST MOVE
570 PRINT "BEFORE THIS MOVE I HAVE"14-CL
EFT"TILES..."
580 GOSUB 1570
590 X=0:FLAG=0
600 X=X+1
610 IF LEFT$(C$(X),1)=LEFT$(P$,1) THEN F
LAG=1:GOSUB 870:RETURN
620 IF RIGHT$(C$(X),1)=LEFT$(P$,1) THEN
FLAG=2:GOSUB 870:RETURN
630 IF LEFT$(C$(X),1)=RIGHT$(P$,1) THEN
FLAG=3:GOSUB 870:RETURN
640 IF RIGHT$(C$(X),1)=RIGHT$(P$,1) THEN
 FLAG=4:GOSUB 870:RETURN
```

```
650 IF X<14 THEN 600
660 PRINT "I CANNOT MOVE...":GOSUB 1570
670 X=X+1
680 IF D$(X)="" THEN 730
690 Y=0
700 Y=Y+1
710 IF C$(Y)="" THEN C$(Y)=D$(X):D$(X)="
":TFLAG=1:RETURN
720 IF Y<14 THEN 700
730 IF X<28 THEN 670
740 PRINT "THERE ARE NO TILES LEFT IN BO
NEYARD"
750 GOSUB 1570
760 NTFLAG=NTFLAG+1
770 RETURN
780 REM * FIRST MOVE **
790 X=0
800 X=X+1
810 IF LEFT$(C$(X),1)=RIGHT$(C$(X),1) TH
EN 840:REM DOUBLE FOUND
820 IF X<7 THEN 800
830 X=INT(RND(1)*7)+1
840 P$=C$(X):C$(X)=""
850 RETURN
860 REM *********
870 REM MAKE MOVE
880 IF FLAG=1 THEN P$=RIGHT$(C$(X),1)+LE
FT$(C$(X),1)+":"+P$
890 IF FLAG=2 THEN P$=C$(X)+":"+P$
900 IF FLAG=3 THEN P$=P$+":"+C$(X)
910 IF FLAG=4 THEN P$=P$+":"+RIGHT$(C$(X
),1)+LEFT$(C$(X),1)
920 C$(X)=""
930 RETURN
940 REM **********
950 REM HUMAN MOVES
960 MF=2
970 PRINT:PRINT "HERE IS YOUR HAND:":PRI
NT
980 FOR G=1 TO 14
990 IF H$(G)<>"" THEN PRINT G"- ";H$(G)
1000 NEXT G
1010 PRINT:PRINT "ENTER THE NUMBER OF TH
E PIECE YOU WANT  TO MOVE, 0 TO PASS"
```

```
1020 INPUT "                   ";M
1030 IF M<0 OR M>14 THEN 1020
1040 IF M=0 THEN 1160:REM PASS
1050 IF H$(M)="" THEN 1020
1060 PRINT "AT THE START (S) OR END (E)?
"
1070 INPUT "                 ";A$
1080 IF A$<>"S" AND A$<>"E" THEN 1070
1090 IF A$="E" THEN 1120
1100 IF RIGHT$(H$(M),1)=LEFT$(P$,1) THEN
 P$=H$(M)+":"+P$:GOTO 1140
1110 P$=RIGHT$(H$(M),1)+LEFT$(H$(M),1)+"
:"+P$:GOTO 1140
1120 IF LEFT$(H$(M),1)=RIGHT$(P$,1) THEN
 P$=P$+":"+H$(M):GOTO 1140
1130 P$=P$+":"+RIGHT$(H$(M),1)+LEFT$(H$(
M),1)
1140 H$(M)=""
1150 RETURN
1160 REM HUMAN PASS
1170 X=0
1180 X=X+1
1190 IF H$(X)="" THEN 1210
1200 IF X<14 THEN 1180
1210 Y=14
1220 Y=Y+1
1230 IF D$(Y)<>"" THEN 1280
1240 IF Y<28 THEN 1220
1250 PRINT "NO TILES LEFT IN BONEYARD"
1260 NTFLAG=NTFLAG+1
1270 RETURN
1280 H$(X)=D$(Y):D$(Y)=""
1290 PRINT "YOU HAVE DRAWN :";H$(X);":"
1300 GOSUB 1570
1310 RETURN
1320 REM COMPUTER OUT?
1330 REM *************
1340 CLEFT=0
1350 FOR J=1 TO 14
1360 IF C$(J)="" THEN CLEFT=CLEFT+1
1370 NEXT J
1380 RETURN
1390 REM **********
1400 REM HUMAN OUT?
```

```
1410 HLEFT=0
1420 FOR J=1 TO 14
1430 IF H$(J)="" THEN HLEFT=HLEFT+1
1440 NEXT J
1450 RETURN
1460 REM *********
1470 REM PRINT OUT
1480 CLS
1490 IF MF=9 THEN 1530
1500 CLS
1510 IF MF=1 THEN PRINT "AFTER MY MOVE,
";:GOTO 1530
1520 PRINT "AFTER YOUR MOVE, ";
1530 PRINT "THIS IS THE BOARD:"
1540 PRINT:PRINT
1550 PRINT P$
1560 PRINT
1570 FOR Q=1 TO 1000:NEXT Q
1580 RETURN
1590 REM **************
1600 REM INITIALISATION
1610 CLS
1620 RANDOMIZE VAL(RIGHT$(TIME$,2))
1630 DIM D$(28),H$(14),C$(14)
1640 PRINT:PRINT "STAND BY, CHAMP!"
1650 REM * SET UP DOMINOES *
1660 X=0
1670 FOR J=0 TO 6
1680 FOR K=0 TO J
1690 X=X+1
1700 D$(X)=RIGHT$(STR$(J),1)+RIGHT$(STR$
(K),1)
1710 NEXT K
1720 NEXT J
1730 PRINT:PRINT
1740 REM * SHUFFLE DOMINOES *
1750 REM MOSES/OAKFORD ROUTINE (1963)
1760 FOR J=28 TO 1 STEP -1
1770 T=INT(RND(1)*J)+1
1780 H$=D$(T)
1790 D$(T)=D$(J)
1800 D$(J)=H$
1810 NEXT J
1820 REM * ALLOT HANDS *
```

```
1830 FOR J= 1 TO 7
1840 H$(J)=D$(J):D$(J)=""
1850 C$(J)=D$(J+7):D$(J+7)=""
1860 NEXT J
1870 P$="":REM HOLDS CURRENT BOARD
1880 HGAME=0:CGAME=0:REM TOTALS WON
1890 RETURN
```

HEADACHES

Heads I win, tails you lose. Or rather, your computer wins. If you flip a coin three times, eight different results are possible (and try it with a quarter if you don't believe me). If you were asked about it, you'd probably think that any one of the eight possible combinations is as likely to appear as any other. But it's not so.

In fact, with a bit of study, you can easily find out which combinations are most likely to come up in a long series of coin tosses. Here are the eight possible combinations:

```
HHH    TTT
HHT    TTH
HTH    THT
HTT    THH
```

And here are the odds related to these combinations:

```
THT beats HHH 7 to 1
HTH beats TTT 7 to 1
HTT beats TTH 3 to 1
THH beats HHT 3 to 1
TTH beats THH 2 to 1
TTH beats THT 2 to 1
HHT beats HTH 2 to 1
HHT beats HTT 2 to 1
```

This program will give your computer the power to win bets against your friends ("Oh, yeah, so you think you can beat the computer, huh?"). The winner is the first player to win five rounds. Appropriately enough, mathematician Walter Penney discovered this principle and published it in the *Journal of Recreational Mathematics* (October, 1969). Martin Gardner explored it further in his *Scientific American* column of October, 1974. David Ortman, of Seattle, brought it to my attention, and wrote the notes for this program.

Here it is in action:

```
OK, ENTER YOUR COMBINATION
? HTH
```

OK, YOU HAVE HTH AND I'VE CHOSEN HHT

NOW I'LL FLIP...

TAILS TAILS HEADS

YOU: HTH   ME: HHT

THE LAST THREE THROWN WERE TTH

SO I MUST FLIP AGAIN...

HEADS

YOU: HTH   ME: HHT

THE LAST THREE THROWN WERE THH

SO I MUST FLIP AGAIN...

HEADS

YOU: HTH   ME: HHT

THE LAST THREE THROWN WERE THH

SO I MUST FLIP AGAIN...

TAILS

YOU: HTH   ME: HHT

THE LAST THREE THROWN WERE HHT

I'VE WON!!!

YOUR SCORE IS 0 AND MINE IS 1

STAND BY FOR A NEW GAME...

```
OK, ENTER YOUR COMBINATION
? HHH

OK, YOU HAVE HHH AND I'VE CHOSEN THH

NOW I'LL FLIP...

TAILS TAILS HEADS

YOU: HHH    ME: THH

THE LAST THREE THROWN WERE TTH


SO I MUST FLIP AGAIN...

TAILS

YOU: HHH    ME: THH

THE LAST THREE THROWN WERE THT


SO I MUST FLIP AGAIN...

HEADS

YOU: HTT    ME: HHT

THE LAST THREE THROWN WERE THH


SO I MUST FLIP AGAIN...

TAILS

YOU: HTT    ME: HHT

THE LAST THREE THROWN WERE HHT

I'VE WON!!!

THAT'S FIVE FOR ME SO I WIN THE ROUND!
```

So you think you can beat the computer? Just try it with this listing:

```
10 REM HEADACHES
20 RANDOMIZE VAL(RIGHT$(TIME$,2))
30 CLS
40 A$=""
50 CS=0:HS=0
60 GOSUB 600
70 PRINT "OK, ENTER YOUR COMBINATION"
80 INPUT H$
90 IF ASC(H$)>ASC("T") THEN PRINT "UPPER
 CASE, PLEASE":GOTO 80
100 IF LEN(H$)<>3 THEN PRINT "I NEED THR
EE":GOTO 80
110 IF H$="HHH" OR H$="HHT" THEN C$="THH
"
120 IF H$="HTH" OR H$="HTT" THEN C$="HHT
"
130 IF H$="THH" OR H$="THT" THEN C$="TTH
"
140 IF H$="TTH" OR H$="TTT" THEN C$="HTT
"
150 CLS
160 GOSUB 600
170 PRINT "OK, YOU HAVE ";H$;" AND I'VE
CHOSEN ";C$
180 GOSUB 600
190 PRINT "NOW I'LL FLIP..."
200 GOSUB 600
210 FOR Z=1 TO 3
220 GOSUB 520
230 NEXT Z
240 GOSUB 600
250 GOSUB 470:GOSUB 470
260 PRINT:PRINT "YOU: ";H$;"    ME: ";C$
270 M$=RIGHT$(A$,3)
280 PRINT:PRINT "THE LAST THREE THROWN W
ERE ";M$
290 GOSUB 470:GOSUB 470
300 IF M$=H$ THEN HS=HS+1:PRINT:PRINT "Y
OU'VE WON!!!":GOTO 380
310 IF M$=C$ THEN CS=CS+1:PRINT:PRINT "I
'VE WON!!!":GOTO 380
320 PRINT:PRINT
```

```
330 PRINT "SO I MUST FLIP AGAIN...":PRIN
T
340 GOSUB 470
350 GOSUB 520
360 PRINT
370 GOTO 260
380 GOSUB 600
390 IF CS=5 THEN PRINT "THAT'S FIVE FOR
ME SO I WIN THE ROUND!":END
400 IF HS=5 THEN PRINT "THAT'S FIVE FOR
YOU SO YOU WIN THE ROUND!":END
410 PRINT "YOUR SCORE IS"HS"AND MINE IS"
CS
420 GOSUB 600
430 PRINT "STAND BY FOR A NEW GAME..."
440 GOSUB 470
450 GOTO 60
460 REM *****
470 REM DELAY
480 FOR J=1 TO 1000:NEXT J
490 RETURN
500 END
510 REM ***********
520 REM FLIP-A-COIN
530 Y$="TAILS"
540 GOSUB 470
550 IF RND(1)>.5 THEN Y$="HEADS"
560 PRINT Y$;" ";
570 A$=A$+LEFT$(Y$,1)
580 RETURN
590 REM *********
600 REM SPACE OUT
610 PRINT:PRINT:PRINT
620 RETURN
```

STORY
BOARD

Now it's time to unleash your creativity. Your computer asks you for a number of words, juggles them around in its electronic head, and then produces an original piece of prose. You'll have a lot of laughs with this program, especially if you enter the names (and parts of the body) of some of your friends.
This is the kind of instructions you have to follow:

```
NOW, YOU AND I ARE GOING TO WRITE
A STORY TOGETHER. ALL YOU HAVE TO DO IS
GIVE ME WORDS AS I ASK FOR THEM, AND
I'LL WEAVE THEM INTO A FASCINATING TALE


GIVE ME A WORD ENDING IN 'LY'? HEAVILY
NOW A NOUN [SINGULAR]? GRAPEFRUIT
I WOULD NOW LIKE AN ADJECTIVE STARTING
 WITH A VOWEL? OPULENT
OK, NOW A WORD LIKE 'SEE' OR 'HEAR'? WAT
CH


OK, NOW NAME A PART OF THE BODY? KNEE
OK, A FRIEND'S FIRST NAME? GREG
FINE, NOW ANOTHER FRIEND'S FIRST NAME? M
ARY-ANNE
AND NEXT I'LL NEED A SINGULAR WORD,
DENOTING ACTION, SUCH AS 'EAT'? KILL


I'D LIKE AN EMOTIONAL WORD, SUCH AS
'ANGRY'? FURIOUS
NOW AN ADJECTIVE? LANGUID
AND ANOTHER ADJECTIVE? EXPLOSIVE
NEXT, A PLURAL NOUN? PADLOCKS
```

```
OK, LET'S HAVE A STRANGE LOCATION
SUCH AS 'INSIDE A MUSHROOM'? ACROSS THE
IRISH SEA
RIGHT, ANOTHER VERB ENDING IN 'S'? SQUAS
HES


A PLURAL NOUN...? TAXI-CABS
AN ADJECTIVE, PLEASE? WET

NOT TOO MANY MORE!
```

And this is the sort of story your computer can produce from that input:

```
ONE DAY, TIM EXPANDS THAT
GREG IS HAVING A KNUCKLE-DUSTER
WITH MARY-ANNE.

SO THAT TIM CAN WATCH
THEM IN AN OPULENT DOLLAR BILL,
TIM WASHES ACROSS THE IRISH SEA
WITH WET TAXI-CABS
TO LISTEN...

WHEN TIM SQUASHES GREG AND MARY-ANNE
ACROSS THE IRISH SEA
WEARING EXPLOSIVE PADLOCKS
BOUGHT FROM THE LANGUID
GRAPEFRUIT, TIM GETS FURIOUS
AND STRETCHES GREG
WITH AN ORANGE YELLOW JIGSAW
BETWEEN THE NOSE.

AT THE SAME TIME, TIM
YELLS OUT HEAVILY: 'I JUST
CAN'T KILL IT ANY MORE!'

AT THESE WORDS, MARY-ANNE
PICKS UP GREG BY
THE KNEE AND STRETCHES
TOWARDS THE OPULENT GRAPEFRUIT
WHERE THEY LIVE HEAVILY
          EVER AFTER!
```

When you can't wait a moment more, enter the following listing, and create some excitement of your own. (Note that you may have to adjust the timing loop in line 1020 to show the story on your screen.)

```
10 REM STORY BOARD
20 CLS
30 PRINT:PRINT "NOW, YOU AND I ARE GOING
   TO WRITE"
40 PRINT "A STORY TOGETHER. ALL YOU HAVE
   TO DO IS"
50 PRINT "GIVE ME WORDS AS I ASK FOR THE
M, AND"
60 PRINT "I'LL WEAVE THEM INTO A FASCINA
TING TALE"
70 PRINT:PRINT
80 GOSUB 1040:REM DELAY
90 CLS
100 PRINT:PRINT
110 INPUT "GIVE ME A WORD ENDING IN 'LY'
";X$
120 INPUT "NOW A NOUN (SINGULAR)";Q$
130 INPUT "I WOULD NOW LIKE AN ADJECTIVE
   STARTING   WITH A VOWEL";G$
140 INPUT "OK, NOW A WORD LIKE 'SEE' OR
'HEAR'";F$
150 CLS
160 PRINT:PRINT
170 INPUT "OK, NOW NAME A PART OF THE BO
DY";Z$
180 INPUT "OK, A FRIEND'S FIRST NAME";C$

190 INPUT "FINE, NOW ANOTHER FRIEND'S FI
RST NAME";E$
200 PRINT "AND NEXT I'LL NEED A SINGULAR
   WORD,"
210 INPUT "DENOTING ACTION, SUCH AS 'EAT
'";Y$
220 CLS
230 PRINT:PRINT
240 PRINT "YOU ARE DOING WELL!"
250 GOSUB 1040
260 CLS
270 PRINT:PRINT
```

```
280 INPUT "AND NOW TELL ME YOUR FIRST NA
ME";A$
290 INPUT "GIVE ME ANOTHER PART OF THE B
ODY";W$
300 PRINT:PRINT
310 PRINT "NEXT, I'LL NEED A WORD DENOTI
NG"
320 INPUT "POSITION, SUCH AS 'OVER'";V$
330 INPUT "AND ANOTHER NOUN, A CRAZY ONE
";U$
340 INPUT "AN ADJECTIVE STARTING WITH A
VOWEL";T$
350 CLS
360 PRINT:PRINT
370 INPUT "NOW A VERB, SUCH AS 'RUNS', E
NDING IN S";S$
380 PRINT "HEY, ";S$;" IS PRETTY GOOD!"
390 PRINT "WHY NOT GIVE ME ANOTHER VERB
ENDING"
400 INPUT "IN 'S'";B$
410 PRINT:PRINT
420 PRINT "OK, NOT TOO MANY MORE, NOW...
"
430 GOSUB 1040
440 CLS
450 PRINT:PRINT
460 INPUT "I'D LIKE AN EMOTIONAL WORD, S
UCH AS    'ANGRY'";R$
470 INPUT "NOW AN ADJECTIVE";P$
480 INPUT "AND ANOTHER ADJECTIVE";N$
490 INPUT "NEXT, A PLURAL NOUN";O$
500 PRINT:PRINT
510 PRINT "OK, LET'S HAVE A STRANGE LOCA
TION"
520 INPUT "SUCH AS 'INSIDE A MUSHROOM'";
J$
530 INPUT "RIGHT, ANOTHER VERB ENDING IN
 'S'";M$
540 PRINT:PRINT
550 INPUT "A PLURAL NOUN...";L$
560 INPUT "AN ADJECTIVE, PLEASE";K$
570 PRINT:PRINT "NOT TOO MANY MORE!"
580 GOSUB 1040
590 CLS
```

```
600 INPUT "LET'S HAVE A VERB ENDING IN '
S'";I$
610 INPUT "A NOUN";H$
620 INPUT "A NOUN STARTING WITH A CONSON
ANT";D$
630 CLS
640 PRINT:PRINT "OK, STAND BY..."
650 GOSUB 1040
660 CLS
670 PRINT "ONE DAY, ";A$;" ";B$;" THAT"
680 PRINT C$;" IS HAVING A ";D$
690 PRINT "WITH ";E$;"."
700 PRINT
710 GOSUB 1040
720 PRINT "SO THAT ";A$;" CAN ";F$
730 PRINT "THEM IN AN ";G$;" ";H$;","
740 PRINT A$;" ";I$;" ";J$
750 PRINT "WITH ";K$;" ";L$
760 PRINT "TO LISTEN..."
770 PRINT
780 GOSUB 1040
790 PRINT "WHEN ";A$;" ";M$;" ";
800 PRINT C$;" AND ";E$;" ";J$
810 PRINT "WEARING ";N$;" ";O$
820 PRINT "BOUGHT FROM THE ";P$
830 PRINT Q$;", ";A$;" GETS ";R$
840 PRINT "AND ";S$;" ";C$
850 PRINT "WITH AN ";T$;" ";U$
860 PRINT V$;" THE ";W$"."
870 PRINT
880 GOSUB 1040
890 PRINT "AT THE SAME TIME, ";A$
900 PRINT "YELLS OUT ";X$;": 'I JUST"
910 PRINT "CAN'T ";Y$;" IT ANY MORE!'"
920 PRINT
930 GOSUB 1040
940 PRINT "AT THESE WORDS, ";E$
950 PRINT "PICKS UP ";C$;" BY"
960 PRINT "THE ";Z$;" AND ";S$
970 PRINT "TOWARDS THE ";G$;" ";Q$
980 PRINT "WHERE THEY LIVE ";X$
990 PRINT "        EVER AFTER!"
1000 PRINT:PRINT
1010 END
```

```
1020 REM  *************
1030 REM  *** DELAY ***
1040 FOR J=1 TO 1000:NEXT J
1050 RETURN
```

Intellectual Twisters

Now you can prove that computer users are much more intelligent than any other group in society. The BETTY BIG-BRAIN program will manipulate numbers to home in on a target value, and THE WORD-SQUARE ENGINE will generate enough word square problems to satisfy anyone. Next comes OLIVER RAND, the rather oddly titled program which is, in so far as I can determine, unbeatable. From there we move to the original board game FROSTVIKEN in which nomadic Lapplanders battle it out against invading Finns, and finally we'll have a look at a program which replicates the performance of a machine built by scientist Torres y Quevedo in 1890 to play a particular chess end-game.

BETTY BIG-BRAIN

Here's an IQ-tester which will put your intellectual equipment through its paces. Conceived by the not-so-big brain of Neal Cavalier-Smith, BETTY BIG-BRAIN can be particularly frustrating if you believe you are good at mathematics.

Here's the game in action, which shows very clearly what is going on:

```
        I will display seven numbers.


    You need to take two of them, and using
      the operators [+ − / and *], make a
      number as close as possible to the
                 target number.



        The target number is 68



        Enter the first number ? 72

        Now enter the operator [+ − / *] ? −

        Now the second number ? 4

        Now the second number ? 3


        The answer is 69

        which is an error of 1


        Hey, that's pretty good!
```

```
        Enter 'Y' for another go or
             'N' to stop      ? y



        198  30  50  190  92  161  175

        The target number is 2



        Enter the first number ? 190

        Now enter the operator (+ - / *) ? /

        Now the second number ? 92



        The answer is 2.06

        which is an error of .05



        Hey, that's pretty good!
```

You are given seven *source* numbers, and one *target* number. You can use the plus, minus, multiply or divide operators with two of the source numbers to get as close as you can to the target number. You should be able to get an answer which is close enough to satisfy the program more often than not. You'll be offered additional tries, using the same source numbers, if you don't get within five of the target number.

To prove you deserve the title of BETTY BIG-BRAIN, enter and run this little listing on your machine:

```
10 REM BETTY BIG-BRAIN
20 CLS:RANDOMIZE VAL(RIGHT$(TIME$,2))
30 DIM A(8)
40 GOSUB 690
50 PRINT TAB(5);"I will display seven nu
mbers."
60 GOSUB 690
70 PRINT "You need to take two of them,
and using"
```

```
80  PRINT TAB(2);"the operators (+ - / an
d *), make a"
90  PRINT TAB(3);"number as close as poss
ible to the"
100  PRINT TAB(13);"target number."
110  FOR X=1 TO 8
120  A(X)=INT(RND(1)*10)+1
130  IF RND(1)>.17 THEN A(X)=INT(RND(1)*1
79)+21
140  NEXT X
150  REM **************
160  REM DISPLAY NUMBERS
170  FOR J=1 TO 20:PRINT:FOR X=1 TO 200:N
EXT X:NEXT J
180  FOR X=1 TO 7
190  PRINT A(X);
200  NEXT X
210  GOSUB 690
220  PRINT " The target number is"A(8)
230  GOSUB 690
240  REM ************
250  REM ACCEPT INPUT
260  PRINT:INPUT " Enter the first number
 ";S
270  FLAG=0
280  FOR J=1 TO 7
290  IF S=A(J) THEN FLAG=1
300  NEXT J
310  IF FLAG=0 THEN 260
320  PRINT:INPUT " Now enter the operator
 (+ - / *) ";P$
330  IF P$<>"+" AND P$<>"-" AND P$<>"*" A
ND P$<>"/" THEN 320
340  PRINT:INPUT " Now the second number
";N
350  FLAG=0
360  FOR J=1 TO 7
370  IF N=A(J) THEN FLAG=1
380  NEXT J
390  IF FLAG=0 THEN 340
400  REM ******************
410  REM WE CAN WORK IT OUT
420  T=0
430  IF P$="+" THEN T=S+N
```

```
440  IF P$="-" THEN T=S-N
450  IF P$="*" THEN T=S*N
460  IF P$="/" THEN T=S/N
470  T=INT(100*T)/100
480  GOSUB 690
490  PRINT "The answer is"T;
500  GOSUB 690
510  E=ABS(A(8)-T)
520  E=INT(100*E)/100
530  IF E<>0 THEN PRINT "which is an erro
r of"E
540  GOSUB 690
550  IF E<4 THEN PRINT "Hey, that's prett
y good!":GOTO 630
560  PRINT "Hey, that's not too good. Wou
ld you"
570  PRINT "you like to use the same numb
ers or"
580  PRINT TAB(7);"have a new go? (S for
same,"'
590  PRINT TAB(23);"N for new ones)"
600  INPUT D$
610  IF D$="s" OR D$="S" THEN 160
620  GOTO 40
630  GOSUB 690
640  PRINT "Enter 'Y' for another go or"
650  INPUT "      'N' to stop    ";Y$
660  IF Y$="y" OR Y$="Y" THEN 40
670  END
680  REM ********
690  REM SPACE OUT
700  FOR J=1 TO 2
710  PRINT
720  NEXT J
730  RETURN
```

THE WORD-SQUARE ENGINE

Are your eyes sharp enough to spot words hidden within a grid of jumbled letters? This program will allow you to answer that pressing question.
Here's the ENGINE in action:

```
ENTER LEVEL 1 (EASY) TO 10 (HARD)
        ? 1

PLEASE STAND BY...
```

```
euwvfAyxlggvblV      ANIMATE
fdbwmBnceWbSipp      OBVIOUS
LAygdzkiAhptepx      DOUBLE
cxNxoeuSXqsXPfd      HOLD
JvUIUeHsHtuIhad      WASHING
tvmnMIjnKOtzSUb
blzeNAxksjLUgrl
UevGZoThpwODcIj
cyovlakEhIzftjr
wrfsftigVcrxqct
geMgljgBctqaids
gnudzHOpvBXpkwq
pzsjokkCfwqkkIq
vTgmpastzuGbxrf
jfdgoluwdfDxVjr
```

The lower the level, the higher the chance that the words you are looking for (those which are printed to the right of the grid) will be the only words appearing in upper case. The randomly chosen letters that fill in the rest of

the square will appear in lower case. Here's the solution to the first square
generated by our ENGINE:

```
euwvfAyxlggvblV          ANIMATE
fdbwmBnceWbSipp          OBVIOUS
LAygdzkiXhptepx          DOUBLE
cxWxoeuXXqsXPfd          HOLD
JvUXUeWsHtuIhad          WASHING
tvmnMIjnKQtzSUb
blzeWAxksjWgrl
UevGZoThpwODcIj
cyovlakEhIzftjr
wrfsftigYcrxqct
geMgljgBctqaids
gnudzHOpvBXpkwq
pzsjokkCfwqkkIq
vTgmpastzuGbxrf
jfdgoluwdfDxVjr
```

At least two of the words from the list will be part of the square. If you
want to make the game even harder, stop the program from printing out the
key words which appear to the right of the puzzle. Here's a puzzle on level
three:

```
ccOccUDflcyajxt          SWEET
vkaaeYtSdeRIeFB          TELEVISE
jgmZoBWeDzkJMDq          WASHING
qETxBEDPoRasOKk          GREAT
gITEEBpltzuUUxK          DOUBLE
chnTLCzoeQBKmje
lnWvrElhbLwRoJW
iWMsJiVDEYzrlAJ
GecsipCIYowuSot
hROwbfLJSnnHTmU
fKEXIxpgcEIffIA
jixAlssysNcjkOM
yJulTJZnGpGmwDi
cmidiWbkmbfnGxi
bdxajxjkZfbuBCV
```

Here's the solution:

```
ccOccUDflcyajxt        SWEET
vkaaeYt8deRIeFB        TELEVISE
jgmZoBWeDzkJMDq        WASHING
qETxBEDPoRasOKk        GREAT
gITEEBpltzuUUxK        DOUBLE
chnTCzoeQBKmje
lnWvrTlhbLwRoJW
iWMsJiVDEYzrlMJ
QecsipCTYowuSot
hROwbfLJSnnMTmU
fKEXIxpgcEIffIA
jixAlssysNcjkOM
yJulTJZn6pGmwDi
cmidiWbkmbfnGxi
bdxajxjkZfbuBCV
```

To give you an idea of just how challenging this program can be, here are a couple of word squares, created at the highest level, for you to try to solve:

```
ASTQBYUAYTODHCX        WATER
VDRBTRMDWNFRKCS        SOFTWARE
QMKRHXBJSLWCTUI        PARTY
SRAOOHLGZIPLHMI        IMAGINE
OPQKBTWEVUBEAID        HOLD
QAVRXUXARURGDTV
QVIVXFOGUHIAQII
JETKOAAZPNAGJYB
ICXMGQJYETTDLWZ
LGEGLCPIVUQGEUD
YOOMPYFJHWXFJSH
OBIHRXNECGHPNZU
UHSBTQWJXDGHZBY
MIMACTYYBLWSNIF
LFUTUGYWMHGTSWG
```

```
BPVIFAAGEGYHMCT          SOFTWARE
AKAYLDLNQBWMZGH          PACKAGE
UOXRZKOGOOPGJMJ          SAVOY
YBTATCYYVWTNTON          TELEVISE
RWRTGYOYJESVNMQ          PARTY
ZVDWBVILLOLUCCA
OBREAQEEFWYXAHE
FKSSDXVTRESYLKD
ERTPHIWOGAYCNFU
HBKCSAZABIMFOXX
ICPERAKQDDWUSTC
IWYETCGFTPJILQY
GWQBADASGPOQYHH
NWJPPFUACWTWYHS
SOSASWAYDAJDSVT
```

By all means modify the words in the DATA statements from line 1420
on to include a vocabulary of your choosing. There must be 30 words in this
section. The program is based on one written by Tony Pearson of London,
England. Here's the listing:

```
10  REM WORD-SQUARE ENGINE
20  CLS
30  RANDOMIZE VAL(RIGHT$(TIME$,2))
40  DIM A$(15,15),W$(30),C$(5)
50  DIM C(5,4),L(30)
60  PRINT:PRINT " ENTER LEVEL 1 (EASY) TO
  10 (HARD)"
70  INPUT "          ";LEV
80  IF LEV<1 OR LEV>10 THEN 70
90  LEV=LEV/10
100 PRINT:PRINT "PLEASE STAND BY..."
110 FOR F=1 TO 30
120 READ B$
130 W$(F)=B$
140 NEXT F
150 PRINT
160 FOR F=1 TO 15
170 FOR G=1 TO 15
180 A$(F,G)="*"
190 NEXT G
200 NEXT F
```

```
210 GOSUB 360
220 FOR F=1 TO 5
230 R=INT(RND(1)*4)+1
240 ON R GOSUB 440,640,870,1060
250 NEXT F
260 FOR F=1 TO 15
270 FOR G=1 TO 15
280 IF A$(F,G)<>"*" THEN 320
290 WS=INT(RND(1)*26)+65:Q$=CHR$(WS)
300 IF RND(1)>LEV THEN Q$=CHR$(WS+32)
310 A$(F,G)=Q$
320 NEXT G
330 NEXT F
340 GOSUB 1290
350 REM ****************************
360 FOR F=1 TO 5
370 RN=INT(RND(1)*30)+1
380 C$(F)=W$(RN)
390 IF L(RN)=1 THEN 370
400 L(RN)=1
410 NEXT F
420 REM *************
430 RETURN
440 X=INT(RND(1)*15)+1
450 Y=INT(RND(1)*15)+1
460 IF X<LEN(C$(F)) OR Y+(LEN(C$(F)))>15
   THEN 440
470 L=0
480 L=L+1
490 IF A$(X,Y)<>"*" THEN 440
500 X=X-1:Y=Y+1
510 IF L=LEN(C$(F)) THEN 530
520 GOTO 480
530 X=X+LEN(C$(F)):Y=Y-LEN(C$(F))
540 C(F,1)=X:C(F,2)=Y
550 REM *************
560 FOR G=1 TO LEN(C$(F))
570 A$(X,Y)=MID$(C$(F),G,1)
580 X=X-1:Y=Y+1
590 NEXT G
600 REM *************
610 C(F,3)=X+1:C(F,4)=Y-1
620 RETURN
630 REM **************
```

```
640 COUNT=0
650 COUNT=COUNT+1
660 IF COUNT=222 THEN 100
670 X=INT(RND(1)*15)+1
680 Y=INT(RND(1)*15)+1
690 IF X+LEN(C$(F))>15 OR Y+LEN(C$(F))>1
5 THEN 650
700 L=0
710 L=L+1
720 IF A$(X,Y)<>"*" THEN 650
730 X=X+1:Y=Y+1
740 IF L=LEN(C$(F)) THEN 760
750 GOTO 710
760 X=X-LEN(C$(F))
770 Y=Y-LEN(C$(F))
780 C(F,1)=X:C(F,2)=Y
790 REM ************
800 FOR G=1 TO LEN(C$(F))
810 A$(X,Y)=MID$(C$(F),G,1)
820 X=X+1:Y=Y+1
830 NEXT G
840 C(F,3)=X-1:C(F,4)=Y-1
850 RETURN
860 REM ************
870 X=INT(RND(1)*15)+1
880 Y=INT(RND(1)*15)+1
890 IF X+LEN(C$(F))>15 OR Y<LEN(C$(F)) T
HEN 870
900 L=0
910 L=L+1
920 IF A$(X,Y)<>"*" THEN 870
930 X=X+1:Y=Y-1
940 IF L=LEN(C$(F)) THEN 970
950 GOTO 910
960 REM ************
970 X=X-LEN(C$(F)):Y=Y+LEN(C$(F))
980 C(F,1)=X:C(F,2)=Y
990 FOR G=1 TO LEN(C$(F))
1000 A$(X,Y)=MID$(C$(F),G,1)
1010 X=X+1:Y=Y-1
1020 NEXT G
1030 C(F,3)=X-1:C(F,4)=Y+1
1040 RETURN
1050 REM *************
```

```
1060 COUNT=0
1070 X=INT(RND(1)*15)+1
1080 Y=INT(RND(1)*15)+1
1090 COUNT=COUNT+1
1100 PRINT COUNT;
1110 IF COUNT=220 THEN 100
1120 IF X<LEN(C$(F)) OR Y<LEN(C$(F)) THE
N 1070

1130 L=0
1140 L=L+1
1150 IF A$(X,Y)<>"*" THEN 1070
1160 X=X-1:Y=Y-1
1170 IF L=LEN(C$(F)) THEN 1200
1180 GOTO 1140
1190 REM *************
1200 X=X+LEN(C$(F)):Y=Y+LEN(C$(F))
1210 C(F,1)=X:C(F,2)=Y
1220 FOR G=1 TO LEN(C$(F))
1230 A$(X,Y)=MID$(C$(F),G,1)
1240 X=X-1:Y=Y=1
1250 NEXT G
1260 C(F,3)=X+1:C(F,4)=Y+1
1270 RETURN
1280 REM *************
1290 CLS
1300 FOR F=1 TO 15
1310 PRINT TAB(3);
1320 FOR G=1 TO 15
1330 PRINT A$(F,G);
1340 NEXT G
1350 IF F<=5 THEN PRINT "      ";C$(F);
1360 PRINT
1370 NEXT F
1380 PRINT
1390 END
1400 REM *********
1410 REM WORD DATA
1420 DATA "EXTREME","DECEMBER","BETWEEN"
,"MARTIAN","GREAT","WATER"
1430 DATA "FRATERNITY","OBVIOUS","PARTIC
ULAR","ENORMOUS","TELEVISE"
1440 DATA "WASHING","ACCURATE","ANIMATE"
,"PACKAGE","SOFTWARE"
```

```
1450 DATA "HOLD","HARTNELL","BICYCLE","D
AVID","PARTY"
1460 DATA "IMAGINE","SWEET","LORD","DOUB
LE","FANTASY"
1470 DATA "HELLO","SAVOY","TRUFFLE","BUL
LDOG"
```

OLIVER RAND

Way back in 1972, the British publisher George Allen & Unwin Ltd. published the book *Games Playing with Computers*, by A. G. Bell. Although this is really not so long ago in terms of the history of the universe, it is an era away in the history of computers.

". . . it is very likely," Bell writes in his introduction, "that future generations will use them [computers] in their leisure time to interact with game playing programs." Indeed it is very likely, Mr. Bell. Your book provided me with the germ of the next program—which "future generations" may well be playing.

Mr. Bell describes a game called BRIDGET which, he says, a computer can easily be taught to play. In it, the players take turns drawing segments of a line on a grid of dots, with the idea of trying to create an unbroken line from their "base" to their "goal" line.

Here's the board:

```
    C       C       C       C       C
H  37  H  38  H  39  H  40  H  41  H
    C  33  C  34  C  35  C  36  C
H  28  H  29  H  30  H  31  H  32  H
    C  24  C  25  C  26  C  27  C
H  19  H  20  H  21  H  22  H  23  H
    C  15  C  16  C  17  C  18  C
H  10  H  11  H  12  H  13  H  14  H
    C   6  C   7  C   8  C   9  C
H   1  H   2  H   3  H   4  H   5  H
    C       C       C       C       C
```

The computer's base line is the bottom of the screen, and it is working its way to the goal at the top. You start with your base on the left, and work toward the goal of the right. You move by selecting a number which lies between two H's, such as the "10" next to the bottom left-hand corner of the board. You need to print out the board using your printer, and to draw in

the lines selected by you and the computer on that printout. If you don't have a printer, you can copy out the board by hand.

Here's an example of the "conversation" that makes up a game in progress:

```
          ENTER YOUR MOVE   36

    MY MOVE IS 32


          ENTER YOUR MOVE



    MY MOVE IS 23


          ENTER YOUR MOVE   22

    MY MOVE IS 26


          ENTER YOUR MOVE   14

    MY MOVE IS 18


          ENTER YOUR MOVE   13

    MY MOVE IS 17


          ENTER YOUR MOVE   0

    I ACCEPT YOUR WISH TO CONCEDE
```

And here's the completed game—filled in by hand. In this game, the computer has won, with a line joining the following points: 1, 6, 7, 12, 17, 18, 23, 32 and 41:
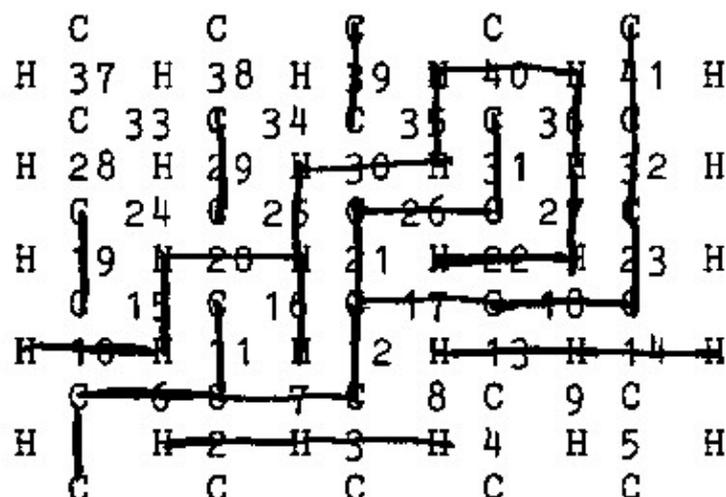
The winning strategy, encoded in this program, was devised by Oliver Gross of the Rand Corporation and outlined in A. G. Bell's book (page 23) (that's why I've called it OLIVER RAND). When you're ready to take on the hopeless task of trying to beat your computer, run the following listing:

```
10 REM OLIVER RAND
20 GOSUB 440:REM INITIALISE
30 GOSUB 240:REM PRINT BOARD
                  FOR REFERENCE
40 REM **********
50 REM MAIN CYCLE
60 GOSUB 100:REM MACHINE MOVES
70 GOSUB 150:REM HUMAN MOVES
80 GOTO 60
90 REM *************
100 REM MACHINE MOVES
110 MVE=R(HM)
120 PRINT:PRINT "MY MOVE IS"MVE
130 RETURN
140 REM ***********
150 REM HUMAN MOVES
160 REM ENTER 0 TO CONCEDE
170 PRINT:PRINT
180 INPUT "   ENTER YOUR MOVE   ",HM
190 IF HM=0 THEN 210
```

```
200 RETURN
210 PRINT:PRINT "I ACCEPT YOUR WISH TO C
ONCEDE"
220 END
230 REM ***********************
240 REM   BOARD FOR REFERENCE
250 REM MODIFY TO PRINT OUT ON
260 REM      YOUR PRINTER
270 REM ***********************
280 CLS:PRINT:PRINT
290 PRINT "  C    C    C    C    C"
300 PRINT "H 37 H 38 H 39 H 40 H 41 H"
310 PRINT "  C 33 C 34 C 35 C 36 C"
320 PRINT "H 28 H 29 H 30 H 31 H 32 H"
330 PRINT "  C 24 C 25 C 26 C 27 C"
340 PRINT "H 19 H 20 H 21 H 22 H 23 H"
350 PRINT "  C 15 C 16 C 17 C 18 C"
360 PRINT "H 10 H 11 H 12 H 13 H 14 H"
370 PRINT "  C  6 C  7 C  8 C  9 C"
380 PRINT "H 1  H 2  H 3  H 4  H 5  H"
390 PRINT "  C    C    C    C    C"
400 PRINT:PRINT
410 INPUT A$
420 RETURN
430 REM **********
440 REM INITIALISE
450 CLS
460 PRINT:PRINT "PLEASE STAND BY..."
470 HM=1:REM FIRST MOVE BY MACHINE
480 DIM R(41)
490 REM * READ RESPONSES *
500 FOR Z=1 TO 41
510 READ R(Z)
520 NEXT Z
530 RETURN
540 REM *************
550 REM RESPONSE DATA
560 DATA 1,6,7,8,9,2,3,4,5
570 DATA 11,10,16,17,18,19
580 DATA 12,13,14,15,21,20
590 DATA 26,27,28,29,22,23
600 DATA 24,25,31,30,36,37
610 DATA 38,39,32,33,34,35,41,40
```

FROSTVIKEN

The name of this game comes from the area where Lapplanders live—which traverses the north of Scandinavia from Norway to the Kola Peninsula in the Soviet Union. The Finns arrived in the area some 2000 years ago, and proceeded to force the nomadic Lapps out of the best parts of the country by enclosing the land for agriculture.

This board game pits the Lapps against Finnish farmers. You are in control of the Lapp warriors (the dollar signs) and the Finns (the asterisks) are played by the computer. You play the game more or less as in checkers, moving diagonally, and capturing by leaping over an opponent's piece to a vacant square beyond. The winner is the first player to capture seven of the opponent's pieces.

Many of the Lapps eventually took up the Finnish way of life, and in this game, any Lapp ($) getting to the far side of the board (row A) turns into a Finn (*). Similarly, a Finn crossing the board turns into a Lapp.

Here are some examples of a game in progress:

```
     MY SCORE: 0

    YOUR SCORE: 0

        12345678
     A   *  *  *  *  A
     B  *  *  *  *   B
     C   *  .  *  *  C
     D  .  .  *  .   D
     E   .  .  .  .  E
     F  $  $  $  $   F
     G   $  $  $  $  G
     H  $  $  $  $   H
        12345678
                         ?


     FROM? F1
       TO? E2
```

```
          MY SCORE: 0

        YOUR SCORE: 0

          12345678
      A   *  *  *  *   A
      B  *  *  *  *     B
      C   *  .  *  *    C
      D  .  .  *  .     D
      E   $  .  .  .    E
      F  .  $  $  $     F
      G   $  $  $  $    G
      H  $  $  $  $     H
          12345678
                                      ?


          MY SCORE: 0

        YOUR SCORE: 0

          12345678
      A   *  *  *  *   A
      B  *  *  .  *     B
      C   .  *  *  .    C
      D  *  .  *  *     D
      E   $  .  $  .    E
      F  $  $  .  $     F
      G   $  $  $  $    G
      H  .  $  $  $     H
          12345678
                                      ?
```

```
               MY SCORE: 1

             YOUR SCORE: 0

               12345678
           A   *  *  *  *   A
           B *  *  .  *      B
           C   .  *  *  .   C
           D *  .  *  .      D
           E   $  .  .  .   E
           F $  $  *  $      F
           G   $  $  $  $   G
           H .  $  $  $      H
               12345678
                                        ?

             FROM?  G6
              TO?  E4




               MY SCORE: 1

             YOUR SCORE: 1

               12345678
           A   *  *  *  *   A
           B *  *  .  *      B
           C   .  *  *  .   C
           D *  .  *  .      D
           E   $  $  .  .   E
           F $  $  .  $      F
           G   $  $  .  $   G
           H .  $  $  $      H
               12345678

                                        ?
```

MY SCORE: 1

YOUR SCORE: 1

```
   12345678
A   *  *  *  *   A
B  *  *  .  *    B
C   .  *  *  .   C
D  *  .  .  .    D
E    $  $  *  .  E
F  $  $  .  $    F
G   $  $  .  $   G
H  .  $  $  $    H
   12345678
```

?

FROM? F7
TO? D5

MY SCORE: 1

YOUR SCORE: 2

```
   12345678
A   *  *  *  *   A
B  *  *  .  *    B
C   .  *  *  .   C
D  *  .  $  .    D
E    $  $  .  .  E
F  $  $  .  .    F
G   $  $  .  $   G
H  .  $  $  $    H
   12345678
```

?

```
          MY  SCORE:  2

         YOUR  SCORE:  2

            12345678
          A   *  *  *  *   A
          B  *  *  .  *    B
          C   .  .  *  .   C
          D  *  .  .  .    D
          E   $  $  *  .   E
          F  $  $  .  .    F
          G   $  $  .  $   G
          H  .  $  $  $    H
            12345678
                                        ?

           FROM?  H5
             TO?  G6




          MY  SCORE:  3

         YOUR  SCORE:  3

            12345678
          A   *  *  *  *   A
          B  .  .  .  .    B
          C   .  .  *  *   C
          D  *  .  *  .    D
          E   .  $  *  .   E
          F  $  $  $  .    F
          G   $  $  $  $   G
          H  .  $  .  .    H
            12345678
                                        ?

           FROM?  F5
             TO?  D7
```

MY SCORE: 3

YOUR SCORE: 4

```
  12345678
A  *  *  *  *  A
B  .  .  .  .  B
C  .  .  *  *  C
D  *  .  *  $  D
E  .  $  .  .  E
F  $  $  .  .  F
G  $  $  $  $  G
H  .  $  .  .  H
  12345678
```

?

MY SCORE: 6

YOUR SCORE: 4

```
  12345678
A  *  *  *  *  A
B  .  .  .  .  B
C  .  .  .  *  C
D  .  .  *  .  D
E  .  $  .  *  E
F  $  .  .  $  F
G  .  $  $  .  G
H  $  $  .  .  H
  12345678
```

? E4

FROM? E4
TO? C6

MY SCORE: 6

YOUR SCORE: 5

```
   12345678
A  *  *  *  *  A
B  .  .  .  .  B
C  .  .  $  *  C
D  .  .  .  .  D
E   .  .  .  *  E
F  $  .  .  $  F
G  .  $  $  .  G
H  $  $  .  .  H
   12345678
```

?

MY SCORE: 6

YOUR SCORE: 5

```
   12345678
A  *  *  .  *  A
B  .  .  .  *  B
C  .  .  $  *  C
D  .  .  .  .  D
E  .  .  .  *  E
F  $  .  .  $  F
G  .  $  $  .  G
H  $  $  .  .  H
   12345678
```

?

FROM? C6
TO? B5

```
        MY SCORE: 6

      YOUR SCORE: 5

         12345678
     A   *  *  .  *   A
     B  .  .  $  *    B
     C    .  .  .  *  C
     D  .  .  .  .    D
     E    .  .  .  *  E
     F  $  .  .  $    F
     G    .  $  $  .  G
     H  $  $  .  .    H
         12345678
                              ?



        MY SCORE: 7

      YOUR SCORE: 5

         12345678
     A   *  .  .  *   A
     B  .  .  .  *    B
     C    .  .  *  *  C
     D  .  .  .  .    D
     E    .  .  .  *  E
     F  $  .  .  $    F
     G    .  $  $  .  G
     H  $  $  .  .    H
         12345678
                              ?



        I'M THE WINNER!

      THANKS FOR THE GAME.
```

Back in the early days of computer games (long, long ago, in a galaxy far away called 1966), many programs worked with a "look-up table" with all the potential moves stored in it. I've followed this practice in writing this program. The look-up table is the vast body of DATA from line 1200 onward. The main advantage of using a table is that the programmer can control the computer's actions very precisely. The computer also responds, in many cases, far more quickly in a look-up table program than it might if an alternative move-generating algorithm was used.

```
10  REM FROSTVIKEN
20  GOSUB 910:REM INITIALISE
30  REM **********
40  REM GAME CYCLE
50  GOSUB 410:REM PRINT BOARD
60  GOSUB 110:REM COMPUTER MOVES
70  GOSUB 410
80  GOSUB 720:REM ACCEPT HUMAN MOVE
90  GOTO 50
100  REM **************
110  REM COMPUTER MOVES
120  REM * LOOK FOR CAPTURE *
130  Z=37
140  Z=Z-1
150  IF B(C(Z))=W AND B(D(Z))=B AND B(E(Z
))=E THEN 330
160  IF Z>1 THEN 140
170  REM * LOOK FOR NON-CAPTURE *
180  REM * TRY 7 RANDOM SQUARES *
190  Y=0
200  Y=Y+1
210  Z=INT(RND(1)*49)+1
220  IF B(F(Z))=W AND B(G(Z))=E THEN 370
230  IF Y<8 THEN 200
240  REM * NOW SEARCH IN ORDER *
250  Z=50
260  Z=Z-1
270  IF B(F(Z))=W AND B(G(Z))=E THEN 370
280  IF Z>1 THEN 260
290  REM * NO MOVE FOUND, CONCEDE *
300  GOSUB 410
310  PRINT:PRINT "I CONCEDE, MASTER"
320  END
```

```
330 REM * MAKE CAPTURE *
340 SCRE=SCRE+1
350 B(C(Z))=E:B(D(Z))=E:B(E(Z))=W
360 RETURN
370 REM * NON-CAPTURE *
380 B(F(Z))=E:B(G(Z))=W
390 RETURN
400 REM ***********
410 REM PRINT BOARD
420 CLS
430 PRINT:PRINT:PRINT
440 PRINT TAB(15);"MY SCORE:"SCRE
450 PRINT:PRINT TAB(14);"YOUR SCORE:"HSC
RE
460 PRINT
470 PRINT TAB(17);"12345678"
480 FOR Z=32 TO 1 STEP -1
490 IF Z>28 AND B(Z)=B THEN B(Z)=W
500 IF Z<5 AND B(Z)=W THEN B(Z)=B
510 IF Z=32 THEN PRINT TAB(15);"A   ";
520 IF Z=28 THEN PRINT "A":PRINT TAB(15)
;"B  ";
530 IF Z=24 THEN PRINT " B":PRINT TAB(15
);"C  ";
540 IF Z=20 THEN PRINT "C":PRINT TAB(15)
;"D  ";
550 IF Z=16 THEN PRINT " D":PRINT TAB(15
);"E  ";
560 IF Z=12 THEN PRINT "E":PRINT TAB(15)
;"F  ";
570 IF Z=8 THEN PRINT " F":PRINT TAB(15)
;"G  ";
580 IF Z=4 THEN PRINT "G":PRINT TAB(15);
"H ";
590 PRINT CHR$(B(Z));" ";
600 NEXT Z
610 PRINT " H";
620 PRINT TAB(17);"12345678"
630 IF SCRE<7 AND HSCRE<7 THEN RETURN
640 REM *************
650 REM WIN CONDITION
660 PRINT:PRINT
670 IF SCRE>HSCRE THEN PRINT TAB(14);"I'
M THE WINNER!"
```

```
680 IF SCRE<HSCRE THEN PRINT TAB(14);"YO
U'RE THE WINNER!"
690 PRINT:PRINT TAB(12);"THANKS FOR THE
GAME."
700 END
710 REM *****************
720 REM ACCEPT HUMAN MOVE
730 PRINT:PRINT TAB(16);"FROM";
740 INPUT A$
750 IF A$="Q" THEN END
760 PRINT TAB(18);"TO";
770 INPUT B$
780 F=0:T=0
790 FOR Z=1 TO 32
800 IF K$(Z)=A$ THEN F=Q(Z)
810 IF K$(Z)=B$ THEN T=Q(Z)
820 NEXT Z
830 B(F)=E:B(T)=B
840 IF T-F<6 THEN RETURN
850 HSCRE=HSCRE+1
860 Z=0
870 Z=Z+1:IF Z>32 THEN RETURN
880 IF C(Z)=T AND E(Z)=F THEN B(D(Z))=E:
RETURN
890 GOTO 870
900 REM *************
910 REM INITIALISATION
920 RANDOMIZE VAL(RIGHT$(TIME$,2))
930 DEFINT A-Z
940 CLS
950 PRINT:PRINT:PRINT TAB(8);"PLEASE STA
ND BY..."
960 DIM B(32),C(36),D(36),E(36),F(49),G(
49),K$(32),Q(32)
970 W=ASC("*"):B=ASC("$"):E=ASC(".")
980 FOR Z=1 TO 32
990 B(Z)=E
1000 IF Z>20 THEN B(Z)=W
1010 IF Z<13 THEN B(Z)=B
1020 NEXT Z
1030 SCRE=0:REM COMPUTER SCORE
1040 HSCRE=0:REM HUMAN SCORE
1050 REM * CAPTURE DATA *
1060 FOR Z=1 TO 36
```

```
1070 READ C(Z),D(Z),E(Z)
1080 NEXT Z
1090 REM * NON-CAPTURE DATA *
1100 FOR Z=1 TO 49
1110 READ F(Z),G(Z)
1120 NEXT Z
1130 REM * HUMAN INPUT DATA *
1140 FOR Z=1 TO 32
1150 READ K$(Z),Q(Z)
1160 NEXT Z
1170 RETURN
1180 REM ************
1190 REM CAPTURE DATA
1200 DATA 9,6,2,10,6,1,10,7,3
1210 DATA 11,7,2,11,8,4,12,8,3
1220 DATA 13,9,6,14,9,5,14,10,7
1230 DATA 15,10,6,15,11,8,16,11,7
1240 DATA 17,14,10,18,14,9,18,15,11
1250 DATA 19,15,10,19,16,12,20,16,11
1260 DATA 21,17,14,22,17,13,22,18,15
1270 DATA 23,18,14,23,19,16,24,19,15
1280 DATA 25,22,18,26,27,17,26,23,19
1290 DATA 27,23,18,27,24,20,28,24,19
1300 DATA 29,25,22,30,25,21,30,26,23
1310 DATA 31,26,22,31,27,24,32,27,23
1320 REM ******************
1330 REM NON-CAPTURE DATA
1340 DATA 6,1,6,2,7,2,7,3,14,9,14,10
1350 DATA 15,10,15,11,22,17,22,18
1360 DATA 23,18,23,19,30,25,30,26
1370 DATA 31,26,31,27,9,5,9,6
1380 DATA 11,7,11,8,17,13,17,14
1390 DATA 19,15,19,16,25,21,25,22
1400 DATA 27,23,27,24,5,1,8,3,8,4
1410 DATA 10,6,10,7,12,8,13,9,16,11
1420 DATA 16,12,18,14,18,15,20,16
1430 DATA 21,17,24,19,24,20,26,22
1440 DATA 26,23,28,24,29,25
1450 DATA 32,27,32,28
1460 REM ******************
1470 REM HUMAN INPUT DATA
1480 DATA "A2",32,"A4",31,"A6",30
1490 DATA "A8",29,"B1",28,"B3",27
1500 DATA "B5",26,"B7",25,"C2",24
```

```
1510 DATA "C4",23,"C6",22,"C8",21
1520 DATA "D1",20,"D3",19,"D5",18
1530 DATA "D7",17,"E2",16,"E4",15
1540 DATA "E6",14,"E8",13,"F1",12
1550 DATA "F3",11,"F5",10,"F7",9
1560 DATA "G2",8,"G4",7,"G6",6,"G8",5
1570 DATA "H1",4,"H3",3,"H5",2,"H7",1
```

The scenario behind this game follows that used in the Lapp board game *Dablot Prejjesne*, described in R. C. Bell's major work *The Board Game Book* (Marshall Cavendish, London, 1979, p. 183).

Scintillating Simulations

One of the great things the computer can do is to manipulate a number of interrelated variables quickly and simply, and then report the results of that manipulation to us. This is vital to the realism of the simulation programs in this section, where a large number of interrelated factors may have to be manipulated at once. The first simulation is THE MAYOR OF MINNE-APOLIS, in which you have to stand for office, trying to keep your election-eering in tune with public preference as shown by opinion polls. You take on intergalactic trucking with BIG JOE'S SPACE RIG, and then return swiftly to earth (and the past) to take part in THE CRUSADES in and around the ancient kingdom of Jerusalem.

Back in the present day, you take on the challenge of raising a little wool in SHEEP STATION and follow that up by running the country from THE OVAL OFFICE. Whether you're behind the wheel of a car in GRAND PRIX or looking out for number one in the ASTEROID MINE, your computer doesn't let up. If managing the Asteroid Belt is well within your capabilities, take on the challenge of governing the Bolivian city of COCHABAMBA. Finally, after all that, I'll transport you back to AD 14, following the death of the emperor Augustus. You and the challenger (the evil usurper, Caesar Computerus) battle it out for domination of the RO-MAN EMPIRE. Come on in, the simulations are scintillating.

THE MAYOR OF MINNEAPOLIS

In this game, you and your computer (Candidate McCompute) are competing for election to the position of mayor of Minneapolis. There are four issues which concern the people of your city: social security, defense (!), commerce and public works. The city's budget for the forthcoming financial year is $31 million.

One or more opinion polls are held in the period before the election, which shows the relative importance the voters place on each of these four issues. Issues can change in importance, just like in real life, as further polls are held.

Here's the result of three polls in one run of the program:

```
AN OPINION POLL HAS FOUND THE FOLLOWING:

SOCIAL SECURITY IS THE MAJOR ISSUE

DEFENSE IS NOT IMPORTANT
COMMERCE IS NOT IMPORTANT
PUBLIC WORKS IS VITAL TO VOTERS

DEFENSE IS NOT IMPORTANT
COMMERCE IS NOT IMPORTANT
PUBLIC WORKS IS VITAL TO VOTERS

DEFENSE IS NOT IMPORTANT
COMMERCE IS A NEUTRAL ISSUE
PUBLIC WORKS IS VITAL TO VOTERS
```

You can get yourself elected if your allotment of the $31 million most closely approximates the wishes of the voters, as expressed in the opinion polls. Your opponent—Candidate McCompute—reads the same opinion polls, and is also trying to work out a budgetary allotment which will please the electorate:

```
        CANDIDATE McCOMPUTE IS MEETING WITH HER
        ADVISERS TO PREPARE A BUDGET OUTLINE
```

You have to announce your proposed budget before you see what
McCompute has cooked up. You enter your intentions, making sure that your
proposals total $31 million:

```
        YOU HAVE $31,000,000 TO SPEND ON
        SOCIAL SECURITY, DEFENSE, COMMERCE
                AND PUBLIC WORKS

        SOCIAL SECURITY:? 13
                DEFENSE:? 7
               COMMERCE:? 2
           PUBLIC WORKS:? 9
```

Once you have announced your budget, McCompute will unveil what
she and her advisers have worked out:

```
        CANDIDATE McCOMPUTE PLEDGES TO SPEND
        AS FOLLOWS IN THE COMING YEAR:

          $11,000,000 ON SOCIAL SECURITY
          $ 1,000,000 ON DEFENSE
          $ 6,000,000 ON COMMERCE
          $13,000,000 ON PUBLIC WORKS
```

Then the election is held:

```
        THE VOTERS ARE GOING TO THE POLLS TO
        DECIDE ON McCOMPUTE OR HUMANSON AS
        THE NEXT MAYOR OF MINNEAPOLIS


        HUMANSON'S PLEDGES:
            $13,000,000 ON SOCIAL SECURITY
            $ 7,000,000 ON DEFENSE
            $ 2,000,000 ON COMMERCE
            $ 9,000,000 ON PUBLIC WORKS
```

```
McCOMPUTE'S PLEDGES:
    $11,000,000 ON SOCIAL SECURITY
    $ 1,000,000 ON DEFENSE
    $ 6,000,000 ON COMMERCE
    $13,000,000 ON PUBLIC WORKS
```

If the result is a tie, the least important of the four issues will be discarded, and the intended budgets on the top three issues will be compared with what the electorate really wants. The result of the election is announced, along with the figures the electorate was looking for:

```
    McCOMPUTE GAINED 898904 VOTES
    HUMANSON GAINED 898630 VOTES


    AS A RESULT OF POLL NUMBER 1
        I DECLARE THE NEW MAYOR OF
        MINNEAPOLIS IS McCOMPUTE

    THE VOTERS WANTED:
        $14,000,000 ON SOCIAL SECURITY
        $ 2,000,000 ON DEFENSE
        $ 3,000,000 ON COMMERCE
        $12,000,000 ON PUBLIC WORKS
```

As you can see by comparing McCompute's proposals with the voters' wishes, she came closer—overall—than you did. You'll find your skill at reading the opinion polls will increase dramatically once you've stood up to the voters a few times. The listing to enable you to do just this follows. As with all text-based games, you may need to add to or adjust the timing loops (see line 730, for instance).

```
10 REM THE MAYOR OF MINNEAPOLIS
20 GOSUB 1030:REM INITIALISE
30 GOSUB 270:REM COMPUTER ALLOTS ITS BUD
GET
40 GOSUB 540:REM HUMAN ALLOTS BUDGET
50 GOSUB 430:REM COMP. REVEALS BUDGET
60 FLAG=0
70 GOSUB 670:REM THE ELECTION
```

```
80 COMPUTER=0:HUMAN=0
90 IF FLAG=0 THEN 170
100 PRINT
110 REM NOTE BELOW THAT IF POLL DEADHEAT

120 REM LEAST IMPORTANT ISSUES DISCARDED

130 IF FLAG=1 THEN C(NT)=0:H(NT)=0
140 IF FLAG=2 THEN C(NL)=0:H(NL)=0
150 IF FLAG=3 THEN GOSUB 970:GOTO 170
160 GOSUB 850
170 PRINT
180 PRINT "THE VOTERS WANTED:"
190 PRINT TAB(5);"$";RIGHT$(STR$(A(1)),2
);",000,000 ON SOCIAL SECURITY"
200 PRINT TAB(9);"$";RIGHT$(STR$(A(2)),2
);",000,000 ON DEFENSE"
210 PRINT TAB(9);"$";RIGHT$(STR$(A(3)),2
);",000,000 ON COMMERCE"
220 PRINT TAB(6);"$";RIGHT$(STR$(A(4)),2
);",000,000 ON PUBLIC WORKS"
230 END
240 END
250 END
260 REM ************************
270 REM COMPUTER ALLOTS BUDGET
280 PRINT:PRINT
290 PRINT "CANDIDATE McCOMPUTE IS MEETIN
G WITH HER"
300 PRINT " ADVISERS TO PREPARE A BUDGET
 OUTLINE"
310 PRINT:PRINT
320 Y=0
330 COUNT=0
340 FOR J=1 TO 4
350 C(J)=INT(RND(1)*13)+1
360 COUNT=COUNT+C(J)
370 NEXT J
380 IF COUNT<>31 THEN 330
390 Y=Y+1
400 IF Y>20 THEN 420
410 IF C(MA)<6 OR C(CR)<4 OR C(NL)<3 OR
C(NT)>2 THEN 330
420 RETURN
```

```
430 REM ********
440 PRINT
450 PRINT "CANDIDATE McCOMPUTE PLEDGES T
O SPEND"
460 PRINT "AS FOLLOWS IN THE COMING YEAR
:"
470 PRINT
480 PRINT TAB(5);"$";RIGHT$(STR$(C(1)),2
);",000,000 ON SOCIAL SECURITY"
490 PRINT TAB(9);"$";RIGHT$(STR$(C(2)),2
);",000,000 ON DEFENSE"
500 PRINT TAB(9);"$";RIGHT$(STR$(C(3)),2
);",000,000 ON COMMERCE"
510 PRINT TAB(6);"$";RIGHT$(STR$(C(4)),2
);",000,000 ON PUBLIC WORKS"
520 RETURN
530 REM ********************
540 REM HUMAN ALLOTS BUDGET
550 PRINT " YOU HAVE $31,000,000 TO SPEN
D ON"
560 PRINT "SOCIAL SECURITY, DEFENSE, COM
MERCE"
570 PRINT TAB(8);"AND PUBLIC WORKS"
580 PRINT
590 INPUT "SOCIAL SECURITY:";H(1)
600 INPUT "        DEFENSE:";H(2)
610 INPUT "       COMMERCE:";H(3)
620 INPUT "    PUBLIC WORKS:";H(4)
630 IF H(1)+H(2)+H(3)+H(4)=31 THEN 650
640 PRINT "YOU MUST SPEND EXACTLY $31,00
0,000":GOTO 580
650 RETURN
660 REM ***********
670 REM THE ELECTION
680 PRINT
690 PRINT "THE VOTERS ARE GOING TO THE P
OLLS TO"
700 PRINT "DECIDE ON McCOMPUTE OR HUMANS
ON AS"
710 PRINT "THE NEXT MAYOR OF MINNEAPOLIS
"
720 PRINT
730 FOR J=1 TO 1000:NEXT J
740 PRINT
```

```basic
750 PRINT "HUMANSON'S PLEDGES:"
760 PRINT TAB(5);"$";RIGHT$(STR$(H(1)),2
);",000,000 ON SOCIAL SECURITY"
770 PRINT TAB(9);"$";RIGHT$(STR$(H(2)),2
);",000,000 ON DEFENSE"
780 PRINT TAB(9);"$";RIGHT$(STR$(H(3)),2
);",000,000 ON COMMERCE"
790 PRINT TAB(6);"$";RIGHT$(STR$(H(4)),2
);",000,000 ON PUBLIC WORKS"
800 PRINT
810 PRINT "McCOMPUTE'S PLEDGES:"
820 GOSUB 480:PRINT
830 PRINT
840 FOR J=1 TO 4000:NEXT J
850 FOR J=1 TO 4
860 COMPUTER=COMPUTER+ABS(A(J)-C(J))
870 HUMAN=HUMAN+ABS(A(J)-H(J))
880 NEXT J
890 COMPUTER=900*1000-(100*COMPUTER+30*C
OMPUTER+7*COMPUTER)
900 HUMAN=900*1000-(100*HUMAN+30*HUMAN+7
*HUMAN)
910 PRINT TAB(6);"McCOMPUTE GAINED";COMP
UTER;"VOTES"
920 PRINT TAB(7);"HUMANSON GAINED";HUMAN
;"VOTES"
930 PRINT
940 IF HUMAN=COMPUTER THEN PRINT "...BAC
K TO THE VOTERS...":FLAG=FLAG+1:RETURN
950 PRINT
960 PRINT "AS A RESULT OF POLL NUMBER";F
LAG+1
970 PRINT TAB(8);"I DECLARE THE NEW MAYO
R OF"
980 PRINT TAB(9);"MINNEAPOLIS IS ";
990 IF COMPUTER<HUMAN THEN PRINT "HUMANS
ON":RETURN
1000 PRINT "McCOMPUTE"
1010 RETURN
1020 REM *************
1030 REM INITIALISATION
1040 RANDOMIZE VAL(RIGHT$(TIME$,2))
1050 CLS
1060 DIM A(4),B$(4),C(4),H(4)
```

```
1070 FOR J=1 TO 4
1080 READ B$(J)
1090 NEXT J
1100 REM DETERMINE RESULT OF VOTE
1110 A(1)=INT(RND(1)*14)+1
1120 A(2)=INT(RND(1)*14)+1
1130 A(3)=INT(RND(1)*14)+1
1140 A(4)=INT(RND(1)*14)+1
1150 IF A(1)+A(2)+A(3)+A(4)<>31 THEN 111
0
1160 IF A(1)=A(2) OR A(1)=A(3) OR A(1)=A
(4) THEN 1110
1170 IF A(2)=A(3) OR A(2)=A(4) THEN 1110

1180 IF A(3)=A(4) THEN 1110
1190 PRINT:PRINT
1200 PRINT "AN OPINION POLL HAS FOUND TH
E FOLLOWING:"
1210 IF A(1)>A(2) AND A(1)>A(3) AND A(1)
>A(4) THEN PRINT "SOCIAL SECURITY IS THE
 MAJOR ISSUE":MA=1
1220 IF A(2)>A(1) AND A(2)>A(3) AND A(2)
>A(4) THEN PRINT "DEFENSE IS THE MAJOR I
SSUE":MA=2
1230 IF A(3)>A(1) AND A(3)>A(2) AND A(3)
>A(4) THEN PRINT "COMMERCE IS THE MAJOR
ISSUE":MA=3
1240 IF A(4)>A(1) AND A(4)>A(2) AND A(4)
>A(3) THEN PRINT "PUBLIC WORKS IS THE MA
JOR ISSUE":MA=4
1250 PRINT
1260 FOR J=1 TO 4
1270 Q(J)=A(J)
1280 NEXT J
1290 FOR J=1 TO 4
1300 IF J=MA THEN 1350
1310 PRINT B$(J);
1320 IF A(J)<6 THEN PRINT " IS NOT IMPOR
TANT":NT=J:GOTO 1350
1330 IF A(J)>5 AND A(J)<11 THEN PRINT "
IS A NEUTRAL ISSUE":NL=J:GOTO 1350
1340 IF A(J)>10 THEN PRINT " IS VITAL TO
 VOTERS":CR=J:GOTO 1350
1350 NEXT J
```

```
1360  IF NT>0 AND NL>0 AND CR>0 THEN 1430
1370  PRINT
1380  A(NT)=A(NT)+A(NT)/2
1390  A(NL)=A(NL)+A(NL)/2
1400  A(CR)=A(CR)+A(CR)/2
1410  A(MA)=A(MA)+A(MA)/2
1420  GOTO 1290
1430  FOR J=1 TO 4
1440  A(J)=Q(J)
1450  NEXT J
1460  RETURN
1470  DATA "SOCIAL SECURITY","DEFENSE","C
OMMERCE","PUBLIC WORKS"
```

BIG JOE'S SPACE RIG

Trucking has entered the twenty-first century, and you must pilot your rig across the fathomless reaches of space, carrying precious cargo for profit. In this program (which I adapted from a program written by teenager Mark Astley, who lives in Melbourne, Australia) you get to choose your cargo and attempt to move it across space.

The riskier the cargo, the higher the potential profit, as this printout from the start of the sample run indicates:

```
YOU START BY SELECTING YOUR PRODUCT:

1:  MAGELLANIC MUSCAS (MEDIUM RETURN,
BUT WILL SPOIL IF NOT DELIVERED ON TIME)

2: PEGASUS PAPYRUS (DOESN'T PAY MUCH,
    DELIVERY TIME IS NOT IMPORTANT)

3: BELLATRIX BEASTIES (BEST RETURN, BUT
        DELIVERY DATE IS CRUCIAL)

ENTER YOUR CHOICE (1 TO 3)
? 2

ENTER THE WEIGHT YOU WISH TO CARRY (UP
TO 10000 GALACTIC UNITS)
? 7600
```

Once you've picked your product, the long, lonely voyage begins:

```
        YOU HAVE BEEN GIVEN CLEARANCE FROM
            EARTH PORT NUMBER 454992


                10


                 9


                 8


                 7


                 6


                 5


                 4


                 3


                 2


                 1


                WE HAVE LIFTOFF!



        SPEED: 0      GYRO: 0
        TIME: 9  47      FIRSTDAY
        FUEL: 600      CREDITS OWED: 0

        ENTER YOUR SPEED (UP TO 160)? 99

        YOU'RE ZAPPING ALONG THE SPACE LANES
        BETWEEN STAR-PORTS 42 AND 838
        YOU HAVE 4212 MILLION MILES TO GO
        YOU ARE FRESH AND RELAXED



        SPEED: 99      GYRO: 198
        TIME: 11  48      FIRSTDAY
        FUEL: 555      CREDITS OWED: 0
```

```
        ENTER YOUR SPEED (UP TO 160)? 106


        YOU'RE ZAPPING ALONG THE SPACE LANES
        BETWEEN STAR-PORTS 42 AND 838
        YOU HAVE 4212 MILLION MILES TO GO
        YOU ARE FRESH AND RELAXED
```

Although you can choose your speed, there are some in the space lanes
who may not like what you're doing, as you'll probably discover in due course:

```
        SPEED: 160    GYRO: 518
        TIME: 13   50    FIRSTDAY
        FUEL: 575    CREDITS OWED: 33.5


        ENTER YOUR SPEED (UP TO 160)? 150


        YOU'RE ZAPPING ALONG THE SPACE LANES
        BETWEEN STAR-PORTS 575 AND 426
        YOU HAVE 3694 MILLION MILES TO GO
        YOU ARE GETTING BORED


        THE INTERGALATIC GENDARMES CLOCK YOU
        FOR SPEEDING

             YOU ARE FINED 50 CREDITS!!

        SPEED: 150    GYRO: 818
        TIME: 15   41    FIRSTDAY
        FUEL: 497    CREDITS OWED: 83.5

        ENTER YOUR SPEED (UP TO 160)? 99
```

Eventually, you should make your destination, and prepare to pocket
your profit:

```
        THERE IS AN ASTEROID REST-STOP AHEAD
        DO YOU WANT TO STOP (Y OR N)? Y

        HOW MANY HOURS DO YOU WANT TO SLEEP? 12
```

YOU ONLY SLEPT FOR 8 HOURS...

SPEED: 1   GYRO: 4011
TIME: 5   58   STARDAY
FUEL: 122   CREDITS OWED: 223.5

ENTER YOUR SPEED (UP TO 160)? 12

YOU'RE ZAPPING ALONG THE SPACE LANES
BETWEEN STAR-PORTS 247 AND 136
YOU HAVE 201 MILLION MILES TO GO
YOU ARE FRESH AND RELAXED

SPEED: 12   GYRO: 4035
TIME: 7   27   STARDAY
FUEL: 117   CREDITS OWED: 223.5

ENTER YOUR SPEED (UP TO 160)?

BETWEEN STAR-PORTS 575 AND 303
YOU HAVE 177 MILLION MILES TO GO
YOU ARE FRESH AND RELAXED

THERE IS AN ASTEROID REST-STOP AHEAD
DO YOU WANT TO STOP (Y OR N)? N

CONGRATULATIONS...YOU HAVE ARRIVED AT

HOLMPORT 1610

ARRIVAL TIME IS 9 :00, STARDAY

YOU WERE EXPECTED TO ARRIVE BY 12:00
             ON DARKDAY

YOU DECIDED TO CARRY PEGASUS PAPYRUS
      AT 1500 CREDITS A SHIP LOAD

YOU MADE 1500 CREDITS ON THAT TRIP,
    A PROFIT OF 1276.5 CREDITS

347

When you're ready to play the part of Big Joe the Space Trucker, this listing will give you the equipment you need:

```
10 REM BIG JOE'S SPACE RIG
20 GOSUB 1450:REM INITIALISE
30 GOSUB 1560
40 PRINT "YOU START BY SELECTING YOUR PR
ODUCT:"
50 GOSUB 1540
60 PRINT "1:  MAGELLANIC MUSCAS (MEDIUM
RETURN,"
70 PRINT "BUT WILL SPOIL IF NOT DELIVERE
D ON TIME)"
80 PRINT "2: PEGASUS PAPYRUS (DOESN'T PA
Y MUCH,"
90 PRINT "   DELIVERY TIME IS NOT IMPORT
ANT)"
100 PRINT:PRINT "3: BELLATRIX BEASTIES (
BEST RETURN, BUT"
110 PRINT "        DELIVERY DATE IS CRUCIA
L)"
120 PRINT:PRINT "ENTER YOUR CHOICE (1 TO
 3)"
130 INPUT A:IF A<1 OR A>3 THEN 130
140 GOSUB 1540
150 PRINT "ENTER THE WEIGHT YOU WISH TO
CARRY (UP  TO 10000 GALACTIC UNITS)"
160 INPUT LO
170 IF LO<1 OR LO>10000 THEN 160
180 CLS:GOSUB 1540
190 PRINT "YOU HAVE BEEN GIVEN CLEARANCE
 FROM"
200 PRINT TAB(5);"EARTH PORT NUMBER"INT(
RND(1)*10000*100)
210 FOR J=10 TO 1 STEP -1
220 PRINT:PRINT TAB(20-J);J
230 FOR H=1 TO 250:NEXT H
240 NEXT J
250 GOSUB 1560
260 PRINT TAB(12);"WE HAVE LIFTOFF!"
270 GOSUB 1540
280 IF TI>24 THEN DA=DA+1:TI=TI-24
290 IF DA=1 THEN D$="FIRSTDAY"
300 IF DA=2 THEN D$="NOONDAY"
```

```
310 IF DA=3 THEN D$="SOLDAY"
320 IF DA=4 THEN D$="DARKDAY"
330 IF DA=5 THEN D$="VANDAY"
340 IF DA=6 THEN D$="JOLMDAY"
350 IF DA=7 THEN D$="STARDAY"
360 IF DA>7 THEN DA=1:D2=D2+1
370 GOSUB 1560
380 PRINT "SPEED:"SP,"GYRO:"OD
390 PRINT "TIME:"TI;INT(RND(1)*50)+10,"
 ";D$
400 PRINT "FUEL:"FU,"CREDITS OWED:"DO
410 GOSUB 1560
420 INPUT "ENTER YOUR SPEED (UP TO 160)"
;SP
430 IF SP<0 OR SP>160 THEN 420
440 V=INT(RND(1)*5)+1:U=U-V
450 FU=FU-INT(RND(1)*10)+3
460 T$="FRESH AND RELAXED"
470 IF U<40 AND U>29 THEN T$="GETTING BO
RED"
480 IF U<30 AND U>19 THEN T$="BECOMING T
IRED!"
490 IF U<20 AND U>9 THEN T$="VERY TIRED!
!"
500 IF U<10 THEN 1040
510 GOSUB 1540
520 PRINT "YOU'RE ZAPPING ALONG THE SPAC
E LANES"
530 PRINT "BETWEEN STAR-PORTS"INT(RND(1)
*1000)+1"AND"INT(RND(1)*1000)+1
540 PRINT "YOU HAVE"4212-OD"MILLION MILE
S TO GO"
550 PRINT "YOU ARE ";T$:PRINT
560 IF FU>0 THEN 630
570 PRINT "YOU MUST SPACE-WALK FOR FIVE
MILLION    MILES FOR FUEL"
580 TI=TI+5:DO=DO+100
590 GOSUB 1540
600 PRINT "YOU ARE BACK AT YOUR SHIP!"
610 FU=FU+500
620 GOTO 280
630 W=INT(RND(1)*5)+1
640 ON W GOTO 650,700,760,800,800
650 GOSUB 1540
```

```
660 PRINT "THERE IS AN ASTEROID REST-STO
P AHEAD"
670 INPUT "DO YOU WANT TO STOP (Y OR N)"
;Y$
680 IF Y$="Y" THEN 850
690 GOTO 800
700 IF SP<101 THEN 800
710 GOSUB 1540
720 PRINT "THE INTERGALATIC GENDARMES CL
OCK YOU    FOR SPEEDING"
730 DO=DO+50
740 PRINT:PRINT TAB(7);"YOU ARE FINED 50
 CREDITS!!"
750 GOTO 800
760 GOSUB 1540
770 PRINT "YOU SEE A REFUELLING SPACE PL
ATFORM. DO YOU WANT TO STOP (Y OR N)";
780 INPUT G$
790 IF G$="Y" THEN 940
800 TI=TI+2:OD=OD+(SP*2)
810 IF OD>4212 THEN 1130
820 FU=FU-INT(SP/2-LO/5000)
830 GOTO 280
840 REM ******************
850 PRINT:INPUT "HOW MANY HOURS DO YOU W
ANT TO SLEEP";HO
860 HM=INT((HO/2)*RND(1))+1
870 HJ=HO-HM
880 TI=TI+HO
890 GOSUB 1540
900 PRINT "YOU ONLY SLEPT FOR"HJ"HOURS..
."
910 U=U+(HO/4)*7:IF U>50 THEN U=50
920 GOTO 280
930 REM ******************
940 PE=(INT(600*RND(1)+1))/10
950 PRINT:PRINT "FUEL COSTS"PE"CENTICRED
ITS PER GALLON"
960 PRINT:INPUT "HOW MANY GALLONS DO YOU
 WANT";FB
970 FU=FU+FB
980 IF FU>1100 THEN PRINT TAB(8);"YOU CA
N ONLY CARRY 1000":FU=FU-FB:GOTO 960
990 GOSUB 1540
```

```
1000 COST=FB*PE/100
1010 D0=D0+COST
1020 PRINT "THAT COST YOU"COST"CREDITS"
1030 GOTO 280
1040 GOSUB 1540
1050 PRINT "YOUR AUTOCORRECTION ANDROID
FAILS..."
1060 GOSUB 1540
1070 PRINT "YOUR SPEED IS NOW 170..."
1080 GOSUB 1540
1090 PRINT "YOUR SHIP HAS HIT AN ASTEROI
D..."
1100 GOSUB 1540
1110 PRINT TAB(8);"YOU ARE RATHER DEAD!"

1120 END
1130 GOSUB 1540
1140 PRINT "CONGRATULATIONS...YOU HAVE A
RRIVED AT"
1150 PRINT:PRINT TAB(16);"HOLMPORT"INT(R
ND(1)*10000)
1160 GOSUB 1540
1170 PRINT "ARRIVAL TIME IS"TI":00, ";D$

1180 PRINT:PRINT "YOU WERE EXPECTED TO A
RRIVE BY 12:00"
1190 PRINT TAB(12);"ON DARKDAY"
1200 F$="MAGELLANIC FRUIT":PR=1/2:R$="GA
LACTIC UNIT"
1210 IF A=2 THEN F$="PEGASUS PAPYRUS":PR
=1500:R$="SHIP LOAD"
1220 IF A=3 THEN F$="BELLATRIX BEASTIES"
:PR=2
1230 GOSUB 1540
1240 PRINT "YOU DECIDED TO CARRY ";F$
1250 PRINT TAB(7);"AT"PR"CREDITS A ";R$
1260 IF DA<4 THEN 1320
1270 T3=0
1280 IF TI>12 THEN T3=TI-12
1290 T4=DA-4
1300 T5=T4*24
1310 T6=T3+T5
1320 IF A=1 THEN GO=1000*T6:GOTO 1350
1330 IF A=3 THEN GO=300*T6
```

```
1340 IF GO>LO THEN GO=LO
1350 LO=LO-GO
1360 IF A=1 THEN FP=LO/2
1370 IF A=2 THEN FP=1500
1380 IF A=3 THEN FP=LO*2
1390 IF GO>0 THEN PRINT:PRINT GO"GALATIC
 UNITS SPOILED DURING FLIGHT"
1400 PRINT:PRINT "YOU MADE"FP"CREDITS ON
 THAT TRIP,"
1410 PRINT TAB(5);"A PROFIT OF"FP-DO"CRE
DITS"
1420 IF FP-DO<0 THEN PRINT TAB(5);"I GUE
SS WE SHOULD CALL THAT A LOSS"
1430 END
1440 REM **************
1450 REM INITIALISATION
1460 CLS
1470 RANDOMIZE VAL(RIGHT$(TIME$,2))
1480 U=49:FU=600
1490 DA=1:TI=9
1500 SP=0:OD=0
1510 D2=0:DO=0
1520 RETURN
1530 REM **************
1540 REM SPACE OUT/DELAY
1550 FOR Z=1 TO 100:NEXT Z
1560 PRINT:
1570 RETURN
```

THE
CRUSADES

The first Christian Crusade against the monstrous infidels was proclaimed by Pope Urban II in 1095. The following year, under the inept leadership of Peter the Hermit (a con-man of the highest order) and the self-effacing knight Walter Sans-Avoir ("The Penniless"), things got off to a bad start when more than 90% of a force of some 40,000 members of the People's Crusade were wiped out near Nicaea by the Seljuk Turks.

The real action began about a year after this tragic fiasco, when an enormous army mustered at Constantinople under the leadership of several men, including the papal legate Adhemar Le Puy and William the Conqueror's son, Robert of Normandy. This is the point where our game takes place.

You play THE CRUSADES as a board game, in which the board positions are fortified sites in and around the kingdom of Jerusalem. These were the scenes of bitter fighting from the time of Le Puy's Crusade right through to the final siege of Acre in April, 1291.

Here's the board as it appears at the start of the game. You control the movement of the Byzantines (the # symbols). The computer controls the Saracens' forces (the * symbols):

```
SARACENS (*): 0    BYZANTINES (#): 0

/--1---2---3---4---5---6---7---8--\
        *       *       *       *
8     LEM     MAL     MIR     MON 8
    *       *       *       *
7 JAB     JEB     JUD     KAH     7

6     HAI     HAR     HOM     IBE 6

5 FIE     GAL     GAZ     GOV     5

4     DAR     DUL     EFR     EXE 4

3 CAC     CAP     CAS     CHA     3
        #       #       #       #
2     BAN     BEL     BIR     BUR 2
    #       #       #       #
1 ACR     ALB     APA     ART     1
  1---2---3---4---5---6---7---8
```

The locations on the board are three-letter abbreviations for the following places:

LEM—Lemezera, MAL—Munitio Malve, MIR—Mirabel, MON—Montfort, JAB—Jabala, JEB—Jebail, JUD—Judyn, KAH—al-Kahf, HAI—Haifa, HAR—Harunia, HOM—Hormoz, IBE—Ibelin, FIE—Fier, GAL—Le Galatie, GAZ—Gaza, GOV—Govasse, DAR—Darbsaq, DUL—Duluk, EFR—Efraon, EXE—Exerc, CAC—Caco, CAP—Capharlet, CAS—Casal Maen, CHA—Chastel Arnaud, BAN—Banyas, BEL—Bel Hacem, BIR—Birejik, BUR—Burj ar-Risas, ACR—Acre, ALB—Albe, APA—Apamea, and ART—Artah.

Although these sound like place names from the movie *Dune*, they all existed in the eleventh and twelfth centuries.

In THE CRUSADES, you gain points by either capturing a fortified site currently occupied by an enemy force, or by managing to get one of your forces to "sanctuary," the back line on the opposite site of the board. All moves are diagonal (as in Checkers), and you can only move into an unoc-

cupied fort. You capture by jumping *over* the fort held by the enemy, into an empty fort beyond it (again as in Checkers). There are, however, no multiple jumps. Once a force reaches sanctuary, it is removed from the battlefield, so there are no "kings" as in Checkers. It is possible to get two points with one move, if you capture a fort and move into sanctuary as you end the capture.

You move by entering the coordinates of the force you're moving (first entering the number along the side and then the number along the bottom as a single, two-digit number), then the coordinates of the location you're moving to (again, as a single two-digit number). You'll see this action in this scene from the game, in which you move from Birejik (26) to Chastel Arnaud (37):

```
SARACENS [*]: 0     BYZANTINES [#]: 0

/---1---2---3---4---5---6---7---8---\
        *               *       *
8       LEM     MAL     MIR     MON 8
              *       *       *
7 JAB     JEB     JUD     KAH       7
        *
6       HAI     HAR     HOM     IBE 6
                              *
5 FIE     GAL     GAZ     GOV       5
                #
4       DAR     DUL     EFR     EXE 4
                #
3 CAC     CAP     CAS     CHA       3
                        #       #
2       BAN     BEL     BIR     BUR 2
      #       #       #       #
1 ACR     ALB     APA     ART       1
  1---2---3---4---5---6---7---8
```

```
>>>>>     ADVANCE FORCE FROM? 26
>>>>>>>>>>  PLACE FORCE AT? 37
```

And so the game unfolds:

```
SARACENS [*]: 1    BYZANTINES [#]: 1

/--1---2---3---4---5---6---7---8--\
                        *       *
8     LEM     MAL     MIR     MON 8
              *
7 JAB     JEB     JUD     KAH     7
          *       *       *       *
6     HAI     HAR     HOM     IBE 6

5 FIE     GAL     GAZ     GOV     5
                  #       #
4     DAR     DUL     EFR     EXE 4
                          #
3 CAC     CAP     CAS     CHA     3
          #                   #
2     BAN     BEL     BIR     BUR 2
                  #       #
1 ACR     ALB     APA     ART     1
   1---2---3---4---5---6---7---8
```

>>>>>   ADVANCE FORCE FROM? 15
>>>>>>>>>> PLACE FORCE AT? 24

```
SARACENS (*): 2    BYZANTINES (#): 1

/--1---2---3---4---5---6---7---8--\
                                 *
8      LEM     MAL     MIR     MON 8
               *               *
7 JAB      JEB     JUD     KAH     7
                *       *       *
6      HAI     HAR     HOM     IBE 6

5 FIE      GAL     GAZ     GOV     5
                       #       #
4      DAR     DUL     EFR     EXE 4
                       *
3 CAC      CAP     CAS     CHA     3
           #       #           #
2      BAN     BEL     BIR     BUR 2
                           #
1 ACR      ALB     APA     ART     1
   1---2---3---4---5--6---7---8

>>>>>    ADVANCE FORCE FROM? 28
>>>>>>>>>> PLACE FORCE AT? 37
```

```
      SARACENS (*): 2    BYZANTINES (#): 1

      /--1---2---3---4--5---6---7--8--\
                                   *
      8     LEM   MAL     MIR     MON 8
                  *               *
      7 JAB   JEB   JUD     KAH     7
                    *     *       *
      6     HAI   HAR     HOM     IBE 6


      5 FIE   GAL   GAZ     GOV     5
                          #       #
      4     DAR   DUL     EFR   EXE 4
                    *       #
      3 CAC   CAP   CAS     CHA     3
              #       #
      2     BAN   BEL     BIR   BUR 2
                              #
      1 ACR   ALB   APA     ART     1
        1---2---3---4---5---6---7--8

      I CAPTURED AND REACHED 13 IN SANCTUARY
```
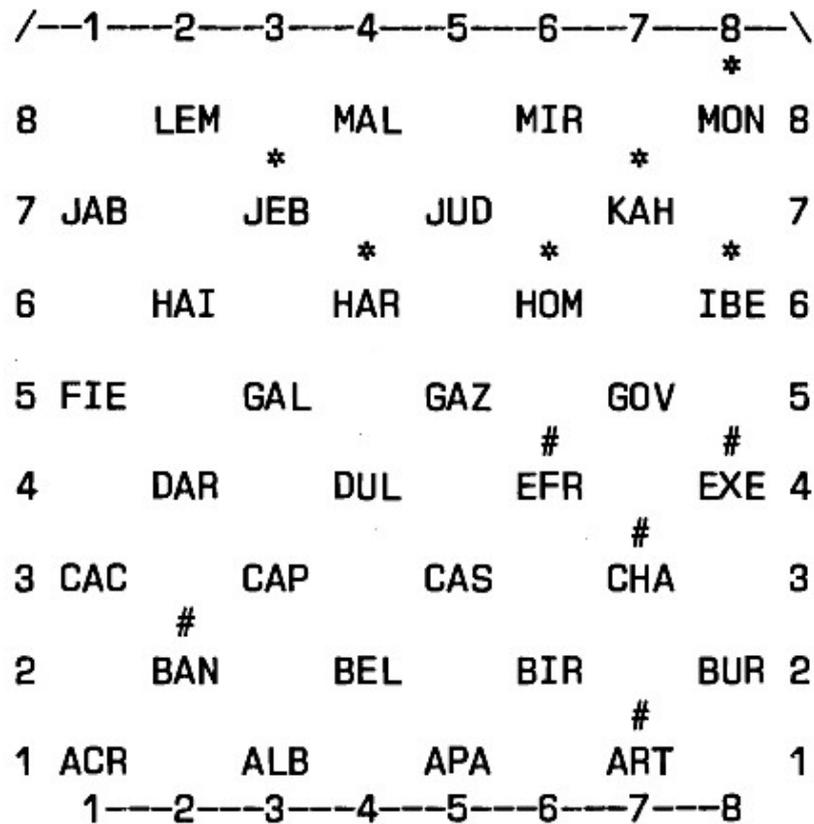
```
SARACENS (*): 4    BYZANTINES (#): 1

/--1---2---3---4---5---6---7---8--\
                                *
8     LEM     MAL     MIR     MON 8
            *                *
7 JAB     JEB     JUD     KAH     7
                *       *       *
6     HAI     HAR     HOM     IBE 6


5 FIE     GAL     GAZ     GOV     5
                        #       #
4     DAR     DUL     EFR     EXE 4
                            #
3 CAC     CAP     CAS     CHA     3
        #
2     BAN     BEL     BIR     BUR 2
                            #
1 ACR     ALB     APA     ART     1
   1---2---3---4---5---6---7---8

>>>>>    ADVANCE FORCE FROM? 22
>>>>>>>>>>  PLACE FORCE AT? 33
```

The Saracens, controlled by the computer, are obviously in top form today, as they end up the victors:

```
SARACENS (*): 4    BYZANTINES [#]: 1

/--1---2---3---4---5---6---7---8--\
                                *
B     LEM     MAL     MIR     MON 8
           *               *
7 JAB     JEB     JUD     KAH     7
               *               *
6     HAI     HAR     HOM     IBE 6
                   #       *
5 FIE     GAL     GAZ     GOV     5
                               #
4     DAR     DUL     EFR     EXE 4
           #               #
3 CAC     CAP     CAS     CHA     3

2     BAN     BEL     BIR     BUR 2
                           #
1 ACR     ALB     APA     ART     1
   1---2---3---4---5---6---7---8
```

```
      SARACENS [*]: 5    BYZANTINES [#]: 1

      /--1---2---3---4---5--6---7---8--\
                                   *
      8      LEM     MAL     MIR      MON 8
                       *             *
      7 JAB     JEB     JUD     KAH      7
                                   *
      6      HAI     HAR     HOM      IBE 6
                                 *
      5 FIE     GAL     GAZ     GOV      5
                               *       #
      4      DAR     DUL     EFR      EXE 4
                       #             #
      3 CAC     CAP     CAS     CHA      3

      2      BAN     BEL     BIR      BUR 2
                                   #
      1 ACR     ALB     APA     ART      1
        1---2---3---4---5--6---7--8
```

THE WAR IS OVER. I'M THE WINNER

When you're ready to assist Adhemar Le Puy and his cronies, enter and run the following program:

```
10 REM ************
20 REM THE CRUSADES
30 REM ************
40 GOSUB 1680
50 GOSUB 1300
60 GOSUB 170
70 GOSUB 1300
80 IF CS>4 THEN 120
90 GOSUB 1520
100 GOSUB 1300
```

```
110  IF HS<5 THEN 60
120  PRINT:PRINT "THE WAR IS OVER. ";
130  IF HS>CS THEN PRINT "YOU HAVE WON"
140  IF CS>HS THEN PRINT "I'M THE WINNER"
150  END
160  REM **************
170  REM SARACENS MOVE
180  REM **************
190  GSAFE=0
200  CSAFE=0
210  CCAPTURE=0
220  FOR J=1 TO 3
230  G(J)=0:S(J)=0:T(J)=0
240  NEXT J
250  FOR J=80 TO 30 STEP -10
260  FOR K=1 TO 8
270  IF A(J+K)<>C THEN 320
280  X=J+K-9:Y=J+K-18:Z=J+K-27:M=-11
290  IF A(X)=H AND A(Y)=B THEN GOSUB 540
300  X=J+K-11:Y=J+K-22:Z=J+K-33:M=-9
310  IF A(X)=H AND A(Y)=B THEN GOSUB 540
320  NEXT K
330  NEXT J
340  IF GSAFE+CSAFE+CCAPTURE=0 THEN 680
350  IF GSAFE<>0 THEN 390
360  IF CSAFE<>0 THEN 520
370  MOVE=T(INT(RND(1)*CCAPTURE)+1)
380  GOTO 400
390  MOVE=G(INT(RND(1)*GSAFE)+1)
400  START=INT(MOVE/100)
410  ED=MOVE-100*START
420  A(START)=B
430  A(START-ED)=B
440  A(START-2*ED)=C
450  CS=CS+1
460  IF START-2*ED>18 THEN RETURN
470  A(START-2*ED)=B
480  CS=CS+1
490  PRINT "I CAPTURED AND REACHED";START
-2*ED;"IN SANCTUARY"
500  FOR T=1 TO 1987:NEXT T
510  RETURN
520  MOVE=S(INT(RND(1)*CSAFE)+1)
530  GOTO 400
```

```
540 IF A(Z)=H THEN 650
550 IF A(Y+M)=H AND A(Y-M)=B THEN 650
560 IF A(J+K+M)=C AND A(J+K+2*M)=H THEN
650
570 CSAFE=CSAFE+1
580 S(CSAFE)=100*(J+K)+20+M
590 CHECK=GSAFE
600 IF Y+2*M<1 THEN RETURN
610 IF A(Y+M)=H AND A(Y-(20+M))<>B AND A
(Y+2*M)=B THEN GSAFE=GSAFE+1
620 IF CHECK=GSAFE THEN RETURN
630 G(GSAFE)=100*(J+K)+20+M
640 RETURN
650 CCAPTURE=CCAPTURE+1
660 T(CCAPTURE)=100*(J+K)+20+M
670 RETURN
680 MOVE=0
690 J=80
700 K=1
710 Q=J+K
720 IF A(Q)<>C THEN 790
730 IF A(Q+9)=B AND A(Q-9)=H AND A(Q+18)
=C THEN MOVE=100*(Q+18)+Q+9
740 IF MOVE<>0 AND A(Q-2)=H AND A(Q+20)=
B AND RND(1)>.5 THEN 1110
750 IF A(Q+9)=B AND A(Q-9)=H AND A(Q+20)
=C THEN MOVE=100*(Q+20)+Q+9:GOTO 1110
760 IF A(Q+11)=B AND A(Q-11)=H AND A(Q+2
2)=C THEN MOVE=100*(Q+22)+Q+11
770 IF MOVE<>0 AND A(Q+2)=H AND A(Q+22)=
B AND RND(1)>.5 THEN 1110
780 IF A(Q+11)=B AND A(Q-11)=H AND A(Q+2
0)=C THEN MOVE=100*(Q+20)+Q+11:GOTO 1110

790 IF K<8 THEN K=K+1:GOTO 710
800 IF J>10 THEN J=J-10:GOTO 700
810 MOVE=0
820 IF A(22)=C AND A(11)=B THEN MOVE=22
830 IF A(28)=C AND A(17)=B THEN MOVE=28
840 IF A(22)=C AND A(13)=B THEN MOVE=22
850 IF A(26)=C AND A(17)=B THEN MOVE=26
860 IF A(26)=C AND A(15)=B THEN MOVE=26
870 IF A(24)=C AND A(15)=B THEN MOVE=24
880 IF A(24)=C AND A(13)=B THEN MOVE=24
```

```
890 IF MOVE=0 THEN 930
900 A(MOVE)=B
910 CS=CS+1
920 RETURN
930 CMOVE=0
940 FOR J=80 TO 30 STEP -10
950 FOR K=1 TO 8
960 IF A(J+K)<>C THEN 1070
970 X=J+K-9:Y=J+K-18:Z=J+K-20
980 Q=J+K+2
990 IF A(X)<>B THEN 1070
1000 IF A(Y)=H OR A(Z)=H AND A(Q)=B THEN
 1070
1010 GOSUB 1160
1020 X=J+K-11:Y=J+K-22:Z=J+K-20
1030 Q=J+K-2
1040 IF A(X)<>B THEN 1070
1050 IF A(Y)=H OR A(Z)=H AND A(Q)=B THEN
 1070
1060 GOSUB 1160
1070 NEXT K
1080 NEXT J
1090 IF CMOVE=0 THEN 1190
1100 MOVE=T(INT(RND(1)*CMOVE)+1)
1110 START=INT(MOVE/100)
1120 ED=MOVE-100*START
1130 A(START)=B
1140 A(ED)=C
1150 RETURN
1160 CMOVE=CMOVE+1
1170 T(CMOVE)=100*(J+K)+X
1180 RETURN
1190 L=0
1200 L=L+1
1210 J=10*INT(RND(1)*8+1)
1220 K=INT(RND(1)*8+1)
1230 IF A(J+K)=C THEN 1260
1240 IF L<200 THEN 1200
1250 PRINT:PRINT "I CONCEDE THE HOLY WAR
":END
1260 IF A(J+K-9)=B THEN MOVE=100*(J+K)+J
+K-9:GOTO 1110
1270 IF A(J+K-11)=B THEN MOVE=100*(J+K)+
J+K-11:GOTO 1110
```

```
1280 GOTO 1240
1290 REM *********
1300 REM PRINT MAP
1310 REM *********
1320 CLS
1330 PRINT " SARACENS (*):";CS;"  BYZANT
INES (#):";HS
1340 PRINT
1350 PRINT " /--1---2---3---4---5---6---
7---8--\":PRINT "    ";
1360 FOR J=80 TO 10 STEP - 10
1370 FOR Z=1 TO 2
1380 FOR K=1 TO 8
1390 PL=A(J+K)
1400 IF Z=1 AND PL<>46 THEN PRINT CHR$(P
L);"    ";
1410 IF Z=1 AND PL=46 THEN PRINT "     ";

1420 IF Z=2 AND K=1 THEN PRINT:PRINT J/1
0;
1430 IF Z=2 THEN PRINT W$(J+K);" ";
1440 NEXT K
1450 NEXT Z
1460 PRINT RIGHT$(STR$(J/10),1):PRINT "
   ";
1470 NEXT J
1480 PRINT "1---2---3---4---5---6---7---
8"
1490 PRINT
1500 RETURN
1510 REM **************
1520 REM BYZANTINE MOVE
1530 REM **************
1540 INPUT ">>>>>   ADVANCE FORCE FROM";
START
1550 IF A(START)<H THEN 1540
1560 FOR X=1 TO 10
1570 PRINT ">";:FOR T=1 TO 199:NEXT T
1580 NEXT X
1590 INPUT "  PLACE FORCE AT";ED
1600 IF A(ED)<>B OR ABS(START-ED)>11 AND
 A((START+ED)/2)<>C THEN 1590
1610 A(START)=B
1620 A(ED)=H
```

```
1630 IF ABS(START-ED)>11 THEN A((START+E
D)/2)=B:HS=HS+1:PRINT ,"AAAH! GOT ME!"
1640 IF ED>80 THEN A(ED)=B:HS=HS+1:PRINT
,"BONUS"
1650 FOR T=1 TO 700:NEXT T
1660 RETURN
1670 REM **********
1680 REM INITIALISE
1690 REM **********
1700 CLS
1710 REM DELETE NEXT TWO LINES IF NOT
             ACCEPTED BY YOUR COMPUTER
1720 DEFINT A-Z
1730 RANDOMIZE(VAL(RIGHT$(TIME$,2)))
1740 DIM A(110),W$(110)
1750 DIM G(3),S(3),T(18)
1760 E=32:B=46:C=42:H=35
1770 HS=0:CS=0
1780 FOR J=10 TO 80 STEP 10
1790 FOR K=1 TO 8
1800 READ X:A(J+K)=X
1810 NEXT K
1820 NEXT J

1830 FOR J=10 TO 80 STEP 10
1840 FOR K=1 TO 8
1850 READ X$:W$(J+K)=X$
1860 NEXT K
1870 NEXT J
1880 RETURN
1890 REM ************************
1900 DATA 35,32,35,32,35,32,35,32
1910 DATA 32,35,32,35,32,35,32,35
1920 DATA 46,32,46,32,46,32,46,32
1930 DATA 32,46,32,46,32,46,32,46
1940 DATA 46,32,46,32,46,32,46,32
1950 DATA 32,46,32,46,32,46,32,46
1960 DATA 42,32,42,32,42,32,42,32
1970 DATA 32,42,32,42,32,42,32,42
1980 REM ******************************
1990 DATA "ACR","    ","ALB","    ","APA",
"    ","ART","    "
2000 DATA "    ","BAN","    ","BEL","    ",
"BIR","    ","BUR"
```

```
2010 DATA "CAC","     ","CAP","     ","CAS",
"     ","CHA","     "
2020 DATA "     ","DAR","     ","DUL","     ",
"EFR","     ","EXE"
2030 DATA "FIE","     ","GAL","     ","GAZ",
"     ","GOV","     "
2040 DATA "     ","HAI","     ","HAR","     ",
"HOM","     ","IBE"
2050 DATA "JAB","     ","JEB","     ","JUD",
"     ","KAH","     "
2060 DATA "     ","LEM","     ","MAL","     ",
"MIR","     ","MON"
```

SHEEP STATION

In this simulation, you have to make a number of decisions to successfully manage a huge sheep station. The station starts the game with a value of $50,000. It is your job to increase its value by making wise decisions.

Every year, you have to make 10 decisions regarding the station. Each one of these decisions has a direct bearing on that year's harvest and sheep population. Once you've answered all the questions posed by the program, you'll be told such things as:

— the number of sheep born
— the number of sheep that have died
— the quantity of grain harvested per acre
— the value of the land
— the value of the grain

You will see that all of these factors are *directly* determined by your actions as manager. The program can give you advice as to the ideal farming pattern. You get this advice by entering 666 after the above information has been given. You can terminate the game at any time by entering 999. The program will tell you how much the property is now worth, and how many years you managed it.

The problem of running the station is compounded by the $1000 a year you have to pay to the bank as a mortgage repayment.

After some practice, you'll find that clever management will allow you to manipulate the market and make a profit. The real task is to maximize your profits. Quick profits are not easy to come by.

Here are some "snapshots" of the simulation in action:

```
        WELCOME TO 'SHEEP STATION'


     THE BEST GRAZING PATTERN IS 10 SHEEP
        PER ACRE, AND 10 KILO OF GRAIN
                 PER SHEEP


     10 KILO OF GRAIN SOWN PER ACRE WILL
        ALLOW YOU TO HARVEST 100 KILO OF
             FOR EACH ACRE SOWN
```

```
YOU BEGIN WITH 1000 SHEEP AND 200 ACRES
$10,000 AND 10,000 KILO OF FOOD

EACH YEAR YOU AUTOMATICALLY PAY THE
BANK $1,000 IN MORTGAGE FEES

THE LAND VALUE IS $ 100 PER ACRE
AND FOOD VALUE IS $ .1 PER KILO

     YOU HAVE $ 10000 IN THE BANK,
        200 ACRES OF LAND,
        1000 HEAD OF SHEEP,
     AND 10000 KILO OF GRAIN.

HOW MANY ACRES WILL YOU BUY? 10

THE LAND VALUE IS $ 100 PER ACRE
AND FOOD VALUE IS $ .1 PER KILO

     YOU HAVE $ 9000 IN THE BANK,
        210 ACRES OF LAND,
        1000 HEAD OF SHEEP,
     AND 10000 KILO OF GRAIN.


DO YOU WANT TO TRADE (Y OR N)? Y
YOU HAVE 1000 SHEEP
EACH SHEEP IS WORTH 90 UNITS OF
  GRAIN OR $ 9

HOW MANY SHEEP DO YOU WANT TO TRADE? 400

DO YOU WANT TO TRADE THE 400
SHEEP FOR GRAIN (G) OR M (MONEY);
? M

THE LAND VALUE IS $ 100 PER ACRE
AND FOOD VALUE IS $ .1 PER KILO

     YOU HAVE $ 12600 IN THE BANK,
        210 ACRES OF LAND,
        600 HEAD OF SHEEP,
     AND 10000 KILO OF GRAIN.
```

```
HOW MANY ACRES WILL YOU GRAZE? 100

THE LAND VALUE IS $ 100 PER ACRE
AND FOOD VALUE IS $ .1 PER KILO

        YOU HAVE $ 12600 IN THE BANK,
           210 ACRES OF LAND,
           600 HEAD OF SHEEP,
        AND 10000 KILO OF GRAIN.


HOW MANY KILO OF FOOD? 6000
YOU NOW HAVE 4000 KILO OF GRAIN

THE LAND VALUE IS $ 100 PER ACRE
AND FOOD VALUE IS $ .1 PER KILO

        YOU HAVE $ 12600 IN THE BANK,
           210 ACRES OF LAND,
           600 HEAD OF SHEEP,
        AND 4000 KILO OF GRAIN.


THE LAND VALUE IS $ 100 PER ACRE
AND FOOD VALUE IS $ .1 PER KILO

        YOU HAVE $ 12600 IN THE BANK,
           210 ACRES OF LAND,
           600 HEAD OF SHEEP,
        AND 4000 KILO OF GRAIN.


HOW MUCH LAND DO YOU WANT TO SOW? 110

THE LAND VALUE IS $ 100 PER ACRE
AND FOOD VALUE IS $ .1 PER KILO

        YOU HAVE $ 12600 IN THE BANK,
           210 ACRES OF LAND,
           600 HEAD OF SHEEP,
        AND 4000 KILO OF GRAIN.


THERE WERE 2 SHEEP BORN
    AND 1 SHEEP DIED
```

YOU HAVE HARVESTED 109 KILO OF
    GRAIN FROM EACH ACRE

THE LAND VALUE IS $ 98 PER ACRE
AND FOOD VALUE IS $ .107 PER KILO

    YOU HAVE $ 11600 IN THE BANK,
        210 ACRES OF LAND,
        601 HEAD OF SHEEP,
    AND 14800 KILO OF GRAIN.

HOW MANY ACRES WILL YOU BUY? 100

DO YOU WANT TO TRADE (Y OR N)? N

THERE WERE 12 SHEEP BORN
    AND 4 SHEEP DIED

YOU HAVE HARVESTED 106 KILO OF
    GRAIN FROM EACH ACRE

THE LAND VALUE IS $ 98 PER ACRE
AND FOOD VALUE IS $ .107 PER KILO

    YOU HAVE $ 10763 IN THE BANK,
        210 ACRES OF LAND,
        507 HEAD OF SHEEP,
    AND 19261 KILO OF GRAIN.

HOW MANY ACRES WILL YOU BUY? 999

THIS SHEEP STATION WAS WORTH $50,000
BEFORE YOU BECAME THE MANAGER.

IT IS NOW WORTH $ 38293
    AFTER JUST 2 YEARS

Note that you *must* answer every question asked. You must always graze at least one acre, and must always sow at least one acre. If you don't want to buy or sell land, enter a zero when asked how many acres you wish to buy or sell. Enter "N" if you don't want to trade. Enter a "Y" if you want to consider trading. However, once you see the current price, you can change your mind. In this case, enter a zero when asked how many sheep you wish to trade. You'll find this is much simpler to understand when the program is running than it may seem from this description. The program is based on one written by Philip Coates.

```
10 REM SHEEP STATION
20 REM ORIGINAL PROGRAM
30 REM BY PHILIP COATES
40 GOSUB 1660:REM INITIALISATION
50 RESTORE
60 PRINT "YOU BEGIN WITH 1000 SHEEP AND
200 ACRES"
70 PRINT "$10,000 AND 10,000 KILO OF FOO
D"
80 PRINT:PRINT
90 PRINT "EACH YEAR YOU AUTOMATICALLY PA
Y THE"
100 PRINT "BANK $1,000 IN MORTGAGE FEES"

110 GOSUB 2010
120 LV=100:FV=.1:B=10000:L=200
130 S=1000:F=10000:Y=0
140 GOSUB 1180
150 PRINT "HOW MANY ACRES WILL YOU BUY";

160 INPUT BL
170 IF BL=0 THEN 270
180 IF BL=666 THEN GOSUB 1660:GOTO 140
190 IF BL=999 THEN 1930
200 IF BL*LV<=B THEN 230
210 PRINT "YOU DO NOT HAVE ENOUGH MONEY"
220 GOTO 150
230 L=L+BL
240 B=B-BL*LV
250 Y=Y+1
260 GOTO 350
270 GOSUB 1280
280 PRINT "HOW MANY ACRES DO YOU WISH TO
   SELL";
```

```
290 INPUT SL
300 IF SL=666 THEN GOSUB 1660
310 IF SL<=L THEN 340
320 PRINT "YOU DON'T HAVE THAT MANY"
330 GOTO 280
340 L=L-SL:B=B+SL*LV
350 GOSUB 1280
360 PRINT "DO YOU WANT TO TRADE (Y OR N)
";
370 INPUT T$
380 IF T$="Y" THEN GOSUB 1440
390 GOSUB 1280
400 PRINT "HOW MANY ACRES WILL YOU GRAZE
";
410 INPUT G
420 IF G=666 THEN GOSUB 1660:GOTO 400
430 IF G=0 THEN G=1
440 IF GL<=L THEN 470
450 PRINT "YOU DON'T HAVE THAT MUCH LAND
"
460 GOTO 400
470 GOSUB 1280
480 PRINT "HOW MANY KILO OF FOOD";
490 INPUT FD
500 IF FD=666 THEN GOSUB 1660:GOTO 490
510 IF FD<=F THEN 550
520 IF FD=0 THEN FD=1
530 PRINT "YOU DON'T HAVE THAT MUCH GRAI
N"
540 GOTO 480
550 F=INT(F-FD)
560 PRINT "YOU NOW HAVE"F"KILO OF GRAIN"

570 GOSUB 1280
580 PRINT "HOW MUCH LAND DO YOU WANT TO
SOW";
590 INPUT SA
600 IF SA=666 THEN GOSUB 1660:GOTO 580
610 IF SA=0 THEN SA=1
620 IF SA<=L-G THEN 650
630 PRINT "YOUR FARM IS NOT THAT EXTENSI
VE"
640 GOTO 580
650 GOSUB 1280
```

```
660 PRINT "HOW MUCH GRAIN DO YOU WANT TO
   PLANT";
670 INPUT GP
680 IF GP=666 THEN GOSUB 1660:GOTO 660
690 IF GP>12*SA THEN PRINT "THAT IS WAST
EFUL":GOTO 660
700 IF GP<=F THEN 750
710 PRINT "GRAIN IN STOCK IS LESS THAN T
HAT"
720 GOTO 660
730 REM ******************
740 RESTORE
750 H=(GP/SA)*10
760 IF H>150 THEN H=150
770 IF H<50 THEN 1390
780 F=F-GP+H*SA
790 F1=10*G/S
800 F2=FD/(S*10)
810 F3=F1*F2
820 IF F3>=1 THEN 930
830 F3=10*F3
840 FOR X=1 TO F3
850 READ NB
860 NEXT X
870 RESTORE
880 FOR X=1 TO (F3+9)
890 READ ND
900 NEXT X
910 RESTORE
920 GOTO 1010
930 FOR X=1 TO (F3+18)
940 READ ND
950 NEXT X
960 RESTORE
970 FOR X=1 TO (F3+28)
980 READ ND
990 NEXT X
1000 RESTORE
1010 Z=(H/10)-4
1020 FOR X=1 TO (Z+38)
1030 READ FV
1040 NEXT X
1050 RESTORE
1060 FOR X=1 TO (Z+49)
```

```
1070 READ LV
1080 NEXT X
1090 RESTORE
1100 SB=S*NB+INT(RND(1)*S/30)+1
1110 SD=SD*ND+INT(RND(1)*4)+1
1120 S=S+SB-SD
1130 B=B-1000
1140 GOTO 140
1150 REM *****************
1160 REM *************
1170 REM HELP, STATUS
1180 GOSUB 2010
1190 PRINT TAB(8);"FOR HELP, ENTER 666"
1200 PRINT TAB(9);"TO QUIT, ENTER 999"
1210 PRINT:PRINT
1220 IF SB>0 THEN PRINT "THERE WERE"INT(
SB)"SHEEP BORN"
1230 IF SD>0 THEN PRINT TAB(6);"AND"INT(
SD)"SHEEP DIED"
1240 GOSUB 2010
1250 H=INT(H)
1260 IF H>0 THEN PRINT "YOU HAVE HARVEST
ED"H"KILO OF"
1270 IF H>0 THEN PRINT TAB(6);"GRAIN FRO
M EACH ACRE"
1280 PRINT
1290 PRINT "THE LAND VALUE IS $"INT(LV)"
PER ACRE"
1300 PRINT "AND FOOD VALUE IS $"FV"PER K
ILO"
1310 PRINT
1320 PRINT TAB(6);"YOU HAVE $"INT(B)"IN
THE BANK,"
1330 PRINT TAB(9);L"ACRES OF LAND,"
1340 PRINT TAB(9);INT(S)"HEAD OF SHEEP,"
1350 PRINT TAB(6);"AND"INT(F)"KILO OF GR
AIN."
1360 GOSUB 2010
1370 RETURN
1380 REM ***************
1390 PRINT "YOU NEED TO PLANT AT LEAST F
IVE"
1400 PRINT TAB(3);"UNITS OF GRAIN PER AC
RE"
```

```
1410 GOSUB 2010
1420 GOTO 650
1430 REM **************
1440 PRINT "YOU HAVE"INT(S)"SHEEP"
1450 PRINT "EACH SHEEP IS WORTH"INT(FV*9
00)"UNITS OF"
1460 PRINT TAB(3);"GRAIN OR $"INT(FV*90)
1470 GOSUB 2010
1480 PRINT "HOW MANY SHEEP DO YOU WANT T
O TRADE";
1490 INPUT T
1500 IF T<=S THEN 1530
1510 PRINT "YOU DO NOT HAVE THAT MANY"
1520 GOTO 1480
1530 PRINT "DO YOU WANT TO TRADE THE"T
1540 PRINT "SHEEP FOR GRAIN (G) OR M (MO
NEY);
1550 INPUT T$
1560 IF T$="G" THEN 1610
1570 IF T$<>"M" THEN PRINT TAB(12);"'G'
OR 'M'":GOTO 1550
1580 S=S-T
1590 B=B+INT(T*FV*90)
1600 RETURN
1610 S=S-T
1620 F=F+(T*FV*900)
1630 RETURN
1640 REM ************
1650 REM INSTRUCTIONS
1660 CLS
1670 RANDOMIZE VAL(RIGHT$(TIME$,2))
1680 PRINT:PRINT
1690 PRINT "WELCOME TO 'SHEEP STATION'"
1700 GOSUB 2010
1710 PRINT "THE BEST GRAZING PATTERN IS
10 SHEEP"
1720 PRINT TAB(3);"PER ACRE, AND 10 KILO
 OF GRAIN"
1730 PRINT TAB(12);"PER SHEEP"
1740 GOSUB 2010
1750 PRINT "10 KILO OF GRAIN SOWN PER AC
RE WILL"
1760 PRINT TAB(2);"ALLOW YOU TO HARVEST
100 KILO OF"
```

```
1770 PRINT TAB(6);"FOR EACH ACRE SOWN"
1780 GOSUB 2010
1790 RETURN
1800 REM **********
1810 REM ** DATA **
1820 DATA 0,0,.01,.02,.03,.04,.05,.1,.15

1830 DATA .9,.8,.7,.6,.5,.4,.3,.2,.1
1840 DATA .2,.4,.55,.65,.75,.8,.85,.9,.9
5,1
1850 DATA .05,.05,.04,.04,.04,.04,.03,.0
3,.02,.01,0
1860 DATA .16,.14,.126,.115,.107,.1,.095
,.09,.086
1870 DATA .083,.08
1880 DATA 90,92,94,96,98,100,102,104,106
,108,110
1890 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,
0,0,0,0,0,0,0,0
1900 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,
0,0,0,0,0,0,0,0
1910 REM *************
1920 REM ** THE END **
1930 GOSUB 2010
1940 PRINT "THIS SHEEP STATION WAS WORTH
 $50,000"
1950 PRINT "BEFORE YOU BECAME THE MANAGE
R."
1960 GOSUB 2010
1970 PRINT "IT IS NOW WORTH $"INT(B+(L*L
V)+(S*FV*90)+F*FV)
1980 PRINT TAB(8);"AFTER JUST"Y"YEARS"
1990 END
2000 REM *****
2010 REM DELAY
2020 FOR J=1 TO 900:NEXT J
2030 PRINT:PRINT
2040 RETURN
```

THE OVAL OFFICE

You have won the election! And now, if you behave yourself, the Oval Office is yours for the next four years. Your performance in office will determine what the electorate thinks about you, and their thoughts will determine whether or not you'll be re-elected at the end of your current term.

The only weapon you have is control of government spending. Spending a high proportion of the federal money reserve will reduce unemployment, but inflation will tend to rise. Be more moderate in the way you spend the Treasury's assets, and inflation will be curbed, but at the cost of higher unemployment.

If you spend too little, there may well be riots, and you'll have to pay for any damage caused by the demonstrators. And that's not the end of your problems. If inflation or unemployment gets too high, the reserves get too low, or your four-year term of office is over, you'll have to stand for re-election. If you lose the election (or bankrupt the economy), the game, written by Robert Day of Sheffield, England, is over.

Here's my own (unsuccessful) attempt to be the country's longest serving president:

```
YEAR 1 OF YOUR FIRST TERM

INFLATION IS 9 %
THERE ARE 871 PEOPLE UNEMPLOYED
THE FEDERAL TREASURY HOLDS $ 89985
AND YOUR ADMINISTRATION SPENT $ 8998
        LAST YEAR.



WHAT WILL YOU SPEND THIS YEAR? 12698



DURING YEAR 1   YOU SPENT $ 12698
SO RESERVES ARE NOW $ 77287
```

```
********************************
THE FEDERAL RESERVE IS NOW $ 77287
********************************
```

THERE HAS BEEN AN INVESTMENT
GAIN OF $ 1888

```
********************************
THE FEDERAL RESERVE IS NOW $ 79175
********************************
```

NEWS FLASH!!!
NEWS FLASH!!!

OPEC MINISTERS MEETING IN GENEVA IMPOSE
MASSIVE CUTS IN PRODUCTION. SHORTAGES
RAPIDLY HIT ENERGY RESERVES IN THE US.

YOU SPEND $ 5729 BUYING IN OIL FROM
NON-OPEC COUNTRIES TO STAVE OFF
UNREST AND SUFFERING

```
********************************
THE FEDERAL RESERVE IS NOW $ 73446
********************************
```

```
$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$
$                                    $
$                                    $
$                                    $
$         REPORT FROM THE HOUSE      $
$                                    $
$                                    $
$                                    $
$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$
```

A NATIONWIDE POLL SHOWS YOU THAT THE
COUNTRY, OVERALL, IS PLEASED
WITH YOUR LEADERSHIP IN YEAR 1

IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII

YEAR 2 OF YOUR FIRST TERM

INFLATION IS 9 %
THERE ARE 871 PEOPLE UNEMPLOYED
THE FEDERAL TREASURY HOLDS $ 73448
AND YOUR ADMINISTRATION SPENT $ 12698
        LAST YEAR.

WHAT WILL YOU SPEND THIS YEAR? 1285

DURING YEAR 2 YOU SPENT $ 1285
SO RESERVES ARE NOW $ 72161

LOW GOVERNMENT SPENDING RAISES
THE NUMBER OF UNEMPLOYED TO 1742
INFLATION IS NOW AT 5 PER CENT

    THE LEVEL OF GOVERNMENT SPENDING
LEADS TO DEMONSTRATIONS IN FRONT OF THE
WHITE HOUSE. $ 65672 DAMAGE WAS CAUSED.

****
THE FEDERAL RESERVE IS NOW $ 6489
****

THERE HAS BEEN AN INVESTMENT
  GAIN OF $ 516

****
THE FEDERAL RESERVE IS NOW $ 7005
****

RESERVES ARE VERY LOW, SIR...

YOU MUST CALL AN ELECTION...

```
          STAND BY FOR THE RESULT...


          YOU'VE BEEN VOTED OUT OF OFFICE!!

          YOU LASTED FOR 3 YEARS.
```

Here's the listing, so you can try to set an Oval Office residency record:

```
10  REM THE OVAL OFFICE
20  GOSUB 1410:REM INITIALISE
30  GOSUB 1370
40  PRINT:PRINT
50  RZ=RZ+1
60  PRINT "YEAR"XZ"OF YOUR ";H$;" TERM"
70  PRINT:PRINT "INFLATION IS"NN"%"
80  PRINT "THERE ARE"UN"PEOPLE UNEMPLOYED
"
90  PRINT "THE FEDERAL TREASURY HOLDS $"G
R
100 PRINT "AND YOUR ADMINISTRATION SPENT
 $"GS:PRINT TAB(8);"LAST YEAR."
110 PRINT:PRINT
120 PRINT "WHAT WILL YOU SPEND THIS YEAR
";
130 INPUT G
140 GS=G
150 IF G<GR+1 THEN 200
160 PRINT "YOU HAVE INSUFFICIENT RESERVE
S"
170 GOSUB 1370
180 GOTO 130
190 REM ****************
200 CLS
210 GR=GR-G
220 ZZ=INT(RND(1)*6)+2
230 PRINT:PRINT "DURING YEAR"XZ" YOU SPE
NT $"G
240 PRINT "SO RESERVES ARE NOW $"GR
250 PRINT
260 A$="":B$=""
270 IF G>(GR/6) THEN UN=INT(UN*(1/ZZ))+1
:A$="HIGH":B$="CUTS"
```

```
280 IF G<(GR/8) THEN UN=INT(UN+(UN*(2/ZZ
))):A$="LOW":B$="RAISES"
290 IF A$="" THEN 430
300 PRINT:PRINT A$;" GOVERNMENT SPENDING
 ";B$
310 PRINT "THE NUMBER OF UNEMPLOYED TO"U
N
320 XX=INT(RND(1)*3)+1
330 IF A$="LOW" THEN NN=INT(NN*(XX/4))+1
:GOTO 350
340 NN=INT(NN+(NN*(1/XX)))+1
350 GOSUB 1370
360 PRINT "INFLATION IS NOW AT"NN"PER CE
NT
370 V=INT(RND(1)*5000)+1
380 GOSUB 1370
390 IF NN>3 THEN 440
400 PRINT:PRINT "THE GOOD INFLATION RATE
 ENCOURAGES      INVESTMENT, SO THE RESE
RVE IS"
410 PRINT TAB(4);"BOOSTED BY $"V
420 GR=GR+V
430 GOSUB 1280
440 Z=INT(RND(1)*GR)+1
450 IF G>4999 THEN 530
460 PRINT:PRINT
470 PRINT TAB(5);"THE LEVEL OF GOVERNMEN
T SPENDING"
480 PRINT "LEADS TO DEMONSTRATIONS IN FR
ONT OF THE";
490 PRINT "WHITE HOUSE. $"Z" DAMAGE WAS
CAUSED."
500 GR=GR-Z
510 IF GR<1 THEN 730
520 GOSUB 1280
530 RE=INT(GR*(RND(1)*20)/100)+1
540 PRINT:PRINT "THERE HAS BEEN AN INVES
TMENT            GAIN OF $"RE
550 GR=GR+RE
560 GOSUB 1280
570 OIL=INT(RND(1)*4)+1
580 IF OIL<>4 THEN 810
590 DR=INT(RND(1)*GR)
600 FOR Q=1 TO 3
```

```
610 PRINT:PRINT TAB(5*Q);"NEWS FLASH!!!"
620 GOSUB 1370
630 NEXT Q
640 PRINT:PRINT "OPEC MINISTERS MEETING
IN GENEVA IMPOSE";
650 PRINT "MASSIVE CUTS IN PRODUCTION. S
HORTAGES"
660 PRINT "RAPIDLY HIT ENERGY RESERVES I
N THE US."
670 GOSUB 1370
680 PRINT:PRINT TAB(3);"YOU SPEND $"DR"B
UYING IN OIL FROM"
690 PRINT TAB(4);"NON-OPEC COUNTRIES TO
STAVE OFF"
700 PRINT TAB(8);"UNREST AND SUFFERING"
710 GR=GR-DR
720 GOSUB 1280
730 PRINT " $$$$$$$$$$$$$$$$$$$$$$$$$$$
$$$$$$$$"
740 FOR E=1 TO 6
750 PRINT " $";TAB(38);"$"
760 IF E=3 THEN PRINT " $";TAB(10);"REPO
RT FROM THE HOUSE";TAB(38);"$"
770 NEXT E
780 PRINT " $$$$$$$$$$$$$$$$$$$$$$$$$$$
$$$$$$$$"
790 GOSUB 1370:PRINT
800 IF GR<1 THEN PRINT "THE U.S. IS BANK
RUPT...SIR! YOU'VE BEEN IMPEACHED":END
810 IF GR<100*100 THEN PRINT "RESERVES A
RE VERY LOW, SIR...":GOTO 990
820 IF NN>40 THEN 960
830 IF UN>5000 THEN 980
840 GOSUB 1370
850 P$="SATISFIED"
860 IF NN<5 AND UN<200 THEN P$="ECSTATIC
"
870 IF NN<5 AND UN>199 AND UN<600 THEN P
$="HAPPY"
880 IF NN>10 OR UN>599 THEN P$="PLEASED"
890 PRINT "A NATIONWIDE POLL SHOWS YOU T
HAT THE     COUNTRY, OVERALL, IS ";
900 PRINT P$:PRINT " WITH YOUR LEADERSHI
P IN YEAR"XZ
```

```
910 IF XZ=4 THEN 990
920 PRINT:PRINT " !!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!":PRINT
930 XZ=XZ+1
940 GOTO 30
950 REM *****************
960 GOSUB 1370
970 PRINT "THE INFLATION RATE IS VERY HI
GH!":GOTO 990
980 PRINT "THE UNEMPLOYMENT RATE IS VERY
 HIGH!"
990 GOSUB 1370
1000 PRINT:PRINT "YOU MUST CALL AN ELECT
ION..."
1010 GOSUB 1370
1020 PRINT:PRINT "STAND BY FOR THE RESUL
T..."
1030 GOSUB 1370:PRINT
1040 W=INT(RND(1)*3)
1050 IF W<>2 THEN 1100
1060 PRINT:PRINT "YOU'VE BEEN VOTED OUT
OF OFFICE!!"
1070 GOSUB 1370
1080 PRINT:PRINT "YOU LASTED FOR"RZ"YEAR
S."
1090 GOSUB 1370:END
1100 XZ=1
1110 FOR E=1 TO 21
1120 PRINT TAB(E);"! YOU WON !"
1130 FOR J=1 TO 10*(21-E):NEXT J
1140 NEXT E
1150 FOR J=1 TO 3
1160 GOSUB 1370
1170 PRINT " !!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!"
1180 NEXT J
1190 CLS

1200 IF H$="FIRST" THEN H$="SECOND":GOTO
 30
1210 IF H$="SECOND" THEN H$="THIRD":GOTO
 30
1220 IF H$="THIRD" THEN H$="FOURTH":GOTO
 30
```

```
1230 IF H$="FOURTH" THEN H$="FINAL":GOTO
 30
1240 IF H$="FINAL" THEN PRINT "BUT YOU D
ECIDE TO RESIGN":GOTO 1070
1250 GOTO 30
1260 END
1270 REM *************
1280 REM RESERVE REPORT
1290 GOSUB 1370
1300 PRINT
1310 PRINT "**************************************
**********"
1320 PRINT "THE FEDERAL RESERVE IS NOW $
"GR
1330 PRINT "*************************************
**********"
1340 PRINT
1350 RETURN
1360 REM *****
1370 REM DELAY
1380 FOR E=1 TO 1000:NEXT E
1390 RETURN
1400 REM **************
1410 REM INITIALISATION
1420 CLS
1430 RANDOMIZE VAL(RIGHT$(TIME$,2))
1440 NN=INT(10+RND(1)*3-RND(1)*3)
1450 UN=INT(900+RND(1)*100-RND(1)*100)
1460 GR=INT(90*1000+RND(1)*100-RND(1)*10
0)
1470 GS=INT(GR/10)
1480 XZ=1:RZ=1
1490 H$="FIRST"
1500 RETURN
```

GRAND PRIX

It doesn't matter if the OPEC ministers in our OVAL OFFICE program are cutting back on oil production, sending prices soaring throughout the world. With this program you've got a racing car you can drive without ever having to fill up on gas.

As you'll see when you run it, the program (written by Ian Turtle, a British student) simulates driving a lap around a Grand Prix race track in a computer-controlled automobile. You're up against other top-rated drivers, so don't expect to win very often. The screen will show you details about the section of the course you're on and the maximum recommended speed for that part of the track. You can, if you feel brave, exceed that limit by up to a third.

You'll also be told your position in the race, your average speed, the gear you're driving in, the accelerator setting, your speedometer reading, and the reading from your tachometer. You have to set the gears (1 to 5), brakes (0 to 2), and accelerator (from 1 upward):

```
COURSE SECTION 1      MAX. SPEED 94


      THE CROWD ROARS...



      CHOOSE YOUR GEAR [1 TO 5]? 1


NOW ENTER YOUR ACCELERATION? 45


HOW MUCH BRAKE PRESSURE [0 TO 2]? 0


GEAR: 1              ACCELERATION: 4.5
TACHOMETER: 9000     SPEED: 9
DISTANCE COVERED: 85
```

COURSE SECTION 2   MAX. SPEED 89
POSITION 7

        VROOM...VROOM....
          VROOM...VROOM....
            VROOM...VROOM....

YOU ARE CURRENTLY IN 1
    CHOOSE YOUR GEAR (1 TO 5)? 2

NOW ENTER YOUR ACCELERATION? 67

HOW MUCH BRAKE PRESSURE (0 TO 2)? 0

GEAR: 2   ACCELERATION: 6.7
TACHOMETER: 8950   SPEED: 31
DISTANCE COVERED: 142.7

COURSE SECTION 3   MAX. SPEED 132
POSITION 11   AVERAGE SPEED 13.43

        THE PRESSURE...
          ....IS....
            ...BUILDING UP...

YOU ARE CURRENTLY IN 2
    CHOOSE YOUR GEAR (1 TO 5)? 2

NOW ENTER YOUR ACCELERATION? 63

HOW MUCH BRAKE PRESSURE (0 TO 2)? 0

GEAR: 2   ACCELERATION: 6.3
TACHOMETER: 8537   SPEED: 40
DISTANCE COVERED: 233.85

```
COURSE SECTION 4    MAX. SPEED 42
POSITION 17   AVERAGE SPEED 20.28


         THE CROWD ROARS...



     YOU ARE CURRENTLY IN 2
         CHOOSE YOUR GEAR (1 TO 5)? 3


     NOW ENTER YOUR ACCELERATION? 89


     HOW MUCH BRAKE PRESSURE (0 TO 2)? 0


             THE PRESSURE...
                ....IS....
                   ...BUILDING UP...


         YOU'VE CRASHED!!!
```

Try to drive as closely as you can to the maximum permissible speed, in order to increase your chances of getting the lead. And don't be too discouraged if you fail to complete the course the first few times you run the program. It is pretty hard to get right until you've had some experience.

```
10  REM GRAND PRIX
20  GOSUB 860:REM INITIALISE
30  FOR Q=1 TO 30
40  FOR L=1 TO 4
50  PRINT
60  GOSUB 820
70  NEXT L
80  M=INT(RND(1)*120)+21
90  PRINT
100 PRINT "COURSE SECTION"Q;TAB(22);"MAX
. SPEED"M
110 IF P<1 THEN 150
120 PRINT "POSITION"P;
130 IF Q>2 THEN PRINT TAB(15);"AVERAGE S
PEED"INT(100*X/Q)/100
140 IF Q<3 THEN PRINT
150 GOSUB 620:REM 'NOISE'
160 PRINT:PRINT
```

```
170 IF G<>0 THEN PRINT "YOU ARE CURRENTL
Y IN"G
180 PRINT TAB(5);"CHOOSE YOUR GEAR (1 TO
 5)";
190 INPUT G1
200 IF ABS(G1-G)>1 OR G1<1 OR G1>5 THEN
190
210 G=G1
220 PRINT:PRINT "NOW ENTER YOUR ACCELERA
TION";
230 INPUT A
240 IF A<1 THEN 230
250 A=A/10
260 PRINT:PRINT "HOW MUCH BRAKE PRESSURE
 (0 TO 2)";
270 INPUT B
280 IF B<0 OR B>2 THEN 270
290 B=B+1
300 S=S/(B+1)+G*A*2
310 IF INT(S/G>7) THEN 350
320 PRINT:PRINT "YOU'VE STALLED...SELECT
 FIRST GEAR..."
330 S=0:R=0:G=0
340 GOTO 150
350 IF S<M+M/3 THEN 390
360 GOSUB 620
370 PRINT:PRINT TAB(8);"YOU'VE CRASHED!!
!"
380 END
390 R=INT((R/4+A*20/G)*100)/100
400 IF R<8500 THEN 440
410 GOSUB 620
420 PRINT "YOUR ENGINE HAS BLOWN UP!!"
430 END
440 X=X+S
450 Y=Y+M
460 J=Y-X
470 IF J<0 THEN J=0
480 P=INT((J+14)/15)+1
490 PRINT
500 PRINT "GEAR:"G;TAB(22);"ACCELERATION
:"A
510 PRINT "TACHOMETER:"R*100;TAB(22);"SP
EED:"INT(S)
```

```
520  PRINT "DISTANCE COVERED:"Y-X
530  NEXT Q
540  PRINT:PRINT " --------------------
-----------"
550  PRINT:PRINT "THE RACE IS OVER...."
560  GOSUB 820
570  PRINT:PRINT "YOU ENDED UP IN POSITIO
N NUMBER"P
580  PRINT:PRINT "YOUR AVERAGE SPEED DURI
NG THE"
590  PRINT "TAB(5);"RACE WAS"INT(10000*X/
30)/1000
600  END
610  REM *****
620  REM NOISE
630  W=INT(RND(1)*3)+1
640  PRINT
650  ON W GOSUB 680,740,760
660  PRINT
670  RETURN
680  PRINT TAB(8);"VROOM...VROOM...."
690  GOSUB 820
700  PRINT TAB(12);"VROOM...VROOM...."
710  GOSUB 820
720  PRINT TAB(16);"VROOM...VROOM...."
730  RETURN
740  PRINT TAB(8);"THE CROWD ROARS..."
750  RETURN
760  PRINT TAB(8);"THE PRESSURE..."
770  GOSUB 820
780  PRINT TAB(12);"....IS...."
790  GOSUB 820
800  PRINT TAB(17);"...BUILDING UP..."
810  RETURN
820  FOR U=1 TO 400:NEXT U
830  RETURN
840  END
850  REM *************
860  REM INITIALISATION
870  CLS
880  RANDOMIZE VAL(RIGHT$(TIME$,2))
890  P=0:R=0:S=0
900  X=0:Y=0:G=0
910  RETURN
```

ASTEROID MINE

Your management skills will be called into action in this strategic simulation, in which the entire economy of a mine based on an asteroid is in your hands.

You'll find, despite the bewildering array of decisions you'll be called upon to make, that the program assists you every step of the way with very clear prompts. Any illegal entries or choices will be rejected.

The aim of the game is simple: Keep your asteroid alive and profitable for as long as you can. The central computer on the asteroid gives you feedback from month to month as to how things are going, and asks you to determine your next moves, as these excerpts from a sample run indicate:

```
STATUS REPORT 1 FROM ASTEROID'S
CENTRAL COMPUTER. MESSAGE CODE # 684
.....................................
>WARNING - HYROPONIC STATUS LOW
              THIS IS YEAR 1
       SENTIENT ENTITY TALLY IS 107
>>> INTERGALACTIC CREDITS $ 4236
ONGOING OVERHEADS - $ 599
    OXYGEN WEB STATUS 2136 UNITS
    OXYGEN COSTS $ 3.3 PER UNIT
EACH ENTITY NEEDS 3 UNITS A YEAR
        << HYDROPONIC STATUS- 916 >>
.....................................
MINING DECISION REQUIRED:
.....................................
*** EACH HECTARE CONSUMES 5
OXYGEN UNITS FOR THE EXPLORATION
        AND MINING PROCESS
AND YOU NEED 4 PEOPLE TO EXPLORE AND
        MINE EACH HECTARE

HOW MANY HECTARES WILL YOU EXPLORE AND
        MINE THIS YEAR?
? 16
```

```
..................................
  15 HECTARES WERE LODE-BEARING
..................................
WE SELL NOW TO NATIVES OF IIPLLILCOPO
PRESS 'RETURN' KEY FOR SALES...
                OK, SALE UNDERWAY
..................................
YOU MANAGED TO SELL 12
THEY SOLD FOR $ 321
..................................
THE MINING PROCESS CONSUMED
 80 UNITS OF OXYGEN (WORTH $ 264 )
    >  3 ORE UNITS SPOILED
..................................



STATUS REPORT 2 FROM ASTEROID'S
CENTRAL COMPUTER. MESSAGE CODE # 1389
..................................
>WARNING - HYROPONIC STATUS LOW
              THIS IS YEAR 1
      SENTIENT ENTITY TALLY IS 107
>>> INTERGALACTIC CREDITS $ 4664
ONGOING OVERHEADS - $ 599
    OXYGEN WEB STATUS 2056 UNITS
    OXYGEN COSTS $ 3.3 PER UNIT
EACH ENTITY NEEDS 3 UNITS A YEAR
        << HYDROPONIC STATUS- 916 >>
..................................
STATUS DECISION REQUIRED:
..................................
FOOD COSTS $ 3.4 PER UNIT TO GROW
AND CONSUMES 2 UNITS OF OXYGEN
EACH INHABITANT NEEDS 6 UNITS A YEAR
($ 20.4 EACH, $ 2182.8 FOR THE ASTEROID)

CURRENT STOCKS WILL LAST 1 YEARS
WITH OUR PRESENT POPULATION OF 107
..................................
HOW MANY HYDROPONIC UNITS TO HARVEST? 70
0
$ 2380 PAID OUT FOR HARVESTING
```

```
STATUS REPORT 3 FROM ASTEROID'S
CENTRAL COMPUTER. MESSAGE CODE # 1125
..................................
>WARNING - HYROPONIC STATUS LOW
              THIS IS YEAR 1
      SENTIENT ENTITY TALLY IS 107
>>> INTERGALACTIC CREDITS $ 2284
ONGOING OVERHEADS - $ 599
   OXYGEN WEB STATUS 656 UNITS
   OXYGEN COSTS $ 3.3 PER UNIT
EACH ENTITY NEEDS 3 UNITS A YEAR
      << HYDROPONIC STATUS- 974 >>
..................................
OXYGEN WEB HOLDINGS WILL LAST 2 YEARS
WITH OUR PRESENT POPULATION OF 107
HOW MUCH OXYGEN WILL YOU BUY? 700
YOU DO NOT HAVE SUFFICIENT CREDITS
..................................
HOW MUCH OXYGEN WILL YOU BUY? 300
$ 990 PAID OUT
```

But it's not easy to be the Big Boss of a mining asteroid:

```
••••••••••••••••••••••••••••••••••••••••
  300 UNITS OF OXYGEN ADDED TO WEBS


STATUS REPORT 4 FROM ASTEROID'S
CENTRAL COMPUTER. MESSAGE CODE # 1085
••••••••••••••••••••••••••••••••••••••••
>WARNING - OXYGEN WEBS CRITICAL
>WARNING - HYROPONIC STATUS LOW
>WARNING - CREDITS AT CRITICAL
                  THIS IS YEAR 1
       SENTIENT ENTITY TALLY IS 107
>>> INTERGALACTIC CREDITS $ 1294
ONGOING OVERHEADS - $ 599
   OXYGEN WEB STATUS 635 UNITS
   OXYGEN COSTS $ 3.3 PER UNIT
EACH ENTITY NEEDS 3 UNITS A YEAR
        << HYDROPONIC STATUS- 974 >>
••••••••••••••••••••••••••••••••••••••••
THERE ARE 10 ROBOTS ON ASTEROID
EACH ONE COSTS $ 3 TO MAINTAIN

••••••••••••••••••••••••••••••••••••••••
CREDIT BEFORE ROBOT MAINTENANCE: $ 1294


••••••••••••••••••••••••••••••••••••••••
NOW WE HAVE $ 1264 CREDITS
```

No matter what you do, events will seem to gang up on you:

```
HOW MANY HECTARES WILL YOU EXPLORE AND
        MINE THIS YEAR?
? 10
••••••••••••••••••••••••••••••••••••••••
  6 HECTARES WERE LODE-BEARING
••••••••••••••••••••••••••••••••••••••••
WE SELL NOW TO NATIVES OF QQASSWERI
PRESS 'RETURN' KEY FOR SALES...
            OK, SALE UNDERWAY
••••••••••••••••••••••••••••••••••••••••
YOU MANAGED TO SELL 6
THEY SOLD FOR $ 160.5
••••••••••••••••••••••••••••••••••••••••
```

THE MINING PROCESS CONSUMED
 50 UNITS OF OXYGEN (WORTH $ 165)
     > 0 ORE UNITS SPOILED

....

>WARNING — OXYGEN WEBS CRITICAL
>WARNING — HYROPONIC STATUS LOW
>WARNING — CREDITS AT CRITICAL
                  THIS IS YEAR 2
       SENTIENT ENTITY TALLY IS 113
>>> INTERGALACTIC CREDITS $ 1531.5
ONGOING OVERHEADS - $ 599
    OXYGEN WEB STATUS 585 UNITS
    OXYGEN COSTS $ 3.3 PER UNIT
EACH ENTITY NEEDS 3 UNITS A YEAR
        << HYDROPONIC STATUS- 974 >>
....
STATUS DECISION REQUIRED:

....
FOOD COSTS $ 3.4 PER UNIT TO GROW
AND CONSUMES 2 UNITS OF OXYGEN
EACH INHABITANT NEEDS 6 UNITS A YEAR
($ 20.4 EACH, $ 2305.2 FOR THE ASTEROID)

CURRENT STOCKS WILL LAST 1 YEARS
WITH OUR PRESENT POPULATION OF 113
....
HOW MANY HYDROPONIC UNITS TO HARVEST? 10
0

STATUS REPORT 8 FROM ASTEROID'S
CENTRAL COMPUTER. MESSAGE CODE # 1196

....
THE MINING ASTEROID IS DEAD....
HYDROP. STORE STATUS ZEROED IN YEAR 2

....
ENTITY DEATH TALLY IS 113 |

Here's the listing to enter when you feel ready to take on the challenge of the asteroid mine:

```
10  REM ASTEROID MINE
20  GOSUB 1890:REM INITIALISE
30  GOSUB 160:REM ENTITIES
40  GOSUB 210:REM STATUS REPORT
50  GOSUB 460:REM MINING
60  GOSUB 210
70  GOSUB 820:REM HYDROPONIC
80  GOSUB 210
90  GOSUB 1070:REM OXYGEN WEB
100 GOSUB 210
110 GOSUB 1570:REM ROBOT MAINTENANCE
120 GOSUB 210
130 IF RND(1)>.8 THEN GOSUB 1220:REM IMP
ERIAL FORCE
140 GOTO 30
150 REM ********************
160 REM MODIFY ENTITY STATUS
170 YE=YE+1
180 FO=FO+INT(FO/(12+RND(1)*8))
190 RETURN
200 REM ***************
210 REM STATUS REPORT
220 RP=RP+1
230 CLS
240 PRINT "STATUS REPORT"RP"FROM ASTEROI
D'S"
250 PRINT "CENTRAL COMPUTER. MESSAGE COD
E #"INT(RND(1)*999+RND(1)*999)
260 GOSUB 2170
270 IF OX<NE*FO THEN 1700:REM OXYGEN WEB
S DEPLETED
280 IF FD<EA*FO THEN 1760:REM HYDROPONIC
 EXHAUSTION
290 IF CA<50 THEN 1800:REM ZERO CASH
300 IF FO<2 THEN 1840:REM ZERO INHABITAN
TS
310 IF FO<13 THEN PRINT ">WARNING - ASTE
ROID POPULATION LOW"
320 IF OX<2*NE*FO THEN PRINT ">WARNING -
 OXYGEN WEBS CRITICAL"
```

```
330 IF FD<2.1*EA*FO THEN PRINT ">WARNING
    - HYROPONIC STATUS LOW"
340 IF CA<1789 THEN PRINT ">WARNING - CR
EDITS AT CRITICAL"
350 PRINT TAB(17);"THIS IS YEAR"YE
360 PRINT TAB(6);"SENTIENT ENTITY TALLY
IS"FO
370 PRINT ">>> INTERGALACTIC CREDITS $"C
A
380 PRINT "ONGOING OVERHEADS - $"RE
390 PRINT TAB(4);"OXYGEN WEB STATUS"OX"U
NITS"
400 PRINT TAB(4);"OXYGEN COSTS $"CO"PER
UNIT"
410 PRINT "EACH ENTITY NEEDS"NE"UNITS A
YEAR"
420 PRINT TAB(8);"<< HYDROPONIC STATUS-"
FD">>"
430 GOSUB 2170
440 RETURN
450 REM *******
460 REM MINING
470 PRINT "MINING DECISION REQUIRED:"
480 GOSUB 2170
490 PRINT "*** EACH HECTARE CONSUMES"AC
500 PRINT "OXYGEN UNITS FOR THE EXPLORAT
ION"
510 PRINT TAB(8);"AND MINING PROCESS"
520 PRINT "AND YOU NEED"NO"PEOPLE TO EXP
LORE AND"
530 PRINT TAB(8);"MINE EACH HECTARE"
540 PRINT
550 PRINT "HOW MANY HECTARES WILL YOU EX
PLORE AND"
560 PRINT TAB(8);"MINE THIS YEAR?"
570 INPUT B
580 IF B=0 THEN GOSUB 2170:RETURN
590 IF B*AC>OX THEN PRINT "OXYGEN WEBS I
NSUFFICIENT":GOTO 540
600 IF B*NO>FO THEN PRINT "INHABITANT NU
MBERS TOO LOW":GOTO 540
610 GOSUB 2170
620 SUCCESS=INT(RND(1)*B)+1:IF SUCCESS<B
/2 THEN 620
```

```
630 PRINT SUCCESS"HECTARES WERE LODE-BEA
RING"
640 GOSUB 2170
650 PRINT "WE SELL NOW TO NATIVES OF ";D
$(INT(RND(1)*8+1));E$(INT(RND(1)*8+1))
660 PRINT "PRESS 'RETURN' KEY FOR SALES.
.."
670 IF INKEY$="" THEN 670:REM OR USE GET
$ OR JUST INPUT
680 PRINT TAB(18);"OK, SALE UNDERWAY"
690 SALES=INT(RND(1)*SUCCESS+1):IF SALES
<SUCCESS/2 THEN 690
700 GOSUB 2170
710 PRINT "YOU MANAGED TO SELL"SALES
720 PRINT "THEY SOLD FOR $"SALES*AP
730 GOSUB 2170
740 PRINT "THE MINING PROCESS CONSUMED"
750 PRINT B*AC"UNITS OF OXYGEN (WORTH $"
B*AC*CO")"
760 PRINT TAB(5);"> "SUCCESS-SALES"ORE U
NITS SPOILED"
770 CA=CA+B*AP
780 OX=OX-B*AC
790 GOSUB 2170:GOSUB 2170
800 RETURN
810 REM ****
820 REM FOOD
830 PRINT "STATUS DECISION REQUIRED:"
840 GOSUB 2170
850 PRINT "FOOD COSTS $"FC"PER UNIT TO G
ROW"
860 PRINT "AND CONSUMES"OG"UNITS OF OXYG
EN"
870 PRINT "EACH INHABITANT NEEDS"EA"UNIT
S A YEAR"
880 PRINT "($"FC*EA"EACH, $"FC*EA*FO"FOR
 THE ASTEROID)"
890 PRINT "CURRENT STOCKS WILL LAST"INT(
.5+FD/(EA*FO))"YEARS"
900 PRINT "WITH OUR PRESENT POPULATION O
F"FO
910 GOSUB 2170
920 PRINT "HOW MANY HYDROPONIC UNITS TO
HARVEST";
```

```
930 INPUT C
940 IF C=0 THEN 1010
950 IF C*FC>CA THEN PRINT "INSUFFICIENT
CREDITS!!:GOSUB 1910:GOTO 800
960 IF C*OG>OX THEN PRINT "INSUFFICIENT
OXYGEN!!":GOSUB 2170:GOTO 920
970 PRINT "$"C*FC"PAID OUT FOR HARVESTIN
G":GOSUB 2170
980 PRINT C"UNITS OF FOOD ADDED TO SUPPL
IES"
990 FD=FD+C
1000 CA=CA-C*FC
1010 FD=FD-EA*FO
1020 OX=OX-C*OG
1030 RETURN
1040 REM ******
1050 PRINT "STATUS DECISION REQUIRED:"
1060 GOSUB 2170
1070 PRINT "OXYGEN WEB HOLDINGS WILL LAS
T"INT(.5+OX/(NE*FO))"YEARS"
1080 PRINT "WITH OUR PRESENT POPULATION
OF"FO
1090 PRINT "HOW MUCH OXYGEN WILL YOU BUY
";
1100 INPUT D
1110 IF D=0 THEN GOTO 1150
1120 IF D*CO>CA THEN PRINT "YOU DO NOT H
AVE SUFFICIENT CREDITS":GOSUB 2170:GOTO
1090
1130 OX=OX+D
1140 CA=CA-D*CO
1150 OX=OX-FO*NE
1160 IF D=0 THEN 1190
1170 PRINT "$"D*CO"PAID OUT":GOSUB 2170
1180 PRINT D"UNITS OF OXYGEN ADDED TO WE
BS"
1190 GOSUB 2170
1200 RETURN
1210 REM ******
1220 REM ATTACK
1230 JJ=INT(RND(1)*8)+1
1240 JK=INT(RND(1)*8)+1
1250 PRINT "WARNING!! WARNING!!"
1260 IF RND(1)>.5 THEN 1250
```

```
1270 PRINT "THE ASTEROID IS UNDER ATTACK
 FROM"
1280 PRINT "THE IMPERIAL FLEET FROM ";D$
(JJ);E$(JK)
1290 GOSUB 2170
1300 PRINT "THE ";D$(JJ);E$(JK);" FORCE
HAS HIT"
1310 PRINT "THE DWELLING AND STORAGE UNI
TS"
1320 GOSUB 2170
1330 DE=INT(FO/(RND(1)*35+4))+2
1340 DA=INT(RND(1)*CA/9)
1350 IF CA-DA<1 THEN DA=0
1360 DD=INT(RND(1)*FO/2)+2
1370 DO=INT(RND(1)*OX/2)
1380 PRINT "DEATH TALLY:"DE
1390 FO=FO-DE
1400 GOSUB 2170
1410 PRINT "DAMAGE REPORT TO STORES AND"

1420 PRINT "DWELLING UNITS TOTALS $"DA
1430 GOSUB 2170
1440 CA=CA-DA
1450 PRINT DD"HYDROPONIC HARVEST UNITS D
ESTROYED"
1460 GOSUB 2170
1470 FD=FD-DD
1480 PRINT DO"OXYGEN UNITS BLED FROM WEB
 FRACTURE"
1490 RC=RC+1+INT(RND(1)*3)
1500 PRINT "ROBOTS DAMAGED..."
1510 PRINT "MAINTENANCE COST FOR THESE N
OW $"RC
1520 GOSUB 2170
1530 OX=OX-DO
1540 RE=RE+INT(RND(1)*30+4)
1550 RETURN
1560 REM ****************
1570 REM ROBOT MAINTENANCE
1580 RM=RM+INT(RND(1)*4)
1590 PRINT "THERE ARE"RM"ROBOTS ON ASTER
OID"
1600 PRINT "EACH ONE COSTS $"RC"TO MAINT
AIN"
```

```
1610 GOSUB 2170
1620 PRINT "CREDIT BEFORE ROBOT MAINTENA
NCE: $"CA
1630 CA=CA-RC*RM
1640 GOSUB 2170
1650 PRINT "NOW WE HAVE $"CA"CREDITS"
1660 GOSUB 2170
1670 RETURN
1680 REM **********
1690 REM TERMINATION
1700 REM ** 02 WEB ZERO **
1710 PRINT A$
1720 PRINT "OXYGEN WEB STATUS ZEROED IN
YEAR"YE
1730 GOSUB 2170
1740 PRINT "ENTITY DEATH TALLY IS"FO"!"
1750 END
1760 REM ** HYDROPIC ZERO **
1770 PRINT A$
1780 PRINT "HYDROP. STORE STATUS ZEROED
IN YEAR"YE
1790 GOTO 1730
1800 REM ** CREDIT TALLY ZERO **
1810 PRINT A$
1820 PRINT "CREDIT STATUS ZEROED IN YEAR
"YE
1830 GOTO 1730
1840 REM ** POPULATION ZERO **
1850 PRINT "YOU ARE THE ONLY SENTIENT BE
ING"
1860 PRINT "LEFT ON THE ASTEROID..."
1870 END
1880 REM **************
1890 REM INITIALISATION
1900 RANDOMIZE VAL(RIGHT$(TIME$,2))
1910 DIM D$(8),E$(8)
1920 CLS
1930 YE=0
1940 A$="THE MINING ASTEROID IS DEAD....
"
1950 FO=INT(80+RND(1)*40)
1960 CA=INT(3900+RND(1)*400)
1970 FD=INT(700+RND(1)*500)
1980 FC=INT(RND(1)*7+1)+.4
```

```
1990 RC=INT(RND(1)*4)+1
2000 RM=INT(RND(1)*24)+3
2010 EA=INT(RND(1)*5+2)
2020 AC=INT(RND(1)*5+2)
2030 AP=INT(RND(1)*AP+18)+.75
2040 OX=INT(3000-RND(1)*2000)
2050 OG=2+INT(RND(1)*2)
2060 NE=INT(RND(1)*4+3)
2070 CO=INT(RND(1)*7+3)+.3
2080 IF AC*CO>=AP THEN 2020
2090 RE=INT(200+RND(1)*400)
2100 RP=0
2110 NO=INT(2+RND(1)*3)
2120 FOR J=1 TO 8
2130 READ D$(J),E$(J)
2140 NEXT J
2150 RETURN
2160 REM *****
2170 REM DELAY
2180 FOR J=1 TO 1500:NEXT J
2190 PRINT "...........................
..........."
2200 RETURN
2210 REM ****
2220 REM DATA
2230 DATA "HARY","JASI","PRITU","QASIO",
"MONI","SWERI","KLLER"
2240 DATA "WEOPO","QQAS","XCERV","QPLSI"
,"ALEWO","FIWA"
2250 DATA "LCOPO","IIPLLI","IUOUSU"
```

COCHABAMBA

Cochabamba is a city in Bolivia, situated in the East Andes. It has around a quarter of a million inhabitants, and is an important agricultural trading center, especially for grain. A university was founded there in 1832.

In this program, you take on the very difficult task of governing Cochabamba. You have to use the money in your treasury, plus the additional funds you raise from taxes, in order to buy food for your people. The unfortunate fact is that the more you feed them, the more they multiply. This—of course—means there are more mouths to feed in the coming years.

Here's the program underway:

```
**************************
    THIS IS YEAR NUMBER 1
**************************



    YOU PRODUCED 13625 BUSHELLS OF GRAIN,
       BUT LOST 792 BUSHELLS.


    AFTER ADDING IN STOCKS ON HAND THERE
       ARE 13630 BUSHELLS AVAILABLE.

       THE VALUE PER BUSHELL IS $ .8



    NEXT YEAR'S PROSPECTS ARE AVERAGE


       $$ THE BANK BALANCE IS $ 12183
       AND YOU HAVE 10451 PEOPLE ALIVE.



    HOW MUCH FOOD WILL YOU BUY? 13459



    AFTER FEEDING YOUR STARVING NATION,
    AND AFTER A YEAR'S DEVELOPMENT, THE
       POPULATION STANDS AT 13862
```

AFTER YOU'VE TAXED YOUR LONG-SUFFERING
PEOPLE, YOUR TREASURY BANK BALANCE
STANDS AT $ 15209.89

****
THIS IS YEAR NUMBER 2
****

YOU PRODUCED 14278 BUSHELLS OF GRAIN,
BUT LOST 637 BUSHELLS.

AFTER ADDING IN STOCKS ON HAND THERE
ARE 13807 BUSHELLS AVAILABLE.

THE VALUE PER BUSHELL IS $ 1.05

NEXT YEAR'S PROSPECTS ARE TERRIBLE

$$ THE BANK BALANCE IS $ 15209
AND YOU HAVE 13862 PEOPLE ALIVE.

HOW MUCH FOOD WILL YOU BUY? 13800

AFTER FEEDING YOUR STARVING NATION,
AND AFTER A YEAR'S DEVELOPMENT, THE
POPULATION STANDS AT 11178

AFTER YOU'VE TAXED YOUR LONG-SUFFERING
PEOPLE, YOUR TREASURY BANK BALANCE
STANDS AT $ 11839.42

****
THIS IS YEAR NUMBER 3
****

YOU PRODUCED 9054 BUSHELLS OF GRAIN,
BUT LOST 132 BUSHELLS.

In an average year (which doesn't come very often in Cochabamba) you can expect your people to produce one bushel of grain per head. Due to a strange coincidence, this is almost exactly what they consume in a year. Boll weevils and other pests take their share of the crop each year, so it is never easy to balance the books:

```
AFTER FEEDING YOUR STARVING NATION,
AND AFTER A YEAR'S DEVELOPMENT, THE
        POPULATION STANDS AT 9776


AFTER YOU'VE TAXED YOUR LONG-SUFFERING
PEOPLE, YOUR TREASURY BANK BALANCE
        STANDS AT $ 9878.561



    YOUR POPULATION HAS DROPPED BELOW
      10,000 PEOPLE...AND YOU'VE BEEN
    DRAMATICALLY REMOVED FROM OFFICE!
```

Once you become experienced in controlling this program (written by Philip Coates) you'll find you can keep the simulation running for many, many years.

```
10  REM COCHABAMBA
20  GOSUB 630:REM INITIALISE
30  GOTO 400
40  GOSUB 760
50  PRINT TAB(8);"************************
* "
60  PRINT TAB(9);"THIS IS YEAR NUMBER"YEA
R
70  PRINT TAB(8);"************************
* "
80  GOSUB 780
90  PRINT "YOU PRODUCED"INT(PR)"BUSHELLS
OF GRAIN,"
100 IF INT(S(3))>0 THEN PRINT TAB(4);"BU
T LOST"INT(S(3))"BUSHELLS."
110 GOSUB 780
120 PRINT "AFTER ADDING IN STOCKS ON HAN
D THERE"
```

```
130 PRINT TAB(4);"ARE"INT(TU)"BUSHELLS A
VAILABLE."
140 PRINT:PRINT TAB(4);"THE VALUE PER BU
SHELL IS $"INT(VP*100)/100
150 GOSUB 760
160 PRINT "NEXT YEAR'S PROSPECTS ARE ";A
$
170 GOSUB 780
180 PRINT TAB(4);"$$ THE BANK BALANCE IS
 $"INT(BB)
190 PRINT TAB(4);"AND YOU HAVE"INT(PO)"P
EOPLE ALIVE."
200 GOSUB 760
210 INPUT "HOW MUCH FOOD WILL YOU BUY";B
Y
220 GOSUB 760
230 IF BY*VP>BB THEN PRINT "YOU DON'T HA
VE THAT MUCH MONEY!":GOTO 40
240 IF BY>TU THEN PRINT "THERE IS NOT TH
AT MUCH AVAILABLE!":GOTO 40
250 PO=(BY/PO)*PO*F
260 BB=BB-(BY*VP)+PO
270 GOSUB 760
280 PRINT "AFTER FEEDING YOUR STARVING N
ATION,"
290 PRINT "AND AFTER A YEAR'S DEVELOPMEN
T, THE"
300 PRINT TAB(9);"POPULATION STANDS AT"I
NT(PO)
310 GOSUB 760
320 PRINT "AFTER YOU'VE TAXED YOUR LONG-
SUFFERING"
330 PRINT "PEOPLE, YOUR TREASURY BANK BA
LANCE"
340 PRINT TAB(9);"STANDS AT $"BB
350 GOSUB 760
360 IF PO<100*100 THEN 570
370 S(1)=PR-BY
380 PR=PO*F
390 REM **************
400 F=(INT(RND(1)*45)+76)/100
410 YEAR=YEAR+1
420 A$="EXCELLENT"
430 IF F<1.16 THEN A$="VERY GOOD"
```

```basic
440 IF F<1.11 THEN A$="GOOD"
450 IF F<1.06 THEN A$="AVERAGE"
460 IF F<96/100 THEN A$="BAD"
470 IF F<91/100 THEN A$="VERY BAD"
480 IF F<85/100 THEN A$="TERRIBLE"
490 TU=PR+S(1)-.8*S(2)
500 VP=PO*1.05/TU
510 IF VP<0 THEN VP=-VP
520 S(3)=S(2)*.8
530 S(2)=S(1)
540 GOTO 40
550 REM **********
560 REM END OF GAME
570 GOSUB 760
580 PRINT TAB(4);"YOUR POPULATION HAS DR
OPPED BELOW"
590 PRINT TAB(5);"10,000 PEOPLE...AND YO
U'VE BEEN"
600 PRINT TAB(4);"DRAMATICALLY REMOVED F
ROM OFFICE!"
610 END
620 REM **********
630 REM INITIALISE
640 CLS
650 RANDOMIZE VAL(RIGHT$(TIME$,2))
660 DIM S(3)
670 PO=99*100+INT(RND(1)*1000)+1
680 BB=89*100+INT(RND(1)*10000)+1
690 PR=88.99*100+INT(RND(1)*10000)+1
700 S(1)=INT(RND(1)*1000)+1
710 S(2)=INT(RND(1)*1000)+1
720 S(3)=.8*S(2)
730 YEAR=0
740 RETURN
750 REM **************
760 REM SPACE OUT/DELAY
770 FOR E=1 TO 1000:NEXT E
780 PRINT:PRINT
790 RETURN
```

ROMAN EMPIRE

In this program, you get your chance to take over the Roman Empire! The year is AD 14, and the emperor Augustus has just died. You, Caesar Humanus, want to be elected by the Roman Senate to take the place left by Augustus. Your rival for this position is Caesar Computerus.

The Senate thinks you are both worthy candidates. They know that tough times are approaching for the empire, and that a strong person will be needed at the helm. They decide to set a test, to see who should be the new emperor. This game is that test.

Both Humanus and Computerus are allotted 240 troops. These troops are spread over the Roman world (which has been somewhat simplified for this program). You can either allot the soldiers yourself, or allow the computer to do it. Once the soldiers are in position, the trial begins. The aim of the game is to take possession of as many provinces within the empire as you can. You do this by getting (and keeping) more of your men into a province than your opponent.

Here's what the part of the Roman Empire we're using in this program looked like in AD 14:
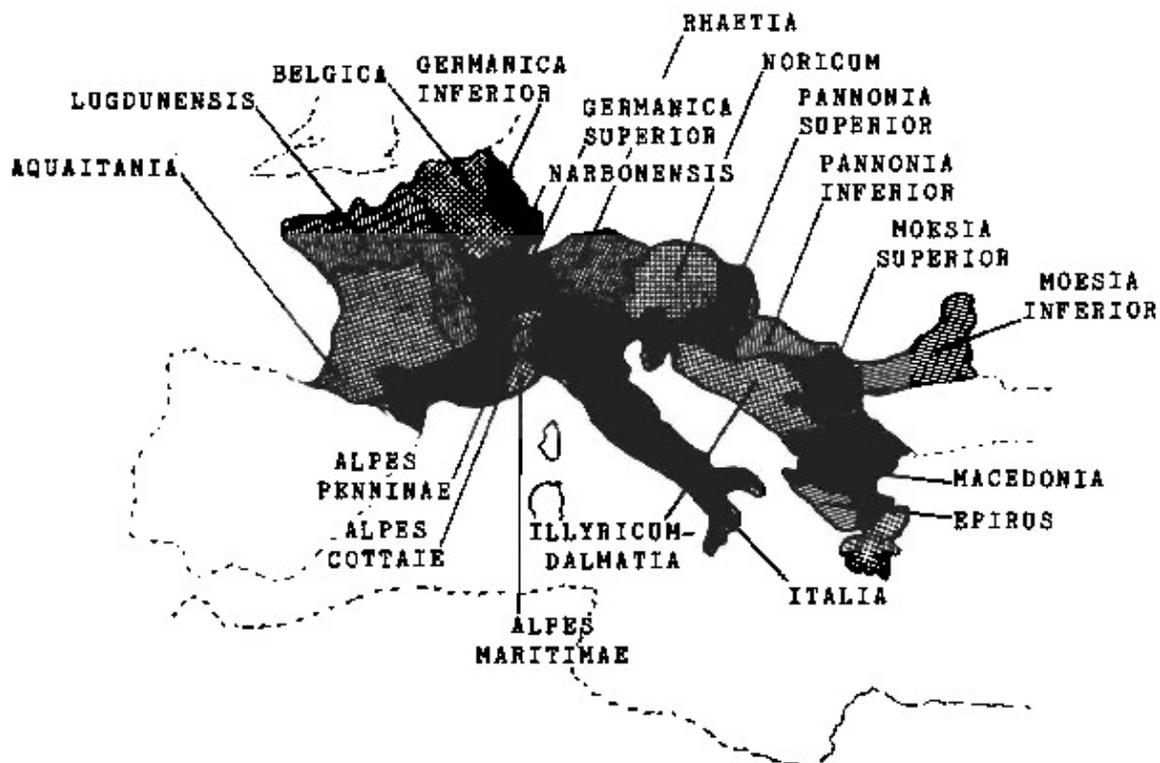
When you run the program, you'll see this "map," with each province indicated by a two-letter abbreviation (such as AQ for Aquitania and IT for Italia):

```
.....................................
.......NUNUBEGI......................
......NUNUBEGI......................
..AQAQNUNUGSGSGSRHRHNONOPSPI........
..AQAQNANAAPITITITITITPSPSMSMIMI..
..AQAQNANAACITITITITIDIDIDMS.......
......NANAAMITITITIT....MAMA.......
...................IT....EP.........
...................IT..............
.....................................
```

HUMANUS: 232   COMPUTERUS: 232

CAESAR HUMANUS MOVES...
ENTER 'M' TO MOVE TROOPS
      'A' TO ATTACK
      'T' TO SEE TROOPS
      'S' TO SEE STATE OF EMPIRE
      'R' TO REPRINT MAP
      'Q' TO QUIT

As you can see, the map appears on the screen, followed by a list of the options facing you. If you press the "T" key ("to see troops") the screen will clear, to be replaced with two maps as follows:

T

CAESAR COMPUTERUS:

```
.....................................
....... 5 * 2 4.....................
....... 1 * 4 8.....................
.. 1 4 4 5 * 3 * 6 7 5 8 7 2......
.. 8 6 8 * 7 * 1 6 5 5 1 7 8 2 1..
.. * 4 5 2 3 7 7 4 4 1 3 4 7.......
....... 1 8 3 6 2 6 8.... 6 *......
...................... *.... *.......
.......................... *.........
.....................................
```

CAESAR HUMANUS:

```
. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
. . . . . . .  6  2  3  6 . . . . . . . . . . . . . . . . . . .
. . . . . . .  8  *  5  3 . . . . . . . . . . . . . . . . . . .
. .  6  4  6  7  6  5  1  8  7  5  8  7  5 . . . . . . .
. .  3  7  7  8  2  1  7  1  7  5  1  4  3  4  6 . .
. .  1  2  7  7  5  2  5  4  7  8  5  5  * . . . . . .
. . . . . . .  *  *  *  *  *  *  * . . . .  *  * . . . . . . .
. . . . . . . . . . . . . . . . .  * . . . .  * . . . . . . .
. . . . . . . . . . . . . . . . . . .  * . . . . . . . . . . .
. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
   >>   PRESS RETURN TO CONTINUE ?
```

This shows the distribution of your respective forces in various parts of each province. Any area with an asterisk (*) has no troops in it. You can see, for example, that in the top right-hand corner, Caesar Computerus has five troops and you have six. This area is part of Lugdunensis (shown as NU on the map).

To play the game, you move your troops around as you wish, and from time to time attack a neighboring province. On any one move, you can call up as many maps as you like, but you can only either move *or* attack. You cannot do both in a single move. Computerus faces the same restrictions.

You need a key to the above map in order to be able to move and attack as you are dealing in segments of provinces in many cases (although some of the smaller provinces only occupy a single square on your map). Although you can move quite happily from one segment to another within the same province, any attack must be made on a neighboring province. You cannot attack an area of one province from another segment within it.

The game continues until either of your forces falls below 100, or you decide to terminate the game by entering "Q" (for "Quit"). The winner is the player who controls the most provinces, with control being given to the player who has the most troops within that province. In the case of both of you controlling an equal number of provinces, the player with the most soldiers left alive is declared emperor.

Here is the key you need, which gives a specific number to each area within provinces. You need to refer to this key throughout the game so that you can give precise orders. The computer converts the number you enter into the name of the province (in each case, you enter the number *below* the abbreviation):

```
           NU   NU   BE   GI
           24   25   26   27
           NU   NU   BE   GI
           44   45   46   47
AQ   AQ   NU   NU   GS   GS   GS   RH   RH   NO   NO   PS   PI
62   63   64   65   66   67   68   69   70   71   72   73   74
AQ   AQ   NA   NA   AP   IT   IT   IT   IT   IT   PS   PS   MS   MI   MI
82   83   84   85   86   87   88   89   90   91   92   93   94   95   96
AQ   AQ   NA   NA   AC   IT   IT   IT   IT   ID   ID   ID   MS
102  103  104  105  106  107  108  109  110  111  112  113  114
          NA   NA   AM   IT   IT   IT   IT             MA   MA
          124  125  126  127  128  129  130            133  134
                                         IT             EP
                                         150            153
                                    IT
                                    171
```

All areas not marked on the map are seas. Actually, in "real life," Germania lies at the top of the map, but for the purposes of this game we'll imagine it is a sea. The Mediterranean forms the southern part of the map.

```
CAESAR HUMANUS MOVES...
ENTER 'M' TO MOVE TROOPS
      'A' TO ATTACK
      'T' TO SEE TROOPS
      'S' TO SEE STATE OF EMPIRE
      'R' TO REPRINT MAP
      'Q' TO QUIT


                                  M

.............................................
.......6 2 3 6................................
.......8 * 5 3................................
.. 6 4 6 7 6 5 1 6 7 5 6 7 5...............
.. 3 7 7 8 2 1 7 1 7 5 1 4 3 4 6..
.. 1 2 7 7 5 2 5 4 7 8 5 5 *.......
...... * * * * * * *.... * *.......
.................... *..... *.........
............................. *...........
.............................................

MOVE FROM WHICH NUMBER? 95
TO WHICH AREA NUMBER? 114
```

THE MOVE HAS BEEN MADE FROM
MOESIA INFERIOR TO MOESIA SUPERIOR

    >> CAESAR COMPUTERUS MOVES...
CONTEMPLATING ATTACK FROM
PANNONIA SUPERIOR

TROOPS NOW IN PANNONIA SUPERIOR 73
INTENDING TO ATTACK NORICUM 72
I HAVE 7 TROOPS MOVING IN,
AND 8 ALREADY IN NORICUM
        MAKING A TOTAL OF 15
YOU HAVE 8 IN NORICUM
        PRESS RETURN TO CONTINUE ?
>>> I WIN THAT BATTLE
 2 OF MY SOLDIERS DIED
 8 OF YOUR TROOPS WERE KILLED
        PRESS RETURN TO CONTINUE ?

....
.......NUNUBEGI......................
.......NUNUBEGI......................
..AQAQNUNUGSGSGSRHRHNONOPSPI........
..AQAQNANAAPITITITITITPSPSMSMIMI..
..AQAQNANAACITITITITIDIDIDMS.......
.......NANAAMITITITIT....MAMA.......
....................IT....EP........
.....................IT.............
....

HUMANUS: 224   COMPUTERUS: 230

CAESAR HUMANUS MOVES...
ENTER 'M' TO MOVE TROOPS
      'A' TO ATTACK
      'T' TO SEE TROOPS
      'S' TO SEE STATE OF EMPIRE
      'R' TO REPRINT MAP
      'Q' TO QUIT

```
                              A
. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
. . . . . . .  6  2  3  6 . . . . . . . . . . . . . . . . . . . .
. . . . . . .  8  *  5  3 . . . . . . . . . . . . . . . . . . . .
. .  6  4  6  7  6  5  1  8  7  5  *  7  5 . . . . . . .
. .  3  7  7  8  2  1  7  1  7  5  1  4  3  *  6 . .
. .  1  2  7  7  5  2  5  4  7  8  5  5  4 . . . . . .
. . . . . . .  *  *  *  *  *  *  * . . . .  *  * . . . . . . .
. . . . . . . . . . . . . . . . . . .  * . . . .  * . . . . . . . .
. . . . . . . . . . . . . . . . . . . . .  * . . . . . . . . . . . .
. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
```

ATTACK FROM WHICH NUMBER? 71
ATTACKING WHICH NUMBER? 91

YOU HAVE 10 TROOPS
       IN ITALIA
AND COMPUTERUS HAS 5
   >> COMPUTERUS WINS THAT BATTLE
COMPUTERUS LOST 3 TROOPS
       AND YOU LOST 8

You'll find it is easier to play this game than you might imagine from trying to understand these instructions. The program prompts you clearly, taking you step by step through the procedure you must follow. It will not allow you to move troops you do not have, and will prevent you from trying to attack another area within the same province. However, it will not always stop you from leading your men into the sea! Battles are resolved generally (but by no means always) in favor of the army with the largest number of men in the area where the battle is being held. The computer determines the winner in each battle, taking into account the relative strengths of the opposing forces. But—as in real life—the largest army does not always win.

Here's a few more "snapshots" of the game in progress:

   >> CAESAR COMPUTERUS MOVES...
CONTEMPLATING ATTACK FROM
PANNONIA SUPERIOR

TROOPS NOW IN PANNONIA SUPERIOR 92
INTENDING TO ATTACK ILLYRI'DALMATIA 112

```
I HAVE 1 TROOPS MOVING IN,
AND 3 ALREADY IN ILLYRI'DALMATIA
        MAKING A TOTAL OF 4
YOU HAVE 5 IN ILLYRI'DALMATIA
            PRESS RETURN TO CONTINUE ?
>>> YOU WIN THAT BATTLE
 4 OF MY SOLDIERS DIED
 1 OF YOUR TROOPS DIED
            PRESS RETURN TO CONTINUE ?



.........................................
.......NUNUBEGI..........................
.......NUNUBEGI..........................
..AQAQNUNUGSGSGSRHRHNONOPSPI.........
..AQAQNANAAPITITITITITPSPSMSMIMI..
..AQAQNANAACITITITITIDIDIDMS.......
.......NANAAMITITITIT....MAMA.......
.....................IT.....EP.........
.......................IT.............
.........................................

HUMANUS: 215   COMPUTERUS: 223

CAESAR HUMANUS MOVES...
ENTER 'M' TO MOVE TROOPS
        'A' TO ATTACK
        'T' TO SEE TROOPS
        'S' TO SEE STATE OF EMPIRE
        'R' TO REPRINT MAP
        'Q' TO QUIT


                          T
CAESAR COMPUTERUS:

.........................................
........ 5 * 2 4.........................
........ 1 * 4 8.........................
.. 1 4 4 5 * 3 * 6 7 513 * 2......
.. 8 6 8 * 7 * 1 6 5 2 * 7 8 2 1..
.. * 4 5 2 3 7 7 4 4 1 * 4 7.......
........ 1 8 3 6 2 6 8.... 6 *.......
.................... *.... *.........
....................... *.............
.........................................
```

CAESAR HUMANUS:

```
.............................................
....... 6 2 3 6.........................
....... 8 * 5 3.........................
.. 6 4 6 7 6 5 1 8 7 * * 7 5.......
.. 3 7 7 8 2 1 7 1 7 2 1 4 3 * 6..
.. 1 2 7 7 5 2 5 4 7 8 4 5 4.......
....... * * * * * * *.... * *.......
.................... *.... *.........
........................ *...........
.............................................
```
     >>   PRESS RETURN TO CONTINUE ?

CAESAR HUMANUS MOVES...
ENTER 'M' TO MOVE TROOPS
       'A' TO ATTACK
       'T' TO SEE TROOPS
       'S' TO SEE STATE OF EMPIRE
       'R' TO REPRINT MAP
       'Q' TO QUIT

                              A
```
.............................................
....... 6 2 3 6.........................
....... 8 * 5 3.........................
.. 6 4 6 7 6 5 1 8 7 * * 7 5.......
.. 3 7 7 8 2 1 7 1 7 2 1 4 3 * 6..
.. 1 2 7 7 5 2 5 4 7 8 4 5 4.......
....... * * * * * * *.... * *.......
.................... *.... *.........
........................ *...........
.............................................
```

ATTACK FROM WHICH NUMBER? 45
YOU HAVE NO TROOPS THERE
ATTACK FROM WHICH NUMBER? 46
ATTACKING WHICH NUMBER? 27

YOU HAVE 11 TROOPS
        IN ITALIA
AND COMPUTERUS HAS 4
   >> COMPUTERUS WINS THAT BATTLE
COMPUTERUS LOST 1 TROOPS
        AND YOU LOST 7

Rather than wait for numbers to fall to the required level, I entered the "Q" option, the computer scanned the map, and announced who had been declared emperor:

```
          'Q' TO QUIT


   IN AQUITANIA COMPUTERUS HAS 13
         TROOPS, AND HUMANUS HAS 19


         > HELD BY HUMANUS


         >> HUMANUS IS LEADING


   IN LUGDUNENSIS COMPUTERUS HAS 15
         TROOPS, AND HUMANUS HAS 29


         > HELD BY HUMANUS


         >> HUMANUS IS LEADING


   IN BELGICA COMPUTERUS HAS 11
         TROOPS, AND HUMANUS HAS 7


         > HELD BY COMPUTERUS


         >> HUMANUS IS LEADING


   IN ALPES PINNINAE COMPUTERUS HAS 7
         TROOPS, AND HUMANUS HAS 2


         > HELD BY COMPUTERUS


         >> HUMANUS IS LEADING


   IN ALPES COTTIAE COMPUTERUS HAS 3
         TROOPS, AND HUMANUS HAS 5


         > HELD BY HUMANUS


         >> HUMANUS IS LEADING


   IN ALPES MARITIMAE COMPUTERUS HAS 3
         TROOPS, AND HUMANUS HAS 0
```

```
                > HELD BY COMPUTERUS


       IN MACEDONIA COMPUTERUS HAS 6
             TROOPS, AND HUMANUS HAS 0


                > HELD BY COMPUTERUS


               >> HUMANUS IS LEADING


       IN EPIRUS COMPUTERUS HAS 0
             TROOPS, AND HUMANUS HAS 0


          THIS IS NEUTRAL TERRITORY


               >> HUMANUS IS LEADING


       >> CAESAR HUMANUS IS DECLARED <<
       >> EMPEROR OF ALL THE ROMAN EMPIRE <<
```

Talent will out, as Caesar Humanus (in this case) proves superior to
Caesar Computerus. Here's the listing so that you can see if you're a skillful
enough commander to wrest the empire from Computerus:

```
10 REM FALL OF THE ROMAN EMPIRE
20 GOSUB 4070:REM INITIALISE
30 GOSUB 3580:REM PRINT TERRITORY MAP
40 IF INKEY$<>"" THEN 40
50 PRINT:PRINT
60 U=0
70 REM IF MOVE=0 THEN HUMAN MOVE
80 REM IF MOVE=1 THEN COMPUTER MOVE
90 IF MOVE=0 THEN 140
100 PRINT TAB(4);">> CAESAR COMPUTERUS M
OVES..."
110 FOR Y=1 TO 1000:NEXT Y
120 MOVE=0:GOSUB 1970:REM COMPUTER MOVE
130 GOSUB 3580
140 PRINT "CAESAR HUMANUS MOVES..."
150 PRINT "ENTER 'M' TO MOVE TROOPS"
160 PRINT "      'A' TO ATTACK"
170 PRINT "      'T' TO SEE TROOPS"
```

```
180 PRINT "        'S' TO SEE STATE OF EMP
IRE"
190 PRINT "        'R' TO REPRINT MAP"
200 PRINT "        'Q' TO QUIT"
210 FLAG=1
220 H$=INKEY$
230 IF H$="M" THEN MOVE=1:GOSUB 330:GOTO
 290
240 IF H$="A" THEN MOVE=1:GOSUB 520:GOTO
 290
250 IF H$="T" THEN FLAG=0:GOSUB 3360:GOT
O 290
260 IF H$="R" THEN GOSUB 3580:GOTO 290
270 IF H$="Q" OR H$="S" THEN GOSUB 860:P
RINT:GOTO 150
280 GOTO 220
290 IF HCOUNT<101 OR CCOUNT<101 THEN H$=
"Q":GOTO 860
300 IF INKEY$<>"" THEN Z=RND(1):GOTO 300

310 GOTO 50
320 REM ***********
330 REM MOVE TROOPS
340 CLS
350 PRINT TAB(24);"M"
360 GOSUB 3390
370 PRINT:PRINT
380 INPUT "MOVE FROM WHICH NUMBER";P
390 IF E(P)=0 THEN PRINT "YOU HAVE NO TR
OOPS THERE":GOTO 380
400 INPUT "TO WHICH AREA NUMBER";Q
410 IF A(Q)=0 THEN PRINT "THAT IS THE SE
A":GOTO 400
420 E(Q)=E(Q)+E(P)
430 E(P)=0
440 PRINT:PRINT "THE MOVE HAS BEEN MADE
FROM"
450 X=A(P):GOSUB 3850
460 PRINT N$;" TO ";
470 X=A(Q):GOSUB 3850
480 PRINT N$
490 FOR J=1 TO 1000:NEXT J
500 RETURN
510 REM *********
```

```
520 REM ATTACK
530 GOSUB 3360
540 PRINT:PRINT
550 INPUT "ATTACK FROM WHICH NUMBER";P
560 IF E(P)=0 THEN PRINT "YOU HAVE NO TR
OOPS THERE":GOTO 550
570 INPUT "ATTACKING WHICH NUMBER";Q
580 IF A(Q)=0 THEN PRINT "YOUR TROOPS HA
VE DROWNED":E(P)=0:RETURN
590 IF A(P)=A(Q) THEN PRINT "YOU MUST AT
TACK ANOTHER COUNTRY":GOTO 550
600 E(Q)=E(Q)+E(P)
610 E(P)=0
620 PRINT
630 X=Q:GOSUB 3850
640 PRINT "YOU HAVE";E(Q);"TROOPS"
650 PRINT TAB(7);"IN ";N$
660 PRINT "AND COMPUTERUS HAS";B(Q)
670 RESULT=INT(RND(1)*2)
680 IF E(Q)>=B(Q) AND RESULT=1 OR B(Q)=0
 THEN GOTO 740
690 PRINT TAB(3);">> COMPUTERUS WINS THA
T BATTLE"
700 DEAD=INT(RND(1)*B(Q)/2+1)
710 D2=INT(RND(1)*E(Q)+1)
720 IF DEAD>D2 AND RND(1)>.5 THEN 700
730 GOTO 790
740 PRINT TAB(5);">> YOU WIN THAT BATTLE
"
750 DEAD=INT(RND(1)*B(Q)+1)
760 D2=INT(RND(1)*E(Q)/2+1)
770 IF DEAD<D2 AND RND(1)>.5 THEN 750
780 IF B(Q)=0 THEN DEAD=0
790 PRINT "COMPUTERUS LOST";DEAD;"TROOPS
"
800 PRINT TAB(6);"AND YOU LOST";D2
810 B(Q)=B(Q)-DEAD
820 E(Q)=E(Q)-D2
830 FOR J=1 TO 2000:NEXT J
840 RETURN
850 REM *********
860 REM END OF WAR
870 TH=0:TC=0:REM TERRITORY HUMAN/COMPUT
ER
```

```
880 FOR G=1 TO 19
890 X=G:GOSUB 3850
900 GOSUB 1040
910 PRINT "IN ";N$;P$;X
920 PRINT R$;Y
930 PRINT
940 IF X=Y THEN PRINT Q$:PRINT:GOTO 980
950 IF X>Y THEN TC=TC+1:PRINT S$
960 IF Y>X THEN TH=TH+1:PRINT T$
970 PRINT
980 FOR J=1 TO 1000:NEXT J
990 IF TC<TH THEN PRINT "      >> HUMANUS
 IS LEADING"
1000 IF TC>TH THEN PRINT "      >> COMPUT
ERUS IS LEADING"
1010 PRINT
1020 NEXT G
1030 GOTO 1800
1040 IF G>1 THEN 1080
1050 X=B(62)+B(63)+B(64)+B(102)+B(103)
1060 Y=E(62)+E(63)+E(64)+E(102)+E(103)
1070 RETURN
1080 IF G>2 THEN 1120
1090 X=B(24)+B(25)+B(44)+B(45)+B(64)+B(6
5)
1100 Y=E(24)+E(25)+E(44)+E(45)+E(64)+E(6
5)
1110 RETURN
1120 IF G>3 THEN 1150
1130 X=B(26)+B(46)
1140 Y=E(26)+E(46)
1150 IF G>4 THEN 1190
1160 X=B(27)+B(47)
1170 Y=E(27)+E(47)
1180 RETURN
1190 IF G>5 THEN 1230
1200 X=B(66)+B(67)+B(68)
1210 Y=E(66)+E(67)+E(68)
1220 RETURN
1230 IF G>6 THEN 1270
1240 X=B(69)+B(70)
1250 Y=E(69)+E(70)
1260 RETURN
1270 IF G>7 THEN 1310
```

```
1280 X=B(71)+B(72)
1290 Y=E(71)+E(72)
1300 RETURN
1310 IF G>8 THEN 1350
1320 X=B(73)+B(92)+B(93)
1330 Y=E(73)+E(92)+E(93)
1340 RETURN
1350 IF G>9 THEN 1390
1360 X=B(73)
1370 Y=E(73)
1380 RETURN
1390 IF G>10 THEN 1430
1400 X=B(94)+B(114)
1410 Y=E(94)+E(114)
1420 RETURN
1430 IF G>11 THEN 1470
1440 X=B(95)+B(96)
1450 Y=E(95)+E(96)
1460 RETURN
1470 IF G>12 THEN 1510
1480 X=B(84)+B(85)+B(104)+B(105)+B(124)+
B(125)
1490 Y=E(84)+E(85)+E(104)+E(105)+E(124)+
E(125)
1500 RETURN
1510 IF G>13 THEN 1550
1520 X=B(86)
1530 Y=E(86)
1540 RETURN
1550 IF G>14 THEN 1590
1560 X=B(106)
1570 Y=E(106)
1580 RETURN
1590 IF G>15 THEN 1630
1600 X=B(126)
1610 Y=E(126)
1620 RETURN
1630 IF G>16 THEN 1690
1640 X=B(87)+B(88)+B(89)+B(90)+B(91)+B(1
07)+B(108)+B(109)+B(110)
1650 X=X+B(127)+B(128)+B(129)+B(130)+B(1
50)+B(171)
1660 Y=E(87)+E(88)+E(89)+E(90)+E(91)+E(1
07)+E(108)+E(109)+E(110)
```

```
1670 Y=Y+E(127)+E(128)+E(129)+E(130)+E(1
50)+E(171)
1680 RETURN
1690 IF G>17 THEN 1730
1700 X=B(111)+B(112)+B(113)
1710 Y=E(111)+E(112)+E(113)
1720 RETURN
1730 IF G>18 THEN 1770
1740 X=B(133)+B(134)+B(153)
1750 Y=E(133)+E(134)+E(153)
1760 RETURN
1770 X=B(153)
1780 Y=E(153)
1790 RETURN
1800 IF TH=TC THEN 1900
1810 IF TH>TC THEN PRINT ">> CAESAR HUMA
NUS IS DECLARED <<"
1820 IF TC>TH THEN PRINT ">> CAESAR COMP
UTERUS IS DECLARED <<"
1830 IF H$="Q" THEN 1880
1840 IF TH=TC THEN PRINT "YOU'RE NECK AN
D NECK":GOTO 1860
1850 PRINT ">> CURRENTLY FAVORITE FOR EM
PEROR <<"
1860 FOR J=1 TO 1000:NEXT J
1870 RETURN
1880 PRINT ">> EMPEROR OF ALL THE ROMAN
EMPIRE <<"
1890 END
1900 PRINT "YOU HOLD EQUAL TERRITORIES"
1910 PRINT
1920 GOSUB 3610
1930 IF HCOUNT>CCOUNT THEN PRINT "HUMANU
S IS DECLARED EMPEROR":END
1940 PRINT "COMPUTERUS IS DECLARED EMPER
OR"
1950 END
1960 REM *************
1970 REM COMPUTER MOVE
1980 STRATEGY=0
1990 STRATEGY=STRATEGY+1
2000 U=0
2010 U=U+1
2020 M=INT(RND(1)*197)+1
```

```
2030 IF B(M)<>0 THEN 2070
2040 IF U<200 THEN 2010
2050 PRINT "I CONCEDE THE EMPIRE, CAESAR
     HUMANUS"
2060 H$="Q":GOTO 860
2070 REM AN OCCUPIED AREA HAS BEEN FOUND

2080 REM IS ATTACK POSSIBLE
2090 TE=A(M)
2100 X=TE:GOSUB 3850
2110 IF RND(1)>.5 THEN 2200:REM MOVE
     WITHOUT CONTEMPLATING ANY ATTACK
2120 PRINT "CONTEMPLATING ATTACK FROM ";
N$
2130 PRINT
2140 U=0
2150 U=U+1
2160 IF A(M+G(U))=0 THEN 2150
2170 IF A(M+G(U))<>TE THEN 2950
2180 IF U<8 THEN 2150
2190 PRINT TAB(4);">> ATTACK IDEA ABANDO
NED"
2200 PRINT "I'LL MOVE TROOPS FROM ";N$
2210 FOR J=1 TO 1000:NEXT J
2220 N=0
2230 IF TE>11 THEN 2270
2240 ON TE GOSUB 2310,2350,2380,2410,244
0,2470,2500,2530,2560,2580,2610
2250 IF N=0 THEN 1990
2260 GOTO 2900
2270 TY=TE-11
2280 ON TY GOSUB 2640,2670,2690,2710,273
0,2820,2850,2880
2290 IF N=0 THEN 1990
2300 GOTO 2900
2310 REM ** 1 **
2320 IF M=62 OR M=83 THEN N=63:RETURN
2330 IF M=82 OR M=63 OR M=103 THEN N=83:
RETURN
2340 IF M=102 THEN N=103:RETURN
2350 REM ** 2 **
2360 IF M=24 OR M=25 OR M=44 THEN N=45:R
ETURN
2370 IF M=45 OR M=64 THEN N=65:RETURN
```

```
2380 REM ** 3 **
2390 IF M=26 THEN N=46:RETURN
2400 IF M=46 THEN N=26:RETURN
2410 REM ** 4 **
2420 IF M=27 THEN N=47:RETURN
2430 IF M=47 THEN N=27:RETURN
2440 REM ** 5 **
2450 IF M=66 OR M=68 THEN N=67:RETURN
2460 IF M=67 THEN N=68:RETURN
2470 REM ** 6 **
2480 IF M=69 THEN N=70:RETURN
2490 IF M=70 THEN N=69:RETURN
2500 REM ** 7 **
2510 IF M=71 THEN N=72:RETURN
2520 IF M=72 THEN N=71:RETURN
2530 REM ** 8 **
2540 IF M=73 OR M=93 THEN N=92:RETURN
2550 IF M=92 THEN N=93:RETURN
2560 REM ** 9 **
2570 RETURN
2580 REM ** 10 **
2590 IF M=94 THEN N=114:RETURN
2600 IF M=114 THEN N=94:RETURN
2610 REM ** 11 **
2620 IF M=96 THEN N=95
2630 RETURN
2640 REM ** 12 **
2650 IF M=84 OR M=104 OR M=105 THEN N=85
:RETURN
2660 IF M=85 OR M=124 OR M=125 THEN N=10
5:RETURN
2670 REM ** 13 **
2680 RETURN
2690 REM ** 14 **
2700 RETURN
2710 REM ** 15 **
2720 RETURN
2730 REM ** 16 **
2740 IF M=87 OR M=107 OR M=108 THEN N=88
:RETURN
2750 IF M=88 OR M=109 THEN N=89:RETURN
2760 IF M=89 OR M=110 THEN N=90:RETURN
2770 IF M=90 OR M=91 THEN N=110:RETURN
2780 IF M=127 OR M=128 THEN N=107:RETURN
```

```
2790 IF M=129 OR M=130 THEN N=110:RETURN

2800 IF M=150 THEN N=130:RETURN
2810 IF M=171 THEN N=150:RETURN
2820 REM ** 17 **
2830 IF M=111 OR M=113 THEN N=112:RETURN

2840 IF M=112 THEN N=111:RETURN
2850 REM ** 18 **
2860 IF M=133 THEN N=134:RETURN
2870 IF M=134 THEN N=133:RETURN
2880 REM ** 19 **
2890 RETURN
2900 REM ** MAKE MOVE **
2910 B(N)=B(N)+B(M):B(M)=0
2920 INPUT "          PRESS RETURN TO CO
NTINUE ";V$
2930 RETURN
2940 REM ************************
2950 REM *** COMPUTER ATTACK ***
2960 REM CT=COMPUTER TROOPS IN AREA
2970 REM HT=HUMAN TROOPS IN AREA
2980 REM M=AREA ATTACK COMING FROM
2990 REM M+G(U)=AA=AREA UNDER ATTACK
3000 PRINT "TROOPS NOW IN ";N$;M
3010 AA=M+G(U)
3020 X=A(AA):GOSUB 3850
3030 PRINT "INTENDING TO ATTACK ";N$;AA
3040 CT=B(AA)+B(M)
3050 HT=E(AA)
3060 PRINT "I HAVE";B(M);"TROOPS MOVING
IN,"
3070 PRINT "AND";B(AA);"ALREADY IN ";N$
3080 B(AA)=B(AA)+B(M):B(M)=0
3090 PRINT TAB(8);"MAKING A TOTAL OF";CT

3100 PRINT "YOU HAVE";HT;"IN ";N$
3110 RESULT=INT(RND(1)*2)
3120 INPUT "          PRESS RETURN TO CO
NTINUE ";V$
3130 IF CT>=HT AND RESULT=1 OR HT=0 THEN
 PRINT ">>> I WIN THAT BATTLE":GOTO 3250
3140 PRINT ">>> YOU WIN THAT BATTLE"
3150 DEAD=INT(RND(1)*CT+1)
```

```
3160 IF DEAD<CT/2 THEN 3150
3170 PRINT DEAD;"OF MY SOLDIERS DIED"
3180 B(AA)=B(AA)-DEAD
3190 D2=INT((RND(1)*HT+1)/2)
3200 IF RND(1)>.5 THEN 3220
3210 IF D2>=DEAD THEN 3190
3220 PRINT D2;"OF YOUR TROOPS DIED"
3230 E(AA)=E(AA)-D2
3240 GOTO 3330
3250 DEAD=INT((RND(1)*CT+1)/2)
3260 PRINT DEAD;"OF MY SOLDIERS DIED"
3270 B(AA)=B(AA)-DEAD
3280 D2=INT(RND(1)*HT+1)
3290 IF RND(1)>.5 THEN 3310
3300 IF D2<CT/2 OR D2>=DEAD THEN 3280
3310 PRINT D2;"OF YOUR TROOPS WERE KILLE
D"
3320 E(AA)=E(AA)-D2
3330 INPUT "              PRESS RETURN TO CO
NTINUE ";V$
3340 RETURN
3350 REM *********
3360 REM DEPLOYMENT MAPS
3370 CLS
3380 PRINT TAB(24);H$
3390 IF FLAG=1 THEN Z=1:GOTO 3430
3400 FOR Z=0 TO 1
3410 IF Z=0 THEN PRINT "CAESAR COMPUTERU
S:"
3420 IF Z=1 THEN PRINT "CAESAR HUMANUS:"
3430 FOR J=1 TO 197
3440 IF A(J)=0 THEN PRINT "..";:GOTO 352
0
3450 IF Z=0 AND B(J)=0 THEN PRINT " *";:
GOTO 3520
3460 IF Z=1 AND E(J)=0 THEN PRINT " *";:
GOTO 3520
3470 IF Z=1 THEN 3500
3480 IF B(J)<10 THEN PRINT " ";RIGHT$(ST
R$(B(J)),1);:GOTO 3520
3490 PRINT RIGHT$(STR$(B(J)),2);:GOTO 35
20
3500 IF E(J)<10 THEN PRINT " ";RIGHT$(ST
R$(E(J)),1);:GOTO 3520
```

```
3510 PRINT STR$(E(J));
3520 GOSUB 3740
3530 NEXT J
3540 IF FLAG=0 THEN NEXT Z
3550 IF FLAG=0 THEN INPUT "        >>  P
RESS RETURN TO CONTINUE ";L$
3560 RETURN
3570 REM *********
3580 REM PRINT MAP
3590 CLS
3600 IF H$="R" THEN PRINT TAB(24);"R"
3610 HCOUNT=0:CCOUNT=0
3620 FOR J=1 TO 197
3630 HCOUNT=HCOUNT+E(J)
3640 CCOUNT=CCOUNT+B(J)
3650 IF A(J)=0 THEN PRINT "..";:GOTO 369
0
3660 X=A(J)
3670 GOSUB 3850
3680 PRINT M$;
3690 GOSUB 3740
3700 NEXT J
3710 PRINT:PRINT
3720 PRINT "HUMANUS:";HCOUNT;"   COMPUTER
US:";CCOUNT:PRINT
3730 RETURN
3740 IF J=17 THEN J=20:PRINT
3750 IF J=37 THEN J=40:PRINT
3760 IF J=57 THEN J=60:PRINT
3770 IF J=77 THEN J=80:PRINT
3780 IF J=97 THEN J=100:PRINT
3790 IF J=117 THEN J=120:PRINT
3800 IF J=137 THEN J=140:PRINT
3810 IF J=157 THEN J=160:PRINT
3820 IF J=177 THEN J=180:PRINT
3830 RETURN
3840 REM *******************
3850 REM NUMBERS INTO NAMES
3860 IF X=1 THEN N$="AQUITANIA":M$="AQ"
3870 IF X=2 THEN N$="LUGDUNENSIS":M$="NU
"
3880 IF X=3 THEN N$="BELGICA":M$="BE"
3890 IF X=4 THEN N$="GERMANIA INFERIOR":
M$="GI"
```

```
3900 IF X=5 THEN N$="GERMANIA SUPERIOR":
     M$="GS"
3910 IF X=6 THEN N$="RHAETIA":M$="RH"
3920 IF X=7 THEN N$="NORICUM":M$="NO"
3930 IF X=8 THEN N$="PANNONIA SUPERIOR":
     M$="PS"
3940 IF X=9 THEN N$="PANNONIA INFERIOR":
     M$="PI"
3950 IF X=10 THEN N$="MOESIA SUPERIOR":M
     $="MS"
3960 IF X=11 THEN N$="MOESIA INFERIOR":M
     $="MI"
3970 IF X=12 THEN N$="NARBONENSIS":M$="N
     A"
3980 IF X=13 THEN N$="ALPES PINNINAE":M$
     ="AP"
3990 IF X=14 THEN N$="ALPES COTTIAE":M$=
     "AC"
4000 IF X=15 THEN N$="ALPES MARITIMAE":M
     $="AM"
4010 IF X=16 THEN N$="ITALIA":M$="IT"
4020 IF X=17 THEN N$="ILLYRI'DALMATIA":M
     $="ID"
4030 IF X=18 THEN N$="MACEDONIA":M$="MA"

4040 IF X=19 THEN N$="EPIRUS":M$="EP"
4050 RETURN
4060 REM **************
4070 REM INITIALISATION
4080 REM DELETE NEXT TWO LINES IF
         COMMANDS NOT ON YOUR COMPUTER
4090 RANDOMIZE VAL(RIGHT$(TIME$,2))
4100 DEFINT A-Z
4110 CLS
4120 REM A=NAME OF TERRITORY SQUARE
4130 REM B=NO. OF ENEMY IN THAT SQUARE
4140 REM E=NO. OF HUMAN TROOPS THERE
4150 DIM A(197),B(197),E(197),G(8)
4160 COMPUTE=0:HUMAN=0:MOVE=0:H$="#"
4170 PRINT "ENTER 'Y' IF YOU WANT ME TO
     ASSIGN"
4180 PRINT "YOUR TROOPS, 'N' IF YOU WANT
      TO"
4190 PRINT "DO IT YOURSELF..."
```

```
4200 INPUT Y$
4210 IF Y$<>"Y" AND Y$<>"N" THEN 4200
4220 CLS
4230 F(J)=D
4240 FOR J=1 TO 62
4250 READ C:READ D
4260 A(C)=D
4270 TROOPS=INT(RND(1)*9)
4280 IF COMPUTE+TROOPS<=240 THEN B(C)=TR
OOPS:COMPUTE=COMPUTE+TROOPS
4290 X=D
4300 GOSUB 3850:REM NUMBERS INTO NAMES
4310 PRINT
4320 PRINT "   HUMAN TROOPS DEPLOYED:";HU
MAN
4330 PRINT "        COMPUTER TROOPS:";COMP
UTE
4340 IF HUMAN=240 THEN 4410
4350 PRINT:PRINT TAB(7);">>  ";N$;C
4360 IF Y$="Y" THEN K=INT(RND(1)*9):GOTO
 4380
4370 INPUT K
4380 IF HUMAN+K>240 THEN PRINT "YOU DO N
OT HAVE THAT MANY":GOTO 4350
4390 E(C)=K
4400 HUMAN=HUMAN+K
4410 NEXT J
4420 FOR J=1 TO 8
4430 READ G(J)
4440 NEXT J
4450 Q$="THIS IS NEUTRAL TERRITORY"
4460 P$=" COMPUTERUS HAS"
4470 R$="        TROOPS, AND HUMANUS HAS"
4480 S$="       > HELD BY COMPUTERUS"
4490 T$="       > HELD BY HUMANUS"
4500 RETURN
4510 DATA 24,2,25,2,26,3,27,4
4520 DATA 44,2,45,2,46,3,47,4
4530 DATA 62,1,63,1,64,2,65,2
4540 DATA 66,5,67,5,68,5,69,6,70,6
4550 DATA 71,7,72,7,73,8,74,9
4560 DATA 82,1,83,1,84,12,85,12,86,13
4570 DATA 87,16,88,16,89,16,89,16
4580 DATA 90,16,91,16,92,8,93,8,94,10
```

```
4590 DATA 95,11,96,11
4600 DATA 102,1,103,1,104,12,105,12
4610 DATA 106,14,107,16,108,16,109,16
4620 DATA 110,16,111,17,112,17,113,17
4630 DATA 114,10,124,12,125,12,126,15
4640 DATA 127,16,128,16,129,16,130,16
4650 DATA 133,18,134,18,150,16,153,19
4660 DATA 171,16
4670 DATA 20,-19,-1,21,-21,1,19,-20
```

Creating Your Own Games
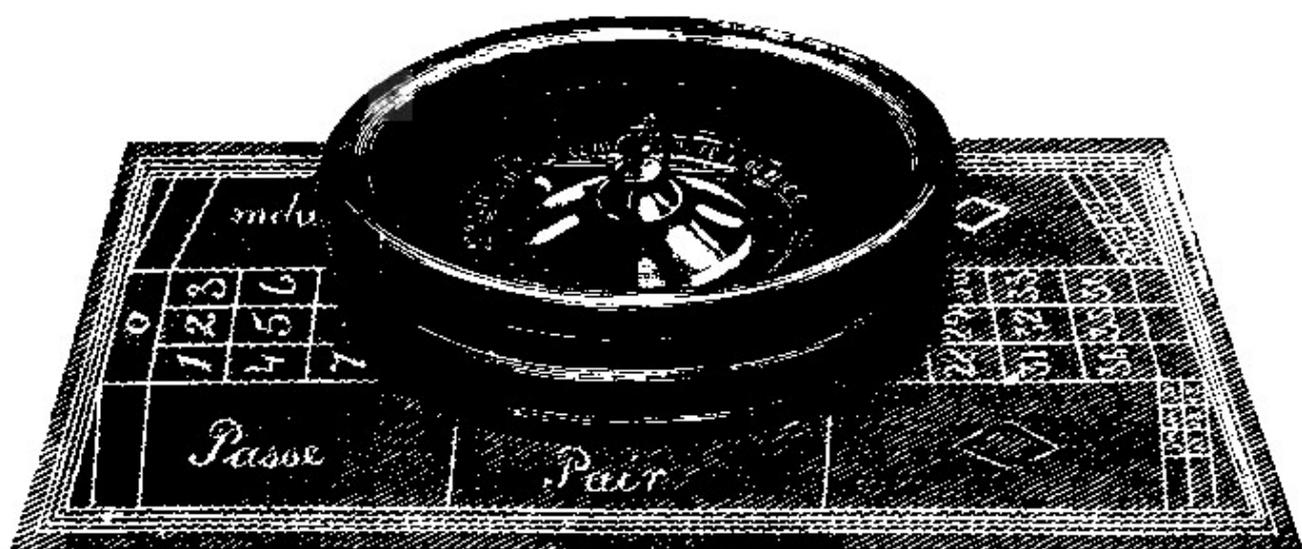
It's all very well entering and running the programs in this book, but I'm sure—eventually, if you haven't already done so—you'll want to write your own games. And this is where the problem can come in. "I'm OK once I know what the game is meant to do," is a common lament, "but I can't think of any ideas to turn into games programs."

This section of the book should help you. It contains a number of ideas for games which you should be able to use as the basis of your own computer programs. And don't worry if the program which you end up with bears little resemblance to the game you thought you were going to write. Many of the best games I've written evolved from rather primitive ideas which were very different from the programs I ended up with. Use these as idea starters, and see what you and the computer can come up with.

If you have a "traditional" game (like bridge or chess) which you want to computerize, and you don't have a clue how to work out an algorithm which the computer can use, follow the lead of programs in this book like OLIVER RAND and FROSTVIKEN, where the computer holds all the possible moves in DATA statements. Then, your program will consist—in large measure—of routines that print out the current state of play, accept the player's move, and decide (on the basis of the move entered by the player) which of the "prepackaged" responses should be used. Programs which use look-up tables of this type may seem somewhat long, and lacking in elegance, in comparison with those which use more sophisticated move-generation routines, but this is unimportant. What really matters is that the computer plays well, and sufficiently swiftly to ensure that the human player doesn't lose interest. In fact, in some cases you may find the computer appears to respond too quickly. A delay loop, which gives the impression the computer is "thinking," can help here.

Some games—such as *Tic-Tac-Toe (Noughts and Crosses)*—can be completely analyzed, and every move (and its best response) encoded as DATA statements. Other games can rely on a combination of look-up tables for the most common situations and move-generating algorithms for the rest. By all means use a look-up table when you can, as this can increase the precision of your computer's response.

Once you've worked your way past games which use such things as boards, counters, dice and cards, you can look to other aspects of human society for ideas. Simulation programs, which allow you and the computer to

emulate sports, production processes, wars and other dramatic interactions, are very rewarding. Such games can also have genuine educational applications.

Let's have a look, for a start, at "traditional" games which can be computerized.

Chess

This is the ultimate test of a programmer's skill. Writing a chess program may seem—at the moment—to be an impossible task. You can "sneak up" on the problem, as it were, by writing games which are either variants of chess (so-called "Fairy Chess" games) or programs which use some elements from chess, like the program KNIGHTSBRIDGE in my first *Giant Book of Computer Games* (Ballantine Books, 1984). This was a board game, played on a seven by seven board, in which each player had seven pieces which moved like chess knights.

Stephen Addison's book *100 Other Games to Play on a Chessboard* (Peter Owen: London and Boston, 1983) is a fertile field full of ideas for games which are variants of chess. They include H. Richter's game *Chess Draughts* in which each player starts the game with eight pieces: six pawns, a bishop, and a king. A pawn reaching the opposite side is converted into a bishop, and the aim of the game—of course—is to capture the opponent's king.

In Solomon W. Golomb's *Cheskers* the players start with twelve pieces each, arranged as in checkers. The pieces are (for each player) two kings; eight of a piece called "the man" (which moves like a standard piece in Checkers); a bishop; and a "camel," which can move three squares vertically and one horizontally or one vertically and three horizontally. The aim is to capture both of the opponent's kings.

Maharajahs

As you can see from these two descriptions, there are many ideas lurking within traditional games which are candidates for computer conversion. In *The Board Game Book* (Marshall Cavendish, London, 1979), R. C. Bell describes *Maharajah and the Sepoys*, another chesslike game which you may want to computerize. One side has a full complement of chess pieces, on their standard squares. The opponent has just one piece, a king of the opposing color. This king—the maharajah—can move either as a queen or a knight. The game ends if the maharajah is immobilized or check-mated.

Bell also describes the game *Halma* (the name is based on the Greek word for "jump") which was invented in England in the closing years of the last century. It is played on a sixteen by sixteen board, by four people, who each start in a corner of the board. Two of the players have nineteen pieces each, and the other two have thirteen pieces each. No pieces are captured.

The aim of the game is to get all your pieces into the squares which are directly opposite yours at the start of the game. You move by leaping over pieces into the vacant squares beyond. Multiple jumps are permitted (but are not compulsory) and you can jump over your own or other players' pieces.

As you can see, there is the seed of a good game in this description. Perhaps you could write a game in which the computer played three of the corners, and you took on the fourth one. Add a scenario (such as "you are out in space, trying to get your entire space fleet to a friendly star base") and you'll have a totally original (and quite absorbing) game.

Holding the Board

A. G. Bell (no relation to R. C. Bell) is the author of *Games Playing with Computers* (George Allen & Unwin Ltd., 1972) in which he describes some relatively primitive algorithms for programming a computer to play such games as *Brag, Poker, Blackjack, Kalah* and *Go*. The book includes programs which will, after a fashion, play these games (along with one which could be worked into a low-level chess program). The important thing is that he points out that the way in which the board is held by the computer is very important. Make the right decision as to the form of the data array which will store the "shape" and "contents" of the board, and you're well on the way toward solving the programming problems associated with the game. Make a bad decision, and you are adding to your problems, and perhaps ensuring that your game is almost impossible to complete. This advice is very important. Take your time about determining the form in which the "state of play" will be held, before you get involved in such things as working out how the player's moves will be accepted, or how the board will look on the screen.

This advice is as important for computer games, which are conversions of traditional board games, as it is for conversions of sporting events or card games. Whereas board games will almost certainly require the use of some sort of array (generally two-dimensional), other games can get by with simple variables. This holds true for nearly all dice games, where the value of each player's stake, the amounts which players have decided to bet on the outcome of a round, and the values showing on the "dice" themselves can easily be held as variables.

Dice Games

For example, in the game *Liar Dice*, you'd only need a few assigned variables: CT for computer tally, HT for the human, and D1, D2, D3, D4 and D5 for the dice. In this game, a kind of poker played with dice instead of cards, each player takes it in turn to throw the dice. The result of the throw is not revealed immediately to the other player. Both players put money into the "pot." The player who has thrown the dice reveals the result of the throw

(which may or may not be true). If the second player challenges the claimed throw, it must be shown. If the throw is as was claimed, or better, the other player forfeits the amount bet. Otherwise, the caster loses. If the claim is not challenged, the second player throws the dice, trying to roll a total higher than the (real) total thrown by the first. The second player does not have to reveal his or her throw, but can also bluff. This claim can be challenged by the first player, and so on. The stakes are raised, as the dice change hands, until finally the results of the throws are revealed. The winner is the player with the best hand. Here's how the winning throws stack up:

— five of a kind (aces high)
— five dice in sequence, ace high ("royal flush")
— five dice in sequence, king high ("low flush")
— four of a kind
— full house (three of a kind plus a pair)
— three of a kind
— two pairs
— pair
— non-scoring hand

The dice output should be shown on-screen as "Ace" (if the throw is a one), "King" (6), "Queen" (5), "Jack" (4), "Ten" (3) and "Nine" (2).

Backgammon

A combination of simple variables (for dice) and arrays (for the board) are called for in the game *Doublets*, an Icelandic game which was the forerunner of *Backgammon*, and is played on a *Backgammon* board. At the start of the game, each player places his or her (or its) twelve pieces, in little heaps two pieces high, on each point in the opposite right-hand table. The pieces are moved off their partners, according to the dice result, and then stacked up again in pairs (again in response to dice throws) before finally being "born off" as in *Backgammon*.

Once you've written a program to play *Doublets*, you might want to try your hand at *Backgammon*. In contrast to *Doublets*, which is totally based on luck, skill comes into play with *Backgammon*, although few expert players will agree on which is most important. Moishe Felberbaum, winner of the final round of the 1978 amateur backgammon championships, claimed the game was "75 percent luck." A professional champion, Paul Magriel, disagrees, saying that "Luck is very much overrated" (from an interview in *Gambling Times* magazine, quoted in *Lady Luck's Companion* (Berger, A. J. and Bruning, Nancy, Media Projects Inc., Harper and Row, New York, 1979, p. 61)).

You'll find that, fairly obviously, while the "luck" part of the game is pretty easy to program, the "skill" part will demand far more of your programming talents. I remember one early *Backgammon* program that ran on

the TRS-80 Color Computer which appeared to me to cheat, more often than not, by throwing itself brilliant dice, while giving me really crummy throws. An element of cheating can, I'll admit, make your program perform better than they really should, but the cheating must be used very sparingly, and in such a way that the human player is not likely to have his or her suspicions aroused.

Cards

Many card games can be computerized, and any game where the ability to remember which cards have been previously dealt (and therefore the chances of the particular cards remaining in the deck coming up in subsequent hands) allow the computer to shine. Get a book of card games, and you're sure to see several good ideas for programs. *Blackjack, Bridge, Poker* and *Gin Rummy* are all worth tackling.

If you feel really ambitious, you could try your hand at *Mah-Jongg*, which is basically a kind of rummy played with colorful tiles instead of cards. A westernized form of the ancient Chinese game of Ma-tsiang (sparrows), *Mah-Jongg* became a craze in the United States in the nineteen twenties. The tiles form three suits (bamboo, circles, and characters); honors (the four winds, and red, green and white dragons) and four seasons or flowers. The terminology of the game is rather fun. You can *rob the kong, go woo, break the wall* or even *create a garden* while dealing with *kongs, pungs* and *chows*.

In contrast to *Mah-Jongg*, simple games like *Bingo* or electronic lottery programs are simple to program and can be a lot of fun to run.

Whatever kind of game you decide to program, you're sure to find there is a special attraction in playing against a program that you have written yourself. And don't just stop once you get a program up and running. Polish it. Make the inputs and outputs as simple as they can be and the displays as attractive as possible. Refine the playing algorithms so that the program does not constantly fall into the same traps. The chances are you'll eventually decide—as I have—that writing and improving the programs are actually just as much fun as playing them.
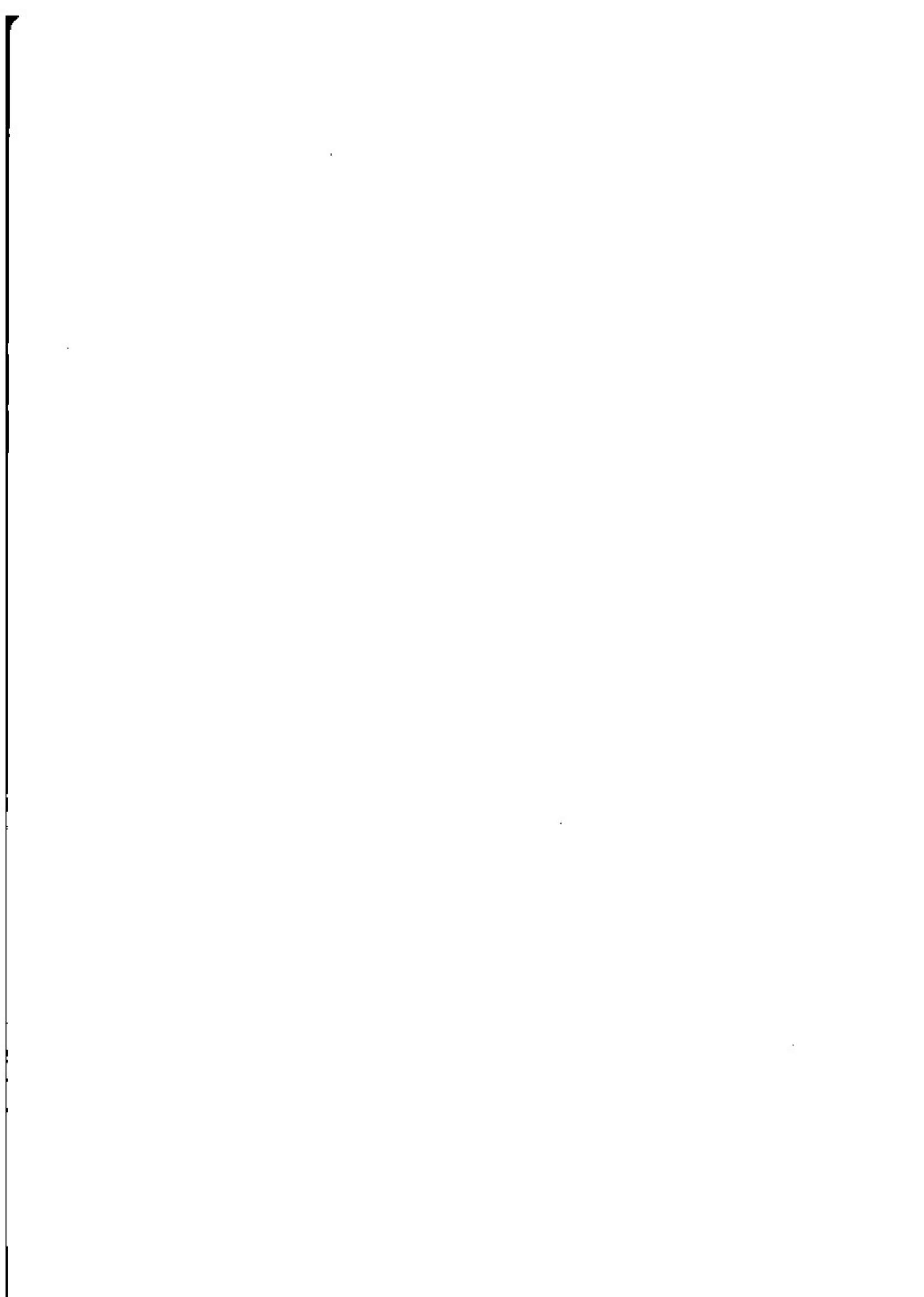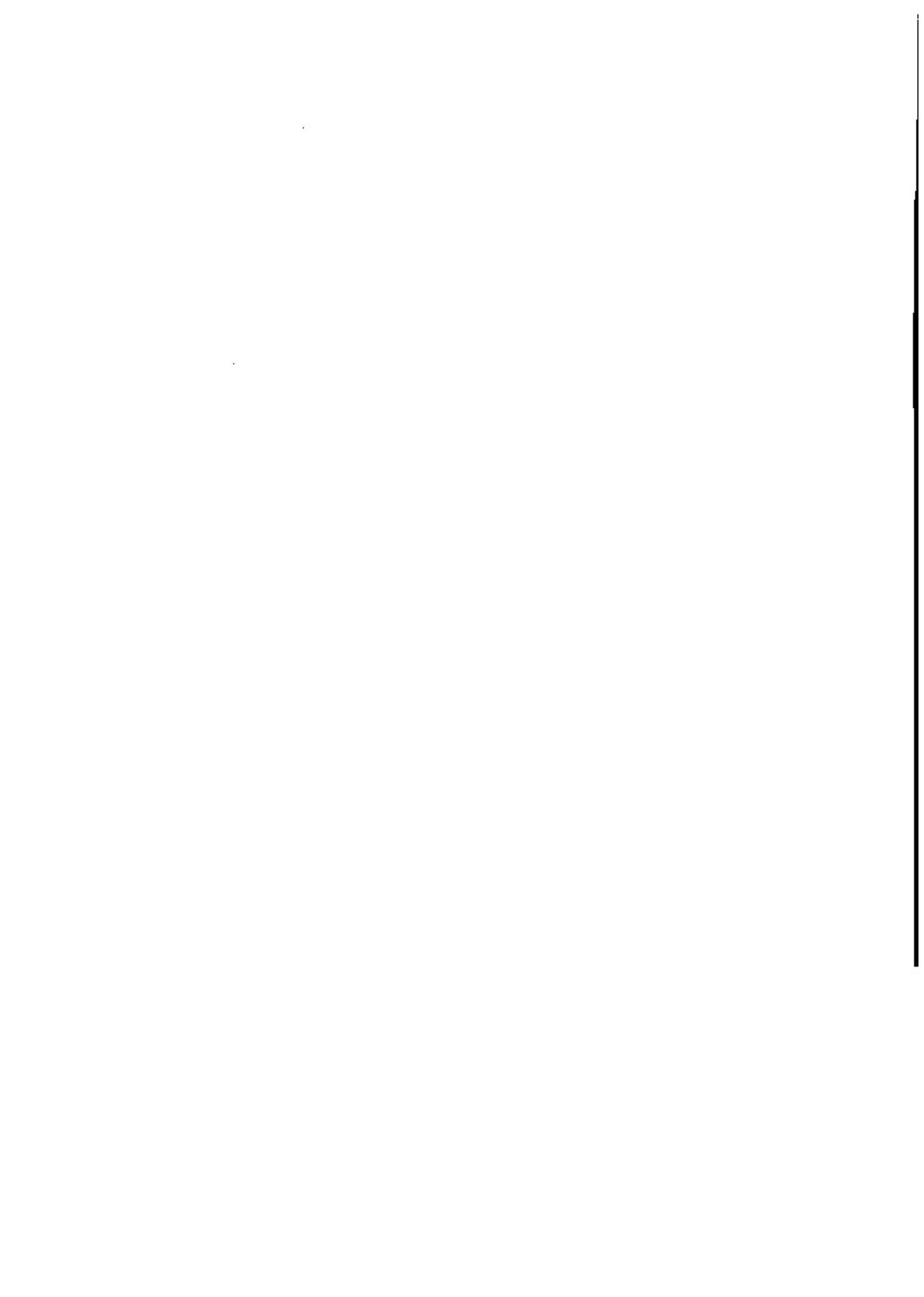
GET READY! GET SET! PLAY!!!
A BLOCKBUSTER COLLECTION

50 HOT new games from the fascinating world of computer fun—
sure to thrill beginners and advanced players alike!

ADVENTURE GAMES

Take on the forces of dread or escape from a dungeon labyrinth in
GHOSTHUNTER and OFF THE WALL ADVENTURE.
Avoid a rabid pack of mutant dogs pursuing you through a post-
holocaust world in GOTHAM RUNNER.

SIMULATION GAMES

Find out if you would make a good president in THE OVAL OFFICE.
Test your intergalactic trucking abilities with BIG JOE'S SPACE RIG.

ACTION GAMES

Speed down a twisting track in HUTT RACER
or make the universe safe for mankind in ENGULF.
Compete with a friend in the fast-moving reaction game for two,
RETRO-ACTION.

JUST FOR FUN GAMES

Encode your secret thoughts or cook up some verse with
POLYBIUS CIPHER and THE PATENTED LIMERICK MACHINE.

PSYCHIC GAMES

Gaze into the future with CELTIC TAROT and
THE BOOK OF CHANGES or chart your biorhythms in GOLDEN DAYS.

PLUS
A SPECIAL CHAPTER ON
CREATING YOUR OWN DAZZLING GAMES!

All programs are compatible with
Microsoft BASIC and will run on most microcomputers.

WARNING:
This book is DEFINITELY habit-forming fun!

"QUITE WONDERFUL…THE VARIETY IS FANTASTIC!"
PC Magazine, reviewing
TIM HARTNELL'S GIANT BOOK OF COMPUTER GAMES

32245

0