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SHARPSOFT USER NOTES

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C O N T E N T S

We welcome the return of our resident artist John Trippick

SHARPSOFT USER NOTES

Issue No. 16

Once again I find it is time to put pen to paper and introduce another issue. Although the MZ-80K, MZ-80A and, to some extent, the MZ-80B computers are considered by the popular press to be limited previous generation microcomputers, these Sharp models are still very much used by their owners and have a faithful following among programmers. This is reflected in the quality of the contributions sent to me at SHARPSOFT for publication in these User Notes. All the software and programming ideas featured in this issue represent a considerable investment in time and energy by the authors.

Mr. P.M. Opacic in his article on PASCAL turtle graphics has provided MZ-80B users with the basic low level routines for a LOGO sytle programming language. If you are an adventure game player then "Crazy Kingdom" by Ian Pugh will tax your powers of deduction, stamina and if you find the "Almighty Polo Mint" allow you to keep your sanity. Ian's program is one of the longest that we have published in this journal - do enter it into your computer - it's great fun.

A second unusual and very interesting game has been sent in by Prof. B. Higman. Again, the ideas in this program are well worth experimenting with.

Programming utilities are always popular with readers - the two contributions by P.J. Rawson and M.J. Wiechowski show that it is possible to extend the capabilities of both the MZ-80K and MZ-80A computers.

Other sections of this Issue are devoted to more listings and, of course, your letters.

The next Issue in the the 1985 series will be published during June.

MIKE BRINSON

EDITOR

BEGINNER'S TUTORIAL GUIDE TO PASCAL

PART - 5

More Data Types

40. Structured Types.

In PASCAL structured data types are formed from unstructured types. A structured type may contain other structured components. PASCAL includes predefined methods for accessing the components of a structured data type.

The PASCAL structured types are

(a) ARRAY

Example 1

```
TYPE
     line     = ARRAY [1..line length] of CHAR;
     page     = ARRAY [1..page size] of line;

     matrix   = ARRAY [1..10,1.10] of REAL;

VAR

     BOOK     : ARRAY [1.100] of page;

     TENBYTEN: MATRIX;
```

(b) RECORD

Example 2

```
CONST
     linelength = 30;
     pagelength = 40;

TYPE
     linesize  = 1.. line length;
     pagesize  = 1.. page length;

     POSITION
          RECORD
               COLUMN   :  linesize;
               ROW      :  pagesize;
          END;
```

(c) SET

Example 3

```
CHARS  =  SET OF linesize;
LINES  =  SET OF pagesize;
```

(d) FILES

NOTE - the file type is not implemented in HISOFT PASCAL 4T.

41. ARRAYS.

An arrays values are determined by its component type.

```
 TYPE

`identifier¨   =   ARRAY    [index type]    OF   type
                              ↑          ↑
                              └──────────┘
                              These may be named
                              or unnamed types.
```

The array is a homogenous structure where all its components are of one type.

Operators:

1. assignment : =

2. For string types only `, `=, =, `¨, ¨=, ¨

Example of a string type

```
TYPE
string16 = PACKED ARRAY[1..16] of CHAR
```

Accessing ARRAYS

ARRAY name [index], for example

```
PROGRAM ARRAYEX;
TYPE
     number = ARRAY [1..10] of INTEGER;

VAR
     N1  :  NUMBER
     I   :  INTEGER

BEGIN

     FOR I:=1 TO 10 DO N1[I]:=I
END.
```

Index types - may be any ORDINAL TYPE - for example

1. Enumeration

```
     TYPE

          days = (MON,TUE,WED,THUR,FRI,SAT,SUN);
          week = ARRAY [days] OF BOOLEAN;

     VAR
          WEEKX : WEEK;
     .
     .
     .
     .
```

```
     WEEKX[SUN] : = TRUE;
```

2. Subrange

```
     TYPE
          lines  = 1..40;
          line   = ARRAY [lines] of CHAR;
     VAR
          First line : line;
          .
          .
          .
firstline [5]:= 'X';
```

3. Char

```
     TYPE
          hidden = ARRAY [CHAR] OF CHAR;
     VAR
          code  :  hidden;
          .
          .
          .
code ['A']:='1';
```

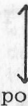
4. BOOLEAN

```
     TYPE
          condition = ARRAY [BOOLEAN] OF (up, down);
     VAR
          DECISION : CONDITION;
          .
          .
          .
     DECISION [TRUE]:= up;
```

NOTE - Component types may be any data type.

For example:

Multiply - Dimensioned ARRAY



The component type
is an ARRAY

42. Multi-dimensional ARRAYS.

1. SYNTAX

```
TYPE
     line  = ARRAY [linesize] of CHAR;
     page  = ARRAY [pagesize] of line;
```

where linesize = 1.. linelength and pagesize = 1.. pagelength

Here page is a two dimensional array which could be written as an UNNAMED TYPE, for example:

```
TYPE
     page = ARRAY [1..pagelength, 1..linelength] of CHAR;
```

The general syntax for multi-dimensional ARRAYS is

```
TYPE
     identifier  =  ARRAY  [ index type list ] of type
```

2. Component access

Using the above example we can define the following examples

```
VAR
     title  :  page;
BEGIN
     .
     .
     .
     title [6,10] : = 'P' ;      (* Access method one *)
     .
     .
     title [7][11] : = 'M';      (* Access method two *)
     .
     .
     title [12] : = 'Programming in PASCAL'
     (* Notice a line component *)
```

43. More Multi-dimensioned ARRAY examples.

```
TYPE
     USER  =  (MIKE, RON, KEN, JOHN);
     day   =  (Sun, Mon, Tue, Wed, Thur, Fri, Sat);
     hours =  0..24;
     Table =  ARRAY [user,day] of hours;
```

```
VAR

     u : user;
     d : day;

     system : Table;
BEGIN
.
.
.
FOR U:=MIKE to JOHN DO
     FOR d:=Sun to Sat DO
          System [u,d]:0;
.
.
.
System [RON, Wed]: = 8;
.
.
.
END.
```

More PASCAL Next Issue

GRAPHPAK

A PASCAL BASED TURTLE GRAPHICS PACKAGE FOR THE MZ-80B

BY P.M. OPACIC

I have been a dedicated Sharp computer user for several years and have been a member of S.U.N. since the user notes were introduced. I have found many of the contributions very informative and thought that it was high time I offered something to fellow users. I have been using Hisoft Pascal almost exclusively for the last 18 months or so and have found it to be an excellent implementation of the language. Hisoft Pascal, as supplied for the MZ-80B does not support many of the more advanced features of the computer such as:- the various console commands, music, the built in clock and high resolution graphics. I have added procedures, to handle these features, to the language and offer the graphics handling routines in this issue.

This package, for the Hisoft Pascal 4T 1.5 compiler, not only allows the plotting of points and the drawing of lines etc. but offers Logo style turtle graphics which enables the user to draw complicated geometric designs with great ease. The designs created by the package can be dumped out to an Epson type 3 printer in bit image mode by the simple command DUMP. The framework of the package is based on the turtle package supplied by Hisoft for the Amstrad computer and I would like to thank Hisoft for permitting me to use the program as a model for Graphpak.

SYSTEM VARIABLES

XCOR,YCOR - These are the horizontal co-ordinates of the turtle on the screen these are set to 160,100 (the middle of the screen) by the command TURTLE and can be set to any other position on the screen by SETXY(X,Y).

HEADING - This holds the direction in which the turtle is pointing and is set to 0 by the command TURTLE. The heading can be set to any other angle up to 360 degrees by the command SETHD(ANGLE). A heading of 0 means that the turtle is pointing east ie. left to right across the screen, as the angle specified is increased the turtle turns clockwise.

PENSTATUS - This is a boolean variable set to true by the command PENDOWN and false by PENUP. PENDOWN tells the turtle to plot points as it goes whilst PENUP enables the programmer to move around the screen without leaving a trail. The TURTLE command sets PENSTATUS TO PENDOWN.

PROCEDURES

GRAPHCLEAR - This routine simply clears the graphic ram made accessible by the GRAPHSTAT procedure below.

GRAPHSTAT - The graphic ram to be written to and/or displayed on screen can be set by GRAPHSTAT which takes an integer parameter. The parameter to be used is the value expected at port F4 as shown on page 47 of the MZ-80B Owner's Manual. As an example GRAPHSTAT(2) will open graphics ram 1 for writing to and will also display the graphics on the screen at the same time.

PLOT - This procedure and its associated routine PLOTPOINT actually decide which pixel is to be plotted and carry out this operation. Note that these routines can easily be changed to 'UNPLOT' a point by subtracting the MASK value from 255 and changing the logical OR B byte in PLOTPOINT ie. HEX B0 to the logical AND B byte ie. HEX A0.

LINE - This command takes two parameters representing the horizontal and vertical co-ordinates of a point to which a line is to be drawn. The starting point is always the point XCOR,YCOR. This starting point is constantly updated to reflect the position last plotted and thus provides a natural point to point relative line drawing feature.

PENDOWN - The turtle plots the point which it passes over.

PENUP - The turtle moves without leaving a trail of pixels.

SETHD(ANGLE)- Sets the turtles heading to ANGLE degrees clockwise of an easterly bearing (see HEADING above).

SETXY(X,Y) - Sets the turtle to the screen position X horizontally and Y vertically (X = 0 to 319, Y = 0 to 199).

FWD(LEN) - Moves the turtle forward, in the direction held in HEADING, by LEN pixels. XCOR and YCOR are updated to reflect the new position.

BACK(LEN) - Moves the turtle back in the opposite direction to that in which it is currently heading but leaves the heading unchanged.

RIGHT(ANGLE) - Turns the turtle clockwise by ANGLE degrees from its current heading but does not move its pixel position.

LEFT(ANGLE) - As RIGHT but turns the turtle anti-clockwise.

TURTLE - Initialises the turtle to position 160,100, heading 0, and pendown.

ARCR(R,DEG) - Draws an arc of a circle in a clockwise direction. The size of the circle is determined by R and the length of the arc by DEG which is the swept angle.

ARCL(R,DEG) - As ARCR but draws an arc anti-clockwise.

BOX(HSIDE,VSIDE) - Draws a rectangle starting at its left hand corner with a heading of 0 and horizontal side length of HSIDE and vertical side length of VSIDE.

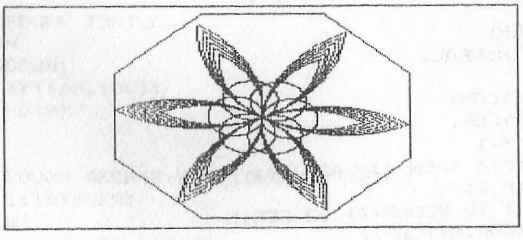
POLYGON(HD,SIDE,SIDES) - Draws a regular polygon starting on a heading of HD, with a side length of SIDE and number of sides of SIDES.

CIRCLE(R) - Draws a circle of a size dictated by R in a clockwise direction (the starting point is on the circles perimeter).

PLOT - The PLOT command and its assiciated sub-procedures GETBYTE and PRINTBYTE send the high resolution graphic image on the screen to an Epson type 3 dot matrix printer. The image is turned on its side 90 degrees anti-clockwise and is printed in normal density dit image mode. If the byte Hex 4B in line 1800 is changed to Hex 4C the image will be printed in dual-density image mode. If no printer is connected delete line 2290 from the demonstration program.

PLEASE NOTE that the '£' characters in the listing should be read as '#' characters.

The rest of the listing is a simple demonstration of the packages capabilities but I am no artist and I am sure someone out there could produce some far more impresive graphics with this program. Perhaps someone can combine the PLOT and PLOTPOINT procedures into a single INLINE based machine code procedure and speed things up a bit. In any case I hope these routines will be of use to other owners of the excellent but rather neglected MZ-80B.

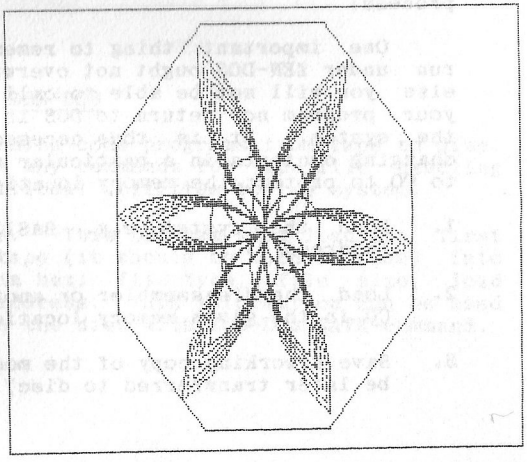


```
6FB0   10 PROGRAM GRAPHPAK;
6FB0   20                                  { GRAPHPAK }
6FB0   30
6FB0   40   { Graphic extensions to HISOFT PASCAL 4T 1.5 for the SHARP
MZ-80B }
6FB0   50 VAR
6FB9   60  I:INTEGER;
6FB9   70  XCOR,YCOR,HEADING:REAL;
6FB9   80  PENSTATUS:BOOLEAN;
6FB9   90
6FB9  100 PROCEDURE GRAPHCLEAR;
6FBC  110 BEGIN
6FD4  120  INLINE(£DB,£E8,£CB,£FF,£D3,£E8,£3E,£00,£01,£00,£E0,£21,£40,
£FF,£02,£03);
6FE4  130  INLINE(£ED,£42,£20,£F7,£DB,£E8,£CB,£BF,£D3,£E8)
6FEE  140 END;
6FF4  150 PROCEDURE GRAPHSTAT(P1:INTEGER);
6FF7  160 BEGIN
700F  170  INLINE(£DD,£7E,£02,£D3,£F4)
7014  180 END;
701B  190 PROCEDURE PLOTPOINT(ADDRESS,MASK:INTEGER);
701E  200 BEGIN
7036  210    INLINE(£DD,£46,£02,£DD,£66,£05,£DD,£6E,£04,£DB,£E8,£CB,
£FF,£D3,£E8);
7045  220    INLINE(£7E,£B0,£77,£DB,£E8,£CB,£BF,£D3,£E8)
704E  230 END;
7058  240 PROCEDURE PLOT(HOR,VER:REAL);
705B  250 VAR
705B  260  H,V:INTEGER;
705B  270  ADDRESS,MASK,CARRY:INTEGER;
705B  280 BEGIN
7073  290  H:= ROUND(HOR);V:= ROUND(VER);
709D  300  IF (H >= 0) AND (H < 320) AND (V >= 0) AND (V < 200)
THEN BEGIN
70FA  310  ADDRESS:= £E000+V*40+H DIV 8;
712D  320  CARRY:= H MOD 8;
7140  330  CASE CARRY OF
7146  340    7:MASK:= 128;
715C  350    6:MASK:= 64;
7172  360    5:MASK:= 32;
7188  370    4:MASK:= 16;
719E  380    3:MASK:= 8;
71B4  390    2:MASK:= 4;
71CA  400    1:MASK:= 2;
71E0  410    0:MASK:= 1
71EE  420  END;
71F3  430  PLOTPOINT(ADDRESS,MASK)
7201  440  END
720A  450 END;
7219  460 PROCEDURE LINE(HOR,VER:REAL);
721C  470 VAR
721C  480  I:INTEGER;
721C  490  X,Y,Z,G,H:REAL;
721C  500 BEGIN
7234  510  X:= HOR-XCOR;
725C  520  Y:= VER-YCOR;
7284  530  Z:= ABS(X);
729E  540  IF ABS(Y)>Z THEN Z:= ABS(Y);
72EB  550  G:= 0;H:= 0;
730F  560  FOR I:= 1 TO ROUND(Z) DO BEGIN
7345  570  PLOT(G+XCOR,H+YCOR);
7382  580  G:= G+X/Z;
73BC  590  H:= H+Y/Z;
73F6  600  END;
```

```
73FA  610  XCOR:= HOR;YCOR:= VER;
7420  620 END;
742F  630 PROCEDURE PENDOWN;
7432  640 BEGIN
744A  650  PENSTATUS:= TRUE
744D  660 END;
7455  670
7455  680 PROCEDURE PENUP;
7458  690 BEGIN
7470  700  PENSTATUS:= FALSE
7472  710 END;
747A  720
747A  730 PROCEDURE SETHD(ANGLE:REAL);
747D  740 BEGIN
7495  750  HEADING:= ANGLE
7495  760 END;
74B2  770
74B2  780 PROCEDURE SETXY(X,Y:REAL);
74B5  790 BEGIN
74CD  800  XCOR:= X;
74E0  810  YCOR:= Y
74E0  820 END;
74FD  830
74FD  840 PROCEDURE FWD(LEN:REAL);
7500  850 CONST PIBY180 = 1.745329E-2;
7500  860 VAR NEWX,NEWY:REAL;
7500  870 BEGIN
7518  880  IF PENSTATUS THEN
751F  890  PLOT(XCOR,YCOR);
753A  900  NEWX:= XCOR+LEN*COS(HEADING*PIBY180);
7578  910  NEWY:= YCOR+LEN*SIN(HEADING*PIBY180);
75B6  920  IF PENSTATUS THEN
75BD  930  LINE(NEWX,NEWY);
75E2  940  XCOR:= NEWX;
75F5  950  YCOR:= NEWY
75F5  960 END;
7617  970
7617  980 PROCEDURE BACK(LEN:REAL);
761A  990 BEGIN
7632 1000  FWD(-LEN)
7648 1010 END;
765B 1020
765B 1030 PROCEDURE RIGHT(ANGLE:REAL);
765E 1040 BEGIN
7676 1050  HEADING:= HEADING+ANGLE
767F 1060 END;
769F 1070
769F 1080 PROCEDURE LEFT(ANGLE:REAL);
76A2 1090 BEGIN
76BA 1100  HEADING:= HEADING-ANGLE
76C3 1110 END;
76E7 1120
76E7 1130 PROCEDURE TURTLE;
76EA 1140 BEGIN
7702 1150  PENDOWN;
770B 1160  SETXY(160,100);
7724 1170  SETHD(0)
772C 1180 END;
773B 1190
773B 1200 PROCEDURE ARCR(R:REAL;DEG:INTEGER);
773E 1210 VAR I:INTEGER;
773E 1220 BEGIN
7756 1230  FOR I:= 1 TO DEG DO
7780 1240  BEGIN
7783 1250  FWD(R);RIGHT(1)
77A2 1260  END
```

```
77AB 1270 END;
77BA 1280
77BA 1290 PROCEDURE ARCL(R:REAL;DEG:INTEGER);
77BD 1300 VAR I:INTEGER;
77BD 1310 BEGIN
77D5 1320  FOR I:= 1 TO DEG DO
77FF 1330  BEGIN
7802 1340  FWD(R);LEFT(1)
7821 1350  END
782A 1360 END;
7839 1370
7839 1380 PROCEDURE BOX(HSIDE,VSIDE:REAL);
783C 1390 BEGIN
7854 1400  SETHD(0);
7865 1410  FWD(HSIDE-1);RIGHT(90);
789C 1420  FWD(VSIDE-1);RIGHT(90);
78D3 1430  FWD(HSIDE-1);RIGHT(90);
790A 1440  FWD(VSIDE-1)
7927 1450 END;
793A 1460
793A 1470 PROCEDURE POLYGON(HD,SIDE:REAL;SIDES:INTEGER);
793D 1480 VAR
793D 1490  ANGLE:REAL;
793D 1500 BEGIN
7955 1510  SETHD(HD);
796C 1520  ANGLE:= 360/SIDES;
798C 1530  WHILE SIDES > 0 DO BEGIN
79A5 1540    FWD(SIDE-1);RIGHT(ANGLE);
79E2 1550    SIDES:= SIDES-1;
79EF 1560  END
79EF 1570 END;
79FE 1580 PROCEDURE CIRCLE(R:REAL);
7A01 1590 BEGIN
7A19 1600  ARCR(R,360)
7A2B 1610 END;
7A3E 1620
7A3E 1630 PROCEDURE PRINTBYTE(CH:CHAR);
7A41 1640 BEGIN
7A59 1650  INLINE(£DD,£7E,£02,£CD,£B2,£12)
7A5F 1660 END;
7A66 1670 FUNCTION GETBYTE(ADDRESS:INTEGER):CHAR;
7A69 1680 BEGIN
7A81 1690  INLINE(£DD,£6E,£02,£DD,£66,£03,£DB,£E8,£CB,£FF,£D3,£E8,
£46,£DB,£E8);
7A90 1700  INLINE(£CB,£BF,£D3,£E8,£78,£32,£C0,£10);
7A98 1710  GETBYTE:= PEEK(£10C0,CHAR)
7A9C 1720 END;
7AA6 1730 PROCEDURE DUMP;
7AA9 1740 VAR
7AA9 1750  PRINTLINE:ARRAY[1..204] OF CHAR;
7AA9 1760  ADDRESS,START,Z,I:INTEGER;
7AA9 1770 BEGIN
7AC1 1780  WRITE(CHR(16));
7AC8 1790  WRITE(CHR(27),CHR(£41),CHR(8));
7ADD 1800  PRINTLINE[1]:= CHR(27);PRINTLINE[2]:= CHR(£4B);
7B23 1810  PRINTLINE[3]:= CHR(£C8);PRINTLINE[4]:= CHR(£00);
7B69 1820  START:= £E027;ADDRESS:= START;
7B91 1830  FOR Z:= 1 TO 40 DO BEGIN
7BCA 1840  FOR I:= 5 TO 204 DO BEGIN
7C03 1850  PRINTLINE[I]:= GETBYTE(ADDRESS);
7C42 1860  ADDRESS:= ADDRESS+40
7C5A 1870  END;
```

```
7C66 1880   FOR I:= 1 TO 204 DO
7C9C 1890   PRINTBYTE(PRINTLINE[I]);
7CD2 1900   WRITELN;
7CD5 1910   START:= START-1;ADDRESS:= START
7CFE 1920   END;
7D09 1930   WRITELN;
7D0C 1940   WRITE(CHR(16))
7D13 1950 END;
7D1E 1960     { SIMPLE TURTLE GRAPHICS DEMONSTRATION }
7D1E 1970
7D1E 1980 PROCEDURE PETAL(S:REAL);
7D21 1990 BEGIN
7D39 2000   ARCR(S,60);
7D54 2010   RIGHT(120);
7D65 2020   ARCR(S,60);
7D80 2030   RIGHT(120)
7D88 2040 END;
7D9B 2050
7D9B 2060 PROCEDURE FLOWER(S:REAL);
7D9E 2070 VAR I:INTEGER;
7D9E 2080 BEGIN
7DB6 2090   FOR I:= 1 TO 6 DO
7DD9 2100   BEGIN
7DDC 2110   PETAL(S);
7DF3 2120   RIGHT(60)
7DFB 2130   END
7E04 2140 END;
7E12 2150 BEGIN  { MAIN PROGRAM LOOP }
7E1B 2160
7E1B 2170   PAGE;GRAPHCLEAR;GRAPHSTAT(2);
7E2E 2180   SETXY(0,0);
7E43 2190   BOX(320,200);
7E58 2200   SETXY(122,7);POLYGON(0,77,8);
7E86 2210   TURTLE;
7E8B 2220   SETHD(215);
7E98 2230   FOR I:= 1 TO 6 DO
7EB2 2240     FLOWER(1+I/10);
7EDB 2250   FOR I:= 1 TO 6 DO BEGIN
7EF8 2260     CIRCLE(0.3);
7F05 2270     RIGHT(60)
7F0D 2280   END;
7F15 2290   DUMP;
7F1A 2300 END.
End Address: 7F1C
```



Making Better use of ZEN-DOS Operating System

by Miroslaw J. Wiechowski from Sweden

1. Introduction

There seems to be very little, if at all, written about the ZEN-DOS floppy disc operating system for MZ-80K. The system is simple but adequate, works reliably and takes up ony 4K memory (C000.CFFF). What more, it contains a number of useful disc I/O routines which are described in the manual.

Each machine code program stored on a disc can be loaded into RAM and executed simply by typing its name. The system will search the directory on the currently active disc drive for a file with the given name. If a match is found, the file will be loaded and executed. The curent active drive may be selected by DRIVE or DIR command, or the file name may be preceeded by the drive number and a colon, e.g. 2:PROG `CR¨.

Therefore it is possible to extend the ZEN-DOS command repertoire by writing own programs in any language that will eventually generate machine code programs (e.g. Hisoft PASCAL, Knights Wee Fortran, Assembler) and saving the resulting machine code on a disc under a suitable name. If the input line contains more than just the program name, the program can access these data. Thus even commands needing parameters can be added to the system (it reminds of transient commands in CP/M).

Nothing forbids that you copy e.g. Sharp BASIC, Crystal BASIC, Hisoft PASCAL or Knights Fortran on a disc and load them into the memory for immediate execution in seconds instead of minutes, just by typing the relevant file name. In the case of Hisoft PASCAL 4 and FORTH you can even replace the tape I/O routines by corresponding disc routines and make the system work with discs. You will never want to go back to the tape loading process!

One important thing to remember is that any program to be run under ZEN-DOS ought not overwrite addresses above BFFF, or else you will not be able to call ZEN-DOS routines from within your program nor return to DOS in another way than by rebooting the system. It is thus necessary to patch some systems by changing contents in a particular memory cell (see below) from DO to CO to protect the memory locations above BFFF.

1. Load the system (e.g. BASIC) and exit to the ROM-monitor (address 0).

2. Load the disassembler or another monitor program and store CO in the given memory location.

3. Save a working copy of the modified system on tape (it will be later transferred to disc).

This can however be done even without the disassembler or PA-MON, using POKE (or similar) and ROM-monitor routines: PHEAD (21H) and PDATA (24H). Before calling them you must store file type (F1 i.e. machine code according to ZEN-DOS convention) in 10F0, file size in 1102-1103, file start address in 1104-1105, file execute address in 1106-1107 and file name (padded with CR=0D) in 10F1-1100. Then execute something like this: USR(33):USR(36).

The addresses of the above mentioned cell for a couple of systems are given here:

SP-5025 BASIC	120BH	Symbolic Debugger	1233H
Knight's Fortran	121BH	Loader	1222H
Editor/Assembler	2223H	Crystal BASIC 3	4854H

In Hisoft PASCAL 4 you do not need to know the location of this cell.

Load the tape and answer:

Top of RAM? 49151

Top of RAM for 'T'? 49151

Then make a copy of the system (see: Hisoft PASCAL Implementation Guide).

In Forth there is a system constant LIMIT that you can change. This should however be done carefully as another constant, #BUFF, must be correspondingly adjusted. Try this:

```
FORTH DEFINITIONS  HEX

B/BUF B/SCR * CONSTANT C/SCR

OB ' #BUFF !

FIRST C/SCR 4 + #BUFF * + ' LIMIT !

SAVESYS
```

2. Two Tape Utilities For ZEN-DOS

We need now to copy machine code programs from tape to disc. As ZEN-DOS completely lacks any commands for tape file handling we will have to add two additional utilities to the system:

(a) TLOAD - load from tape. This program will load the first available file from tape (it should be machine code) into memory and display, in hex: file type, file size, load address and execution address. This information can be used to save now the file on the disc with ZEN-DOS SAVE-command.

```
 1  ORG  0FB5H      ;TLOAD
 2  LOAD 0FB5H
 3  CALL 27H        ;Load header
 4  JP C,0C000H     ;Trap BREAK to DOS
 5  CALL 9H         ;New line
 6  LD DE,138H      ;Message 'LOADING'
 7  CALL 15H        ;Print message
 8  LD DE,10F1H     ;File name address
 9  LD HL,10H
10  ADD HL,DE
11  LD (HL),0DH     ;Put CR
12  CALL 15H        ;Print file name
13  CALL 2AH        ;Load file
14  JP C,0C000H     ;Trap BREAK to DOS
15  ;
16  CALL 9H         ;New line
17  LD A,(10F0H)    ;File type
18  CALL 3C3H       ;Print file type
19  CALL 0CH        ;Print space
20  LD HL,(1102H)   ;File size
21  CALL 3BAH       ;Print it
22  CALL 0CH
23  LD HL,(1104H)   ;File load address
24  CALL 3BAH
25  CALL 0CH
26  LD HL,(1106H)   ;File exec address
27  CALL 3BAH
28  CALL 9H
29  JP 0C000H       ;Back to DOS
30  END
```

(b) TSAVE - will save a given memory area onto tape in a manner similar to that of the system command SAVE. Syntax:

TSAVE:file_name

The user will then be asked to enter the start address ('From:'), end address ('To:') and execution address ('Eec:'). Addresses must be entered as four hex digits and be preceeding by the dollar sign, e.g. $1200.

```
 1        ORG 0BF60H        ;TSAVE
 2        LOAD 0BF60H
 3 CR:    EQU 0DH
 4 FNM:   EQU 0C018H
 5 PHED:  EQU 21H
 6 PDAT:  EQU 24H
 7 TAPH:  EQU 10F0H
 8 ;
 9        EX DE,HL          ;Check syntax
10        LD A,(HL)
11        CP ':'
12        LD A,1            ;Error?
13        SCF
14        RET NZ            ;Missing ':'
15        INC HL
16        LD DE,TAPH        ;Get file name
17        CALL FNM
18        RET C             ;Back to DOS
19 ;Start address
20        LD DE,STAD
21        CALL 15H
22        CALL INPT
23        CALL 9H
24        LD (TAPH+20),HL
25 ;End address
```

```
26        LD DE,EAD
27        CALL 15H
28        CALL INPT
29        CALL 9H
30        LD DE,(TAPH+20)
31        SBC HL,DE
32        INC HL
33        LD (TAPH+18),HL
34 ;Exec address
35        LD DE,XEC
36        CALL 15H
37        CALL INPT
38        CALL 9H
39        LD (TAPH+22),HL
40 ;Wait for tape ready and punch
41        LD DE,WAIT
42        CALL 15H
43        CALL 9B3H       ;Wait for key
44        CALL 9H
45        CALL PHED       ;Punch header
46        CALL PDAT       ;Punch file
47        CCF
48        JP 0C000H       ;Back to DOS
49 ;Input hexnumber
50 INPT:LD DE,11A3H       ;Input buffer
51        CALL 3H         ;Get line
52        LD HL,6         ;Skip 6 chars
53        ADD HL,DE
54        EX DE,HL
55        LD A,(DE)
56        CP '$'
```

```
57        JR Z,DECD        ;Try to decode
58 ERR:   LD A,2           ;Missing '$'
59        SCF
60        RET              ;Error exit
61 DECD:  INC DE
62        CALL 410H        ;Get hexnumber
63        JR C,ERR         ;Can't convert
64        RET              ;Ok!
65 ;Messages
66 STAD:  DB 'From: ',0DH
67 EAD:   DB 'To:   ',0DH
68 XEC:   DB 'Exec: ',0DH
69 WAIT:  DB 'Set tape, press CR: ',0DH
70        END
```

Use ZEN assembler to translate these two programs and save the resulting object code as files TLOAD and TSAVE. Now ZEN-DOS has been extended by two commands.

Just write 'TLOAD' or 'TSAVE:file' and the respective command file will load and autorun (under the condition that it is located on the default disc, which, as said above, can be selected by DRIVE or DIR commands).

3. Copying Tape To Disc

Boot the ZEN-DOS and load the desired program into memory by TLOAD. Take note of the displayed information and using SAVE-command save the relevant memory area on the disc, eg.:

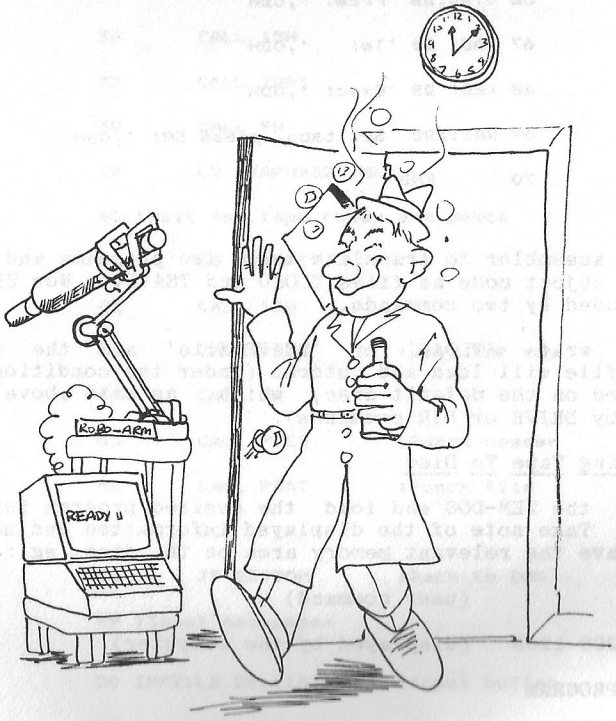
```
TLOAD                (user command)

01 145F 1200 1200    (displayed by the computer)

SAVE 1:MYPROGRAM

FROM?  $1200

TO?    $265F

LOAD?  $1200

ENTRY? $1200
```

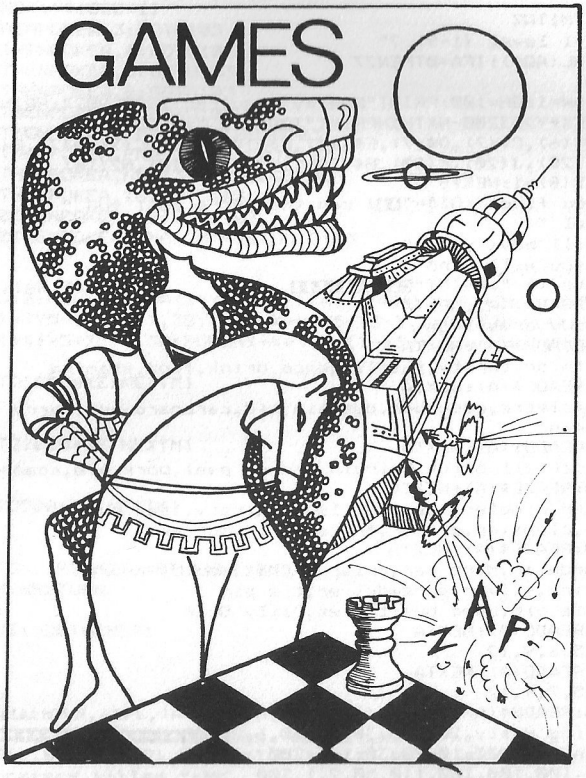
4. Undocumented Commands in ZEN-DOS

There are two undocumented commands in ZEN-DOS:

(i) REPLACE driveno:filename - works like SAVE but overwrites an old file.

(ii) MOVE driveno1:file1,driveno2:file2 - performs file copying, but slower than the COPY utility.






```
1 POKE6636,0:POKE6637,0:POKE7906,0:POKE7907,0:POKE7908,0
2 POKE5343,83:POKE5344,78:POKE5345,73:POKE5353,81:POKE5354,85:POKE5355,69
3 POKE5356,69:POKE5402,70:POKE5403,76:POKE5404,69:POKE5412,84:POKE5413,65
4 POKE5414,76:POKE5450,71:POKE5451,85:POKE5452,83:POKE5582,81:POKE5583,85
5 POKE5584,69:POKE5585,66
6 PRINT"■■■■■■■■■■                ┌──────────────────────┐"
7 PRINT"                 |THE CRAZY KINGDOM|"
8 PRINT"                 └──────────────────────┘"
9 FORJ=1TO5
10 GOSUB841
11 POKE59555,0:GOSUB841
12 POKE59555,1
13 NEXTJ
14 DIMA$(5):A$(1)="The Crazy Kingdom.......":A$(1)=A$(1)+CHR$(105)
15 A$(2)="A 'different' adventure.....":A$(3)="By Ian Pugh.....■"
16 A$(4)="Copyright 1984.....":A$(4)=A$(4)+CHR$(99)
17 FORK=1TO4:PRINT"■"
18 PRINT"■■■■■■■■■■■■■"
19 FORI=1TOLEN(A$(K))
20 PRINTTAB(5);MID$(A$(K),I,1);
21 FORJ=1TO100:NEXTJ:NEXTI
22 FORH=1TO200:NEXTH:NEXTK
23 FORI=1TO1000:NEXTI
24 CLR
```

```
25 NX=49000:LIMITNX
26 PRINT"■Skill level (1-9) ?"
27 GETA0$:A=VAL(A0$):IFA=0THEN27
28 SL=.5+A/10
29 X2=3:Y2=1:AW=1:GH=100:PRINT"■Delay required":GOSUB824:PRINT"■■■■"
30 GOSUB776:IFX*Y>53200-NXTHENPRINT"TOO BIG ":GOTO30
31 DIMA$(4),B$(6),C$(7),D$(7),E$(10),F$(10),B(6),C(7),D(7),E(20),F(20),G(20)
32 DIMH(20),I(20),J(20),K(20),G$(20),L(20),N1(10),N2(10)
33 FORB=1TO6:B(B)=1:NEXTB
34 A$="Here you find ":OI$="■■I can therefore sell you "
35 B$="You feel "
36 C$="You still have your "
37 D$="There you will find "
38 E$="You take it ":PRINT"■■■■■■■■■■                    PLEASE WAIT"
39 FORA=1TO4:READA$(A):NEXTA
40 DATAhead,body,arms,legs
41 FORA=1TO6:READB$(A):NEXTA
42 DATAstrength,dexterity,intelligence,drink,food,stamina
43 FORA=0TO6:READC$(A):NEXTA
44 DATAnone,omelette,cucumber,dustbin lid,carboard box,Barry Manilow album
45 DATAT.V.Times
46 FORA=0TO6:READD$(A):NEXTA
47 DATAnone,cocktail stick,hairpin,orange peel,pork pie,spanner,toy sword
48 FORA=1TO10:READE$(A):NEXTA
49 DATAstronger,nimbler,cleverer,less thirsty,less hungry
50 DATAweaker,clumsier,dumber,thirstier,hungrier
51 FORA=1TO10:READF$(A):NEXTA
52 DATAham sandwich,Mars bar,crisp packet,mouldy orange
53 DATAcuff link,silver screwdriver,tie pin
54 DATAgold tie pin,used bus-ticket,Daily Star
55 FORA=0TO6:READC(A):NEXTA
56 DATA1,3,4,5,6,9,12
57 FORA=0TO6:READD(A):NEXTA
58 DATA1,3,4,5,7,9,12
59 FORA=1TO20:READG$(A),E(A),F(A),G(A),H(A),I(A),J(A),K(A),L(A):NEXTA
60 DATAwandering wally,20,900,30,10,10,1,2,100
61 DATAtax-man,20,1000,10,20,30,1,1,200
62 DATAzombie,100,100,100,110,50,2,1,300
63 DATApostman,150,200,150,75,160,1,2,400
64 DATAmilkman,150,300,150,160,75,1,2,500
65 DATAnewsagent,200,300,100,200,210,2,1,600
66 DATAlibrarian,300,200,150,300,0,1,2,700
67 DATAshop assistant,350,300,175,350,360,1,2,800
68 DATAgas man,400,400,400,410,300,2,2,450
69 DATAdentist,500,500,500,510,250,1,1,1000
70 DATAshopper,550,475,280,550,560,1,1,1100
71 DATAlorry driver,600,200,610,300,600,2,1,1200
72 DATAticket collector,600,500,300,610,600,2,1,1300
73 DATAtravel agent,650,600,325,660,650,2,1,1400
74 DATAbank clerk,700,300,710,350,700,1,2,1500
75 DATApoliceman,720,300,720,730,360,1,2,1600
76 DATAwindow cleaner,800,650,810,800,400,2,1,1700
77 DATAtraffic warden,850,600,850,825,450,2,2,1800
78 DATApolitician,900,700,910,900,450,1,1,1900
79 DATAcabinet minister,1000,100,1000,500,1010,1,2,2000
80 DEFFNA(A)=INT(RND(1)*A)+1:DEFFNF(X)=X-FO/6
81 DEFFNB(B)=INT(RND(1)*(B+1))
82 DEFFNC(Q)=PEEK(NX+X2+Y2*X-X)
83 DEFFND(Q)=PEEK(NX+X3+Y3*X-X)
84 DEFFNE(Q)=NX+X2+Y2*X-X
85 FORA=1TO8:READB:POKE53200+A,B:NEXTA
86 DATA205,27,0,50,218,207,201,0
87 REM
88 REM
```

```
89 FORA=NXTONX+X*Y
90 PE=INT(RND(1)*1000+1)
91 IFPE<40THENPOKEA,3:GOTO103
92 IFPE<170THENPOKEA,4:GOTO103
93 IFPE<250THENPOKEA,5:GOTO103
94 IFPE<270THENPOKEA,6:GOTO103
95 IFPE<380THENPOKEA,7:GOTO103
96 IFPE<480THENPOKEA,FNA(4)+7:GOTO103
97 IFPE<570THENPOKEA,FNA(2)+11:GOTO103
98 IFPE<650THENPOKEA,FNA(3)+12:GOTO103
99 IFPE<680THENPOKEA,16:GOTO103
100 IFPE<710THENPOKEA,17:GOTO103
101 IFPE<970THENPOKEA,FNA(20)+20:GOTO103
102 POKEA,0
103 NEXTA
104 FORA=1TO10:POKENX+FNA(X*Y),2:NEXTA:X5=FNA(X-4)+2:Y5=Y-FNA(8)
105 POKENX+X*(Y5-1)+X5-X,38:POKENX+X*Y5+X5-X,1:POKENX+1+X*Y5+X5-X,38
106 POKENX-1+X*Y5+X5-X,38:POKENX+X*(Y5+1)+X5-X,38:TI$="000000":GOTO774
107 REM
108 FORM1=1TO1500*XE:NEXTM1
109 RETURN
110 REM
111 FORM1=1TO1000*XE:NEXTM1
112 RETURN
113 REM
114 FORM1=1TO500*XE:NEXTM1
115 RETURN
116 REM
117 FORM2=1TO6:IFB(M2)>=0THENNEXTM2
118 IFM2=7THENRETURN
119 GOSUB771
120 IFFNA(100)>20THEN573
121 GOTO582
122 REM
123 GOSUB146
124 PRINT"update"
125 PRINT"[redacted] no. moves",NT
126 PRINTB$(1),B(1),B$(2),B(2),"I.Q.",B(3),B$(4),B(4),B$(5),B(5),B$(6),B(6)
127 PRINT"monsters killed ";MK
128 PRINT"gold pieces     ";GP
129 PRINT"torches",FL,"spells",CS
130 IFLU=>1THENPRINT"luckstone,";
131 IFWA=1THENPRINT"wand,";
132 IFRI=1THENPRINT"ring,";
133 IFCR=1THENPRINT"cross,";
134 PC=0:FORA=1TO10:IF(N1(A)=1)*(N2(A)=0)THENPC=PC+1
135 NEXTA
136 PRINT:PRINT"elixirs",EX,"precious objects";PC
137 PRINT"arrows",AR,"magic arrows";AP
138 PRINT"weapon",D$(D)
139 PRINT"armour",C$(C)
140 IFLA=1THENPRINT"telescope"
141 GOSUB153
142 IFD0=1THENPRINT"and the almighty Polo mint"
143 PRINT"total points",INT(TP*(1/SL)/AW)
144 GOSUB163
145 RETURN
146 REM
147 FORM2=1TO6:IFB(M2)>GHTHENB(M2)=GH
148 NEXTM2
149 FORM2=1TO6:B(M2)=INT(B(M2)*10)/10:NEXTM2:AR=INT(AR):AP=INT(AP)
150 GP=INT(GP):EX=INT(EX):CS=INT(CS):FL=INT(FL):LU=INT(LU):WA=INT(WA)
151 RI=INT(RI):C=INT(C):D=INT(D):PC=INT(PC):NT=INT(NT):MK=INT(MK):TP=INT(TP)
```

```
152 RETURN
153 REM
154 TP=0
155 TP=(NT*10)+(MK*100)+(5000*WA)+(2500*LU)+(2500*CR)+(2500*RI)+(2500*LA)
156 TP=TP+(800*CS)+(800*FL)+(3000*EX)+(GP)+(PC*3000)
157 FORA=1TO6:TP=TP+B(A)*50:NEXTA
158 TP=TP+(C*1800)+(D*1800)
159 RETURN
160 REM
161 FORA=1TO6:B(A)=B(A)-.2:NEXTA
162 RETURN
163 REM
164 ONFNA(20)GOTO166,167,168,169
165 RETURN
166 PRINT"■You find a dead ";G$(FNA(20)):RETURN
167 PRINT"■You slip and twist your ankle":B(2)=B(2)-.5:RETURN
168 PRINT"■A dead ";G$(FNA(20));" falls from above":RETURN
169 PRINT"■You slip on a frog":RETURN
170 REM
171 USR(53201):A1=PEEK(53210):IFA1=0THEN171
172 IFA1=89THENPRINT"■Yes":A1=1:USR(62):RETURN
173 IFA1=78THENPRINT"■No":A1=2:USR(62):RETURN
174 IFA1=81THENPRINT"■Quit":USR(62):GOTO177
175 PRINT"Invalid, answer 'Y' or 'N'":MUSIC"_C6":FORA=1TO1000:NEXTA
176 PRINT"■                                    ■":GOTO171
177 PRINT"Are you sure you want to quit"
178 GOSUB170
179 IFA1=1THENPRINT"■":AW=3:GOTO582
180 PRINT"■   ":PRINT"■■■                                          ":PRINT"■■    ■■"
181 GOTO170
182 REM
183 GOSUB116:IFNT>10THENPRINT"■Your move ?":GOTO189
184 PRINT"■Your move:-"
185 PRINT"            'E' elixir"
186 PRINT"            'M' move on"
187 PRINT"            'U' update"
188 PRINT"            'R' rest"
189 GETZZ$:IFZZ$=""THEN189
190 IFZZ$="E"THENFORZZ=1TO200:NEXTZZ:GOTO210
191 IFZZ$="M"THEN224
192 IFZZ$="U"THENPRINT"■":GOSUB122:GOTO183
193 IFZZ$="R"THEN195
194 GOTO189
195 PRINT"■You rest.....^.....^....."
196 IFFNA(10*SL)=1THEN200
197 IFGP=0THEN200
198 FORA=1TO6:B(A)=B(A)+FNA(5*SL):NEXTA
199 GOSUB113:PRINT"■":GOSUB146:GOTO184
200 GOSUB110
201 PRINT"■You rest and fall to sleep"
202 GOSUB113
203 PRINT"■When you awake you find that all your■  wares are gone."
204 PRINT"■There are ";G$(FNA(20));" prints nearby"
205 IFD>0THENPRINT"■";C$;D$(D)
206 IFC>0THENPRINT"■";C$;C$(C)
207 IFPC=>1THENPRINT"■";LEFT$(C$,15);"the stones"
208 CS=0:GP=0:FL=0:AR=0:AP=0:EX=0:LU=0:WA=0:RI=0:CR=0:LA=0
209 GOTO182
210 REM
211 REM
212 PRINT"■You wish to take an elixir of life ?"
213 GOSUB170
```

```
214 IFA1=2THENPRINT"■Make up your mind !!":GOTO182
215 IFEX<1THENPRINT"■The trouble is that you don't have any !":GOTO182
216 PRINT"■Which factor ' 1 ' ";B$(1)
217 FORA=2TO6:PRINT"                '";A;" ' ";B$(A):NEXTA
218 GETXX:IFXX=ØTHEN218
219 PRINT"■You take it.............................."
220 GOSUB113
221 IF(XX>6)+(XX<1)THENPRINT"■You have wasted it.....................":GOTO182
222 B(XX)=1ØØ:EX=EX-1
223 GOTO182
224 REM
225 PRINT"■You decide to move on. The  time:";TI$:NT=NT+1:GOSUB146:GOSUB16Ø
226 PRINT"■You are at (X,Y) (";STR$(X2);",";STR$(Y2);")"
227 IFNT>10THENPRINT"■Where now?":GOTO233
228 PRINT"■Next move 'N' north"
229 PRINT"           'S' south"
230 PRINT"           'E' east"
231 PRINT"           'W' west"
232 PRINT"           'T' telescope"
233 GETZZ$:IFZZ$=""THEN233
234 IFZZ$="N"THENY2=Y2+1:GOTO268
235 IFZZ$="S"THENY2=Y2-1:GOTO268
236 IFZZ$="E"THENX2=X2+1:GOTO268
237 IFZZ$="W"THENX2=X2-1:GOTO268
238 IF(ZZ$="T")*(LA=1)THEN241
239 IFZZ$="T"THENPRINT"■No telescope":GOSUB110:GOTO224
240 GOTO233
241 REM
242 PRINT"■Which way do you point the telescope ?":LJ=LJ+1
243 GETZZ$:IFZZ$=""THEN243
244 IFZZ$="N"THENY3=Y2+1:X3=X2:GOTO249
245 IFZZ$="S"THENY3=Y2-1:X3=X2:GOTO249
246 IFZZ$="E"THENX3=X2+1:Y3=Y2:GOTO249
247 IFZZ$="W"THENX3=X2-1:Y3=Y2:GOTO249
248 GOTO243
249 PRINTZZ$:IFX3<1THENX3=X
250 IFX3>XTHENX3=1
251 IF(Y3<1)+(Y3>Y)THEN242
252 X3$=STR$(X3):Y3$=STR$(Y3)
253 PRINT"■The telescope points into (";X3$;",";Y3$;")■"
254 IFFND(1)=1THENPRINTD$;"the Almighty Polo mint"
255 IFFND(1)=2THENPRINTD$;"a magic object"
256 IFFND(1)=3THENPRINTD$;"food or drink"
257 IFFND(1)=4THENPRINTD$;"a dustbin"
258 IFFND(1)=5THENPRINTD$;"gold pieces"
259 IFFND(1)=6THENPRINTD$;"elixirs"
260 IFFND(1)=7THENPRINTD$;"a door-to-door salesman"
261 IF(FND(1)>=8)*(FND(1)<=13)THENPRINTD$;"magic wares"
262 IF(FND(1)>=14)*(FND(1)<=16)THENPRINTD$;"an obstacle"
263 IFFND(1)=17THENPRINTD$;"a bus-stop"
264 IFFND(1)>20THENPRINTD$;"a monster"
265 IFFND(1)=ØTHENPRINTD$;"an empty room"
266 IFLJ=1ØØTHENPRINT"■The telescope has brokenU it is now useless":LA=Ø:LJ=Ø
267 GOTO227
268 IFX2<1THENX2=X
269 IFX2>XTHENX2=1
270 IFY2>YTHENPRINT"No go here ":GOSUB110:PRINT"■":Y2=Y:GOTO227
271 IF(Y2<1)*(X2=3)THEN765
272 IFY2<1THENPRINT"No go here ":GOSUB110:PRINT"■":Y2=1:GOTO227
273 X2$=STR$(X2):Y2$=STR$(Y2)
274 PRINT"■You move to (";X2$;",";Y2$;")■"
```

```
275 IFFNC(1)=3THEN297
276 IFFNC(1)=5THEN314
277 IFFNC(1)=4THEN319
278 IFFNC(1)=2THEN372
279 IFFNC(1)=6THEN376
280 IFFNC(1)=7THEN379
281 IFFNC(1)=8THEN500
282 IFFNC(1)=9THEN504
283 IFFNC(1)=10THEN508
284 IFFNC(1)=11THEN512
285 IFFNC(1)=12THEN516
286 IFFNC(1)=13THEN519
287 IFFNC(1)=14THEN522
288 IFFNC(1)=15THEN536
289 IFFNC(1)=16THEN540
290 IFFNC(1)=17THEN586
291 IFFNC(1)>20THEN610
292 IFFNC(1)<>1THEN295
293 PRINT"■Here you find the Almignty Polo mint.":D0=1:POKEFNE(1),0
294 PRINT"■You must now escape to succeed in your  ■mission":GOTO182
295 PRINT"■You find an empty room "
296 GOTO182
297 REM
298 DZ=FNA(2)+3
299 PRINT"■";A$;"some ";B$(DZ)
300 GOSUB113
301 PRINT"■Do you wish to take it"
302 GOSUB170
303 IFA1=2THEN182
304 PRINT"■you take it.";
305 FORZZ=1TO20:PRINT".";:FORZX=1TO10:NEXTZX,ZZ
306 USR(62):PRINT"gulp"
307 DZ=FNA(10):IFDZ>5THEN311
308 PRINT"■It is O.K. !!":PRINT"■";B$;E$(DZ)
309 B(DZ)=B(DZ)+FNA(7*SL):POKEFNE(1),0
310 GOTO182
311 PRINT"■It is poisoned !!":PRINT"■";B$;E$(DZ)
312 DZ=DZ-5:B(DZ)=B(DZ)-FNA(7*(1/SL)):POKEFNE(1),0
313 GOTO182
314 REM
315 PRINTA$;"gold pieces":GOSUB113
316 DZ=FNA(1000*SL)
317 PRINT"■■You find";DZ;" gold pieces"
318 GP=GP+DZ:POKEFNE(1),0:GOTO182
319 REM
320 PRINTA$;"a dustbin":GOSUB113
321 PRINT"■■Do you wish to open it"
322 GOSUB170:IFA1=2THENPRINT"■":GOTO182
323 POKEFNE(1),0
324 PRINT"■"
325 DZ=FNA(100):BG=0
326 IFDZ<20THEN314
327 IFDZ<30THEN334
328 IFDZ<45THEN342
329 IFDZ<60THEN760
330 IFDZ<70THEN350
331 IFDZ<77THEN356
332 IFDZ<90THEN369
333 IFDZ<99THEN370
334 REM
```

```
335 PRINT"■ OH NO !!!!":FORAC=100TO1STEP-1:POKE4513,AC:POKE4514,AC
336 USR(68):NEXTAC:USR(71):PRINT"■You open the chest and find a cat."
337 DZ=FNA(2000):IFGP<2000THENDZ=FNA(GP)-1
338 GP=GP-DZ:PRINT"■It bites your hand and you drop";
339 PRINTDZ:PRINT"■gold pieces. You feel weaker"
340 B(1)=B(1)-FNA(7)
341 GOTO182
342 REM
343 PRINT"■You find a bank manager...he is about to■speak"
344 GOSUB113
345 DZ=FNA(1000):DX=FNA(1000)+200:GP=GP+DX
346 PRINT"■■I have been trapped in that dustbin for"
347 PRINT"■■";:PRINTDZ;" years and you have freed me."
348 PRINT"■As a reward take";DX;" gold pieces"
349 GOTO182
350 REM
351 IF(C=6)*(D=6)THEN325
352 DZ=FNA(2):IF(DZ=1)*(D<6)THEN355
353 IFC=6THENND=0:GOTO355
354 PRINT"■In it you find the T.V.Times.":C=6:GOTO182
355 PRINT"■In the dustbin you find a toy sword":D=6:GOTO182
356 REM
357 PRINT"■":TEMPO7
358 FORDZ=1TO6:MUSIC"_C0""D0_C0""D0":NEXTDZ
359 PRINT"Oh no, the dustbin has blown up."
360 PRINT"■You fall to the ground"
361 DZ=FNA(10):IFDZ<5THEN365
362 PRINT"■You are hurt.....";:DZ=FNA(5)+5:PRINTB$;E$(DZ)
363 B(DZ-5)=B(DZ-5)-FNA(8):GOTO366
364 GOSUB116
365 PRINT"■Luckily you are unhurt"
366 IF(C=6)*(FNA(10)>1)THEN182
367 IF(FNA(10)>6)+(C=0)+(BG=1)THEN182
368 PRINT"■your armour is destroyed":C=0:GOTO182
369 BG=1:GOTO357
370 REM
371 PRINT"■In the dustbin you find nothing, it is ■ empty":GOTO182
372 REM
373 GOSUB113
374 DZ=FNA(10):IF(N1(DZ)=1)+(N2(DZ)=1)THEN374
375 PRINT"■";A$;"the ";F$(DZ):POKEFNE(1),0:N1(DZ)=1:GOTO182
376 REM
377 GOSUB113:POKEFNE(1),0
378 PRINT"■Here you find an elixir of life":EX=EX+1:GOTO182
379 REM
380 PRINT"Here you find a door-to-door salesman,  ■do you wish to trade?"
381 GOSUB170:IFA1=2THENPRINT"■":GOTO182
382 PRINT"■":FORA=1TO10:IF(N1(A)=1)*(N2(A)=0)THEN384
383 NEXTA:GOTO389
384 FORA=1TO10:IF(N1(A)=1)*(N2(A)=0)THENGOSUB386
385 NEXTA:GOTO389
386 PRINT"Will you sell the ";F$(A);" for":DX=FNA(1800*SL)*10
387 PRINT"■■";DX;" gp's":GOSUB170:IFA1=1THENGP=GP+DX:N2(A)=1
388 RETURN
389 DZ=FNA(25)+45
390 PRINT"■You can buy the following :-":PRINT"■Potions";TAB(20);"  :- 1"
391 PRINT"■Torches and spells";TAB(20);"  :- 2"
392 PRINT"■Elixirs";TAB(20);"  :- 3":PRINT"■Magic wares";TAB(20);"  :- 4"
393 PRINT"■Weapons and armour";TAB(20);"  :- 5■"
394 PRINT"To stop trading enter :- 6":PRINT"■You have";GP;" gold pieces left"
395 PRINT"■■Please make selection (1-6)"
396 USR(53201):A=PEEK(53210):IF(A=0)+(A<49)+(A>54)THEN396
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397 IFA=49THEN403
398 IFA=50THEN425
399 IFA=51THEN437
400 IFA=52THEN446
401 IFA=53THEN460
402 IFA=54THEN568
403 REM
404 PRINT"■You wish to buy potions, they are";DZ:PRINT"■gp's each"
405 IFGP>=DZTHEN407
406 PRINT"■But you have not got enough money.":GOSUB110:GOTO390
407 PRINT"■You can buy potions of the following :-"
408 FORA=1TO5
409 PRINT"■";TAB(4);B$(A);TAB(20);":-";A:NEXTA
410 PRINT"■Which factor (0 = stop buying)
411 USR(53201):A=PEEK(53210):IFA=0THEN411
412 IFA=81THEN390
413 A=A-48:IF(A<1)+(A>5)THEN411
414 PRINT"■How many potions of ";B$(A);" do"
415 PRINT"■you wish to buy ";
416 INPUTML:ML=INT(ABS(ML))
417 IFGP>=ML*DZTHEN422
418 GOSUB419:GOTO416
419 PRINT"You have not got enough money":GOSUB110:USR(62)
420 PRINT"■                                    "
421 PRINT"■■■■■■■■■■■■■■■■■■■■";:RETURN
422 GP=GP-ML*DZ:B(A)=B(A)+ML:GOSUB146
423 PRINT"■Your ";B$(A);" level is now";B(A)
424 GOSUB110:GOTO390
425 REM
426 BG=DZ*15
427 PRINT"■You wish to buy torches and spells"
428 IFGP<BGTHEN406
429 PRINT"■They are";BG;" gold pieces each "
430 FORFR=1TO2:DE$="torches":IFFR=2THENDE$="spells"
431 PRINT"■How many ";DE$;" do you wish to buy":INPUTDE:DE=INT(ABS(DE))
432 IFGP<DE*BGTHENPRINT"■You have not got enough money          ■■"
433 IFGP<BG*DETHENGOSUB107:GOTO431
434 GP=GP-BG*DE:IFFR=1THENFL=FL+DE:GOTO436
435 CS=CS+DE
436 NEXTFR:PRINT"■You now have";FL;" torches and";CS;" spells":GOTO424
437 REM
438 BG=DZ*80
439 PRINT"■You wish to buy elixirs"
440 IFGP<BGTHEN406
441 PRINT"■They are";BG;" gold pieces each"
442 INPUT"■How many do you wish to buy ";BH:BH=INT(ABS(BH))
443 IFGP<BH*BGTHENPRINT"■You have not got enough money       ■■"
444 IFGP<BG*BHTHENGOSUB107:GOTO442
445 GP=GP-BG*BH:EX=EX+BH:PRINT"■You have now got";EX;" elixirs":GOTO424
446 REM
447 PRINT"■You wish to buy magic wares "
448 BG=DZ*50
449 IFGP<BGTHEN406
450 PRINT"■They are all";BG;" gold pieces each"
451 PRINT"■You can buy a wand, cross or ring"
452 PRINT"■Q = quit buying. Enter W,C or R"
453 GETZZ$:IFZZ$=""THEN453
454 IFZZ$="Q"THEN390
455 IF(ZZ$="W")*(WA=0)THENPRINT"■Wand":GP=GP-BG:WA=1:GOTO424
456 IF(ZZ$="C")*(CR=0)THENPRINT"■Cross":GP=GP-BG:CR=1:GOTO424
457 IF(ZZ$="R")*(RI=0)THENPRINT"■Ring":GP=GP-BG:RI=1:GOTO424
458 IF(ZZ$="W")+(ZZ$="C")+(ZZ$="R")THENPRINT"■You already have one":GOTO424
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459 GOTO453
460 REM
461 REM
462 PRINT"■You wish to buy weapons and armour"
463 IFGP<DZTHEN406
464 PRINT"■You can buy";TAB(20);"cost";TAB(30);"code"
465 PRINT"■arrows";TAB(20);DZ*10;TAB(30);"A"
466 PRINT"magic arrows";TAB(20);DZ*20;TAB(30);"B"
467 PRINTC$(1);TAB(20);DZ*28;TAB(30);"C"
468 PRINTC$(2);TAB(20);DZ*50;TAB(30);"D"
469 PRINTC$(3);TAB(20);DZ*70;TAB(30);"E"
470 PRINTC$(4);TAB(20);DZ*110;TAB(30);"F"
471 PRINTC$(5);TAB(20);DZ*137;TAB(30);"G"
472 PRINTD$(1);TAB(20);DZ*26;TAB(30);"H"
473 PRINTD$(2);TAB(20);DZ*47;TAB(30);"I"
474 PRINTD$(3);TAB(20);DZ*68;TAB(30);"J"
475 PRINTD$(4);TAB(20);DZ*107;TAB(30);"K"
476 PRINTD$(5);TAB(20);DZ*140;TAB(30);"L"
477 PRINT"Q = Quit buying. Enter code"
478 GETZZ$:IFZZ$=""THEN478
479 IFZZ$="Q"THEN390
480 IFZZ$="A"THEN494
481 IFZZ$="B"THEN494
482 IF(ZZ$="C")*(GP>=DZ*28)*(C<1)THENPRINTC$(1):C=1:GP=GP-DZ*28:GOTO424
483 IF(ZZ$="D")*(GP>=DZ*50)*(C<2)THENPRINTC$(2):C=2:GP=GP-DZ*50:GOTO424
484 IF(ZZ$="E")*(GP>=DZ*70)*(C<3)THENPRINTC$(3):C=3:GP=GP-DZ*70:GOTO424
485 IF(ZZ$="F")*(GP>=DZ*110)*(C<4)THENPRINTC$(4):C=4:GP=GP-DZ*110:GOTO424
486 IF(ZZ$="G")*(GP>=DZ*137)*(C<5)THENPRINTC$(5):C=5:GP=GP-DZ*137:GOTO424
487 IF(ZZ$="H")*(GP>=DZ*26)*(D<1)THENPRINTD$(1):D=1:GP=GP-DZ*26:GOTO775
488 IF(ZZ$="I")*(GP>=DZ*47)*(D<2)THENPRINTD$(2):D=2:GP=GP-DZ*47:GOTO775
489 IF(ZZ$="J")*(GP>=DZ*68)*(D<3)THENPRINTD$(3):D=3:GP=GP-DZ*68:GOTO775
490 IF(ZZ$="K")*(GP>=DZ*107)*(D<4)THENPRINTD$(4)=D=4:GP=GP-DZ*107:GOTO775
491 IF(ZZ$="L")*(GP>=DZ*140)*(D<5)THENPRINTD$(5):D=5:GP=GP-DZ*140:GOTO775
492 PRINT"Is your I.Q. really";B(3);" ?":USR(62)
493 GOSUB107:PRINT"■                                    ■":GOTO478
494 PRINT"■How many arrows do you wish to buy "
495 INPUTZX:VF=1:IFZZ$="B"THENVF=2
496 DH=DZ*10:ZX=INT(ABS(ZX))
497 IFGP<VF*ZX*DHTHENPRINT"■You have not got enough money":GOSUB107:GOTO494
498 IFZZ$="A"THENGP=GP-ZX*DH:AR=AR+ZX:GOTO424
499 GP=GP-ZX*DH*2:AP=AP+ZX:GOTO424
500 REM
501 PRINT"■Here you find a luckstone":GOSUB113
502 IFLU=1THENPRINT"■You leave it as you already have one":GOTO182
503 LU=1:POKEFNE(1),0:PRINT"■";E$:GOTO182
504 REM
505 PRINT"■Here you find a wand":GOSUB113
506 IFWA=1THENPRINT"■You leave it as you already have one":GOTO182
507 WA=1:POKEFNE(1),0:PRINT"■";E$:GOTO182
508 REM
509 PRINT"■Here you find a ring":GOSUB113
510 IFRI=1THENPRINT"■You leave it as you already have one":GOTO182
511 RI=1:POKEFNE(1),0:PRINT"■";E$:GOTO182
512 REM
513 PRINT"■Here you find a cross":GOSUB113
514 IFCR=1THENPRINT"■You leave it as you already have one":GOTO182
515 CR=1:POKEFNE(1),0:PRINT"■";E$:GOTO182
516 REM
517 PRINT"■Here you find torches":GOSUB113
518 DZ=FNA(2):PRINT"■You find";DZ:FL=FL+DZ:POKEFNE(1),0:GOTO182
519 REM
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520 PRINT"■Here you find spells":GOSUB113
521 DZ=FNA(2):PRINT"■You find";DZ:CS=CS+DZ:POKEFNE(1),0:GOTO182
522 REM
523 PRINT"■Here you find a stream":GOSUB113
524 PRINT"■You can jump across it or wade through"
525 PRINT"■it. Your choice ?"
526 GETZZ$:IFZZ$=""THEN526
527 IFZZ$="J"THEN530
528 IFZZ$="W"THEN534
529 GOTO526
530 PRINT"■You jump ";:IFRND(1)>.5THENPRINT"across it and are O.K ":GOTO182
531 PRINT"and fall in ";:IFRND(1)>.5THENPRINT"but you are alright":GOTO182
532 PRINT:PRINT"■.....aaaaarrrgggh, it's acid":DZ=FNA(3)+5
533 PRINT"■";B$;E$(DZ):DZ=DZ-5:B(DZ)=B(DZ)-FNA(6):GOTO182
534 PRINT"■You wade through it";:IFRND(1)>.3THENPRINT" and are O.K":GOTO182
535 GOTO532
536 REM
537 PRINT"Here you find a wall blocking the way":GOSUB113
538 IFD0=1THENPRINT"■You must go north":ZZ$="N":GOTO234
539 PRINT"■You must go south":ZZ$="S":GOTO234
540 REM
541 PRINT"Aaaaaaaarrrrrrgggggghhh !!!"
542 FORVG=1TO2:FORVF=0TO30:POKE4513,VF:POKE4514,VF:USR(68):NEXTVF,VG
543 FORVF=0TO145:POKE4513,VF:POKE4514,VF:USR(68):NEXT
544 PRINT"■You have fallen into a pit"
545 PRINT"■You look up and see a ";G$(FNA(20))
546 PRINT"■I want all your wares in exchange for a ■ladder":LO=0:USR(71)
547 PRINT"■Do you agree ?"
548 GOSUB170:IFA1=1THEN559
549 IF(RND(1)>.5)+(LO=2)THEN552
550 PRINT"■Look, you'd better give me your wares or■you'll never walk again"
551 LO=LO+1:GOSUB107:PRINT"■":GOTO547
552 IFRND(1)>.5THEN555
553 PRINT"■Aaaarrggh it spears you":FORXS=1TO6:B(XS)=B(XS)-FNA(7):NEXTXS
554 GOSUB113:GOSUB116:PRINT"■":GOTO547
555 IFRND(1)>.1THEN557
556 PRINT"■It spears and kills you":GOTO573
557 GOSUB116
558 PRINT"■It throws the ladder at you and runs off":GOTO182
559 GOTO205
560 REM
561 GOSUB107:GOSUB107:PRINT"■":IFD0=0THEN581
562 PRINT"■Congratulations, you have retrieved the"
563 PRINT"■Almighty Polo mint of Myriah and lived"
564 PRINT"■to escape the Crazy Kingdom of the"
565 PRINT"■evil monsters of Aljarmyah."
566 PRINT"■■■■■■■■■■■■■■■■W E L L  D O N E !"
567 GOSUB107:GOSUB107:GOSUB107:PRINT"■":Z1=0:GOSUB122:GOTO827
568 IF(LA=1)+(GP<DZ*200)THEN182
569 PRINT"■If you want a telescope they are";DZ*200
570 PRINT"■gp's each. Do you want one ?"
571 GOSUB170:IFA1=2THEN182
572 GP=GP-DZ*200:LA=1:GOTO182
573 IF(GH<80)+(08=10000)THENGOTO582
574 GOSUB107:PRINT"■By the almighty power of Aljarmyah"
575 PRINT"■you have been resurrected with"
576 PRINT"■1000 gold pieces to your name, a wand"
577 PRINT"■and limited power qualities"
578 PRINT"■as well as a cocktail stick and an      omelette."
579 GP=1000:WA=1:FORDZ=1TO6:B(DZ)=50:NEXTDZ:GH=GH-20:Z1=0
580 CS=0:FL=0:AR=0:AP=0:EX=0:LU=0:RI=0:CR=0:LA=0:C=1:D=1:GOTO182
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581 REM
582 PRINT"Alas, you have failed in your mission":GOSUB153:AM=TP/AW
583 PRINT"But achieved an admirable total of":PRINT"■";INT(AM):GOSUB122
584 GOTO827
585 REM
586 PRINTA$;"an Almighty Bus-Stop":GOSUB113:UI=MK*NT
587 PRINT"■Well, bold one, I see you have killed"
588 PRINT"■■";MK;" monsters and have had";NT;" moves"
589 PRINT"■in this Crazy Kingdom."
590 JK=45:VF=0
591 IFUI>200THENJK=40
592 IFUI>300THENJK=35
593 IFUI>400THENJK=30
594 IFUI>550THENJK=20
595 IFUI>750THENJK=12
596 DZ=FNA(25)+JK:IFGP>15000THEN756
597 IF(C>4)+(GP<DZ*137)THEN602
598 PRINTOI$;"the T.V.Times";
599 PRINT"  ■for";DZ*137;" gold pieces"
600 PRINT"■Do you wish to buy it ?":GOSUB170:IFA1=2THEN602
601 PRINT"■It is yours":GP=GP-DZ*137:C=5:VF=1:GOSUB113:PRINT"■"
602 IF(D>4)+(GP<DZ*140)THEN608
603 IFVF=1THENPRINT"I can also sell you a broadsword":GOTO605
604 PRINTOI$;"a spanner, which is a trusty weapon"
605 PRINT"■for";DZ*140;" gold pieces"
606 PRINT"■Do you wish to buy it ?":GOSUB170:IFA1=2THEN608
607 PRINT"■It is yours":GP=GP-DZ*140:D=5:GOSUB113
608 PRINT"■I am afraid we can trade no longer,     ■farewell."
609 GOTO182
610 REM
611 PRINTA$;"a monster":GOSUB113:SK=1/SL
612 Q=FNC(1)-20:Q1$=G$(Q):Q1=E(Q)*SK:Q2=F(Q)*SK:Q3=G(Q)*SK:Q4=H(Q)*SK
613 Q5=I(Q)*SK:Q6=J(Q):Q7=K(Q):Q8=L(Q):PRINT"■The monster is a ";Q1$
614 PRINT"■You can do any of the following :-■■"
615 A1=0:A2=0:A3=0:A4=0:A5=0:A6=0:A7=0:A8=0:A9=0:A0=0
616 IFQ8<>10000THENPRINT"Retreat";TAB(35);"'R'"
617 IFD>0THENPRINT"Attack it with your ";D$(D);TAB(35);"'A'":A1=1
618 PRINT"Bribe it";TAB(35);"'B'"
619 IFFL>0THENPRINT"Light a torch";TAB(35);"'T'":A2=1
620 IFCS>0THENPRINT"Cast a spell";TAB(35);"'S'":A3=1
621 IFWA=1THENPRINT"Cast a spell with your wand";TAB(35);"'W'":A4=1
622 IFCR=1THENPRINT"Show your cross";TAB(35);"'C'":A5=1
623 IFLU=1THENPRINT"Show your luckstone";TAB(35);"'L'":A6=1
624 IFRI=1THENPRINT"Show your ring";TAB(35);"'D'":A7=1
625 IF(AR>0)*(Q8<>10000)THENPRINT"Fire an arrow";TAB(35);"'O'":A8=1
626 IF(AP>0)*(Q8<>10000)THENPRINT"Fire a magic arrow";TAB(35);"'M'":A9=1
627 GETA0$:IFA0$=""THEN627
628 IFA0$="R"THEN640
629 IF(A0$="A")*(A1=1)THEN675
630 IFA0$="B"THEN661
631 IF(A0$="T")*(A2=1)THEN799
632 IF(A0$="S")*(A3=1)THEN814
633 IF(A0$="W")*(A4=1)THEN729
634 IF(A0$="C")*(A5=1)THEN729
635 IF(A0$="L")*(A6=1)THEN729
636 IF(A0$="D")*(A7=1)THEN729
637 IF(A0$="O")*(A8=1)THEN783
638 IF(A0$="M")*(A9=1)THEN783
639 GOTO627
640 REM
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641 IFQ8=10000THEN627
642 PRINT"■You decide to retreat "
643 GOSUB113:PRINT"■You run to escape from the ";Q1$
644 IF(FNA(10)>3)+(Q8=1800)THEN651
645 PRINT"■The monster does not chase and you go■"
646 DZ=FNA(4):IFDZ=1THENPRINT"north":ZZ$="N"
647 IFDZ=2THENPRINT"south":ZZ$="S"
648 IFDZ=3THENPRINT"east":ZZ$="E"
649 IFDZ=4THENPRINT"west":ZZ$="W"
650 GOSUB110:GOTO234
651 PRINT"■The ";Q1$;" begins to chase you":IF(FNA(10)>3)+(Q8=1800)THEN653
652 PRINT"■but you outrun it, you go ";:GOTO646
653 PRINT"■It swings out....................."
654 FORZX=4TO7:FORA=1TO255STEP20:POKE4514,ZX:POKE4513,A:USR(68):NEXTA,ZX
655 FORA=1TO15:USR(68):NEXTA:USR(71)
656 IFFNA(5*B(2))>125THENPRINT"■But misses, ";:GOTO659
657 PRINT"■OUCH It hits !!"
658 FORA=1TO6:B(A)=B(A)-FNA(5)*Q1/(C(C)*200):NEXTA:PRINT"■";
659 PRINT"you escape and go ";:GOTO778
660 REM
661 PRINT"■You decide to bribe":GOSUB110:IF(Q8=1800)+(Q8=10000)THEN674
662 DZ=FNA(Q8*10):IFGP<DZTHENAX=1:GOTO667
663 PRINT"■I want";DZ;" gold pieces, can I have":PRINT"■them ?"
664 GOSUB170:IFA1=2THENAX=1:GOTO667
665 GP=GP-DZ
666 PRINT"■■Good, just keep quiet":GOTO182
667 DZ=FNA(10):IF(N1(DZ)=1)*(N2(DZ)=0)THEN670
668 AX=AX+1:IFAX>7THEN674
669 GOTO667
670 PRINT"■I want the ";F$(DZ);" can":PRINT"■I have it ?":GOSUB170
671 IFA1=2THEN673
672 N2(DZ)=1:GOTO666
673 PRINT"■O.K, but you asked for it ":GOTO712
674 PRINT"■All I want is your life":GOTO712
675 REM
676 PRINT"■Prepare to combat with a ";Q1$:GOSUB113:GOSUB146
677 PRINT"■The monster is a ";Q1$
678 IF(D=2)+(D=6)THENPRINT"■You have an ";D$(D);" to attack":GOTO680
679 PRINT"■You have a ";D$(D);" to attack"
680 IFC=6THENPRINT"■and ";C$(C);" for defence.":GOTO683
681 IFC=0THENPRINT"■and nothing for defence.":GOTO683
682 PRINT"■and a ";C$(C);" for defence."
683 PRINT"■Your I.Q is";B(3):PRINT"■Your ";B$(1);" is";B(1)
684 PRINT"■Your ";B$(2);" is";B(2)
685 PRINT"■You can aim for the monsters head, body"
686 PRINT"■or arms. Where are you going to aim ?":ND=ND+1
687 GETA2$:IFA2$=""THEN687
688 IFA2$="H"THENB2=1:GOTO692
689 IFA2$="B"THENB2=2:GOTO692
690 IFA2$="A"THENB2=3:GOTO692
691 GOTO687
692 PRINT"■You aim for its ";A$(B2):GOSUB110:IF(Q5=0)*(B2=3)THEN755
693 PRINT"■":B4=(B(1)+2*B(2)+B(3))/Q2:IFB4>.25THEN696
694 PRINT"■Oh dear, you miss and the monster begins"
695 PRINT"to advance":GOTO712
696 PRINT"■You got it and the ";D$(D);" sank"
697 PRINT"■into its ";A$(B2):IF(FNA(50-ND)=1)*(Q8<>10000)THEN710
698 B3=D(D)*(B(1)*2+B(2)+B(3))/(10*FNA(2)):Q2=Q2*(1/(B3^.05))
699 Q1=Q1-B3:IFB2=1THENQ3=Q3-B3
700 IFB2=2THENQ4=Q4-B3
701 IFB2=3THENQ5=Q5-B3
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702 IFQ5<0THENPRINT"■You sliced off all its arms and legs":GOTO707
703 IFQ4<0THENPRINT"■You tore out its heart":GOTO707
704 IFQ3<0THENPRINT"■You sliced off its head":GOTO707
705 IFQ1<0THENPRINT"■The monster dies of exhaustion":GOTO707
706 GOTO712
707 SW=FNA(Q8*SL):B(4)=B(4)+FNA(Q8/90):B(5)=B(5)+FNA(Q8/80):IFQ8=10000THEN770
708 PRINT"■The monster is dead and you get its      ■hoard of";SW;" gp's"
709 GP=GP+SW:POKEFNE(1),0:MK=MK+1:GOTO182
710 PRINT"■Oh no, your ";D$(D);" has broken."
711 PRINT"■It is now useless":D=0:GOSUB107:PRINT"■":GOTO614
712 REM
713 GOSUB113:PRINT"■The ";Q1$;" advances......."
714 IFFNA(10)<6THENPRINT"■Watch out !! ■";
715 FORZX=4TO7:FORA=1TO255STEP20:POKE4514,ZX:POKE4513,A:USR(68):NEXTA,ZX
716 FORA=1TO15:USR(68):NEXTA:USR(71)
717 F0=(Q2+Q1)/(2*B(2)+B(3))*FNA(5):IFF0>9THEN719
718 PRINT"■Phew !! it missed you":GOSUB107:PRINT"■":GOTO614
719 PRINT"■Ouch, it hit you ":MUSIC"_B0_A0_B0_A0_B0_A0_B0"
720 F0=(2*Q1+Q2)/(C(C)*30)
721 F1=FNA(4)
722 PRINT"■It got you in the ";A$(F1);" and you feel":PRINT"■";
723 IFF1=1THENF1$=E$(8):B(3)=B(3)-F0:B(2)=FNF(B(2))
724 IFF1=2THENF1$=E$(6):B(1)=B(1)-F0:B(2)=FNF(B(2))
725 IF(F1=3)+(F1=4)THENF1$=E$(7):B(2)=B(2)-F0:B(1)=FNF(B(1))
726 PRINTF1$:B(4)=FNF(B(4)):B(5)=FNF(B(5)):B(6)=FNF(B(6)):GOSUB110:PRINT"■"
727 GOSUB116:GOSUB146:GOTO614
728 PRINT"■It doesn't have any arms or legs ":GOTO712
729 REM
730 PRINT"■You decide to ";:IFA0$="W"THENPRINT"cast a spell with the wand"
731 IFA0$="C"THENPRINT"show your cross":A1$="cross"
732 IFA0$="L"THENPRINT"show your luckstone":A1$="luckstone"
733 IFA0$="D"THENPRINT"show your ring":A1$="ring"
734 IFA0$="W"THENA1$="wand"
735 GOSUB113:IF(Q8=1700)*(A0$="C")THEN737
736 GOTO738
737 PRINT"■The power of the cross kills the ":PRINT"■";Q1$:GOTO707
738 IFFNA(8)<>1THEN745
739 PRINT"■You look for your ";A1$;" but you":PRINT"■find you have lost it."
740 IFA0$="W"THENWA=0
741 IFA0$="C"THENCR=0
742 IFA0$="L"THENLU=0
743 IFA0$="D"THENRI=0
744 GOSUB110:PRINT"■":GOTO614
745 PRINT"■":IFQ7=2THENPRINTA1$;"s don't affect ";Q1$;"s":GOTO712
746 PRINT"■The ";Q1$;" can't stand the power"
747 IFA0$="W"THENK1=10:K2=9
748 IFA0$="D"THENK1=6:K2=7
749 IFA0$="C"THENK1=5:K2=6
750 IFA0$="L"THENK1=8:K2=8.5
751 Q1=Q1-K1*B(3):Q2=Q2*K2/10
752 PRINT"■It falls to the ground ";
753 IFQ1<0THENPRINT:GOTO707
754 PRINT"but lives and■    advances":GOSUB110:GOTO714
755 PRINT"■It doesn't have any arms or legs":GOTO712
756 PRINT"■For 15000 gold pieces I can tell you"
757 PRINT"■Where the Almighty Polo mint is, do you"
758 PRINT"■wish to know":GOSUB170:IFA1=2THENPRINT"■":GOTO597
759 PRINT"■It is at";X5;Y5:GP=GP-15000:GOTO608
760 REM
```

```
761 PRINT"■In the chest you find potions"
762 DZ=FNA(5):PRINT"■You find potions of ";B$(DZ)
763 PRINT"■You take them and feel ";E$(DZ):B(DZ)=B(DZ)+FNA(5*SL)
764 GOTO182
765 PRINT"■You wish to leave the kingdom but "
766 PRINT"■you must do battle with the dreaded"
767 PRINT"■Teddy Bear of Aljarmyah."
768 Q1$="teddy bear":Q1=2500:Q2=900:Q3=2000:Q4=2000:Q5=2000:Q6=2:Q7=2
769 Q8=10000:GOSUB107:PRINT"■":GOTO614
770 PRINT"You are now free":GOTO561
771 REM
772 FORB=1TO6:IFB(B)<0THENPRINT"■You died from lack of ";B$(B):RETURN
773 NEXTB
774 GP=5000:DZ=10:GOTO810
775 ND=0:GOTO424
776 PRINT"The width of the chambers is 10, how ":X=10
777 INPUT"■deep do you wish them to be ";Y:RETURN
778 IFQ8<>1800THEN646
779 IFZZ$="N"THENDZ=2:GOTO647
780 IFZZ$="S"THENZZ$="N":PRINT"north":GOTO650
781 IFZZ$="W"THENDZ=3:GOTO647
782 IFZZ$="E"THENDZ=4:GOTO647
783 REM
784 AL=1:IFA0$="M"THENAL=2.5
785 PRINT"■You wish to fire an arrow":GOSUB113:NA=NA+1
786 IFA0$="M"THENAP=AP-1:GOTO788
787 AR=AR-1
788 PRINT"■you aim.....";
789 FORZA=5TO3STEP-1:FORZB=255TO1STEP-40:POKE4513,ZB:POKE4514,ZA:USR(68)
790 NEXTZB,ZA:PRINT"and fire !"
791 FORZA=1TO3:FORZB=1TO255STEP10:POKE4513,ZB:POKE4514,ZA:USR(68)
792 NEXTZB,ZA:USR(71)
793 B3=(2*B(3)+B(1)+2*B(2))*(RND(1)/5+1)/Q2
794 IFB3<.5THENPRINT"■Oh no, you miss":GOSUB113:PRINT"■":GOTO614
795 PRINT"■You got it":FORZA=1TO5:MUSIC"¯A0_A0¯A0_A0¯A0_A0":NEXTZA
796 QX=Q1:Q1=Q1-B(2)*AL*5:IFQ1<0THEN797
797 Q2=Q2*(SQR(Q1)/SQR(QX)):IFNA>=2THENPRINT"■":NA=0:GOTO712
798 GOTO614
799 REM
800 PRINT"■You wish to light a torch":GOSUB113
801 PRINT"■You light the torch and see that the":PRINT"■monster has ";
802 FL=FL-1:IFFNA(2)=1THEN807
803 IF(Q3<Q4)*(Q3<Q5)THENPRINT"a weak head":GOTO614
804 IF(Q4<Q3)*(Q4<Q5)THENPRINT"a weak heart":GOTO614
805 IFQ8=700THEN807
806 PRINT"weak arms and legs":GOTO614
807 IF(Q3>Q4)*(Q3>Q5)THENPRINT"a strong head":GOTO614
808 IF(Q4>Q3)*(Q4>Q5)THENPRINT"a sturdy body":GOTO614
809 PRINT"solid arms and legs":GOTO614
810 PRINT"■ Ordinary or self initialised character"
811 GETAA$:IFAA$=""THEN811
812 IF(AA$="S")+(AA$="I")THENPRINT"■":GOTO390
813 FORA=1TO6:B(A)=40:NEXTA:C=3:D=3:LA=1:AR=5:GP=500:FL=3:GOTO182
814 REM
815 PRINT"■You decide to cast a spell":GOSUB113
816 IFQ6=2THENPRINT"■but they don't affect ";Q1$;"s":GOSUB114:GOTO822
817 PRINT"■You cast the spell.....":CS=CS-1
818 IFFNA(B(3)/5)>1THEN823
819 PRINT"■Oh no, it's a Wicked Wizard's spell and"
820 PRINT"■you have cast the spell on yourself !":FORQ=1TO6:B(Q)=B(Q)-FNA(3)
821 NEXTQ:GOSUB108:PRINT"■":GOTO614
```

```
822 PRINT"■":GOTO614
823 K1=8:K2=8:GOTO751
824 PRINT"■from 1 - fast to 9 - slow "
825 GETXE:IFXE=0THEN825
826 PRINT"■":XE=.8+XE/10:RETURN
827 PRINT"Another game ?"
828 GETA$:IFA$="Y"THENRUN
829 IFA$="N"THEN831
830 GOTO828
831 POKE5402,83:POKE5403,65:POKE5404,86
832 POKE5343,76:POKE5344,73:POKE5345,83
833 USR(4608)
834 POKE5343,76:POKE5344,73:POKE5345,83
835 POKE5353,80:POKE5354,82:POKE5355,73:POKE5356,78
836 POKE5402,83:POKE5403,65:POKE5404,86
837 POKE5450,85:POKE5451,83:POKE5452,82
838 POKE5582,80:POKE5583,69:POKE5584,69:POKE5585,75
839 POKE5412,80:POKE5413,79:POKE5414,75
840 END
841 FORI=1TO300:NEXTI:RETURN
```

OPERATIONAL NOTES

```
1 PRINT"■DO NOT STOP THE TAPE, LEAVE THE 'PLAY' ■KEY AS IT IS."
2 FORI=1TO5000:NEXTI
3 PRINT"■■■■":CLR
4 DIMA$(4):A$(1)="Crazy Kingdom":A$(2)="By Ian Pugh":A$(3)="Copyright 1984."
5 A$(4)="Do you require instructions ? (Y/N)"
6 FORJ=1TO4
7 A=LEN(A$(J)):FORI=1TO(39-A)/2
8 PRINT" ";:NEXTI
9 FORI=1TOLEN(A$(J))
10 PRINT"■ ■■";MID$(A$(J),I,1);:USR(62):NEXTI
11 TEMPO7:MUSIC"T£B"
12 PRINT:PRINT:PRINT:IFJ=3THENPRINT:PRINT:PRINT:PRINT
13 NEXTJ
14 GETA$:IF(A$="Y")+(A$="N")THEN19
15 UG=UG+1
16 IFUG=10THENX=INT(RND(1)*1000):IFPEEK(53248+X)=0THENPOKE53248+X,RND(1)*255
17 IFUG=10THENUG=0
18 GOTO14
19 PRINT"■":IFA$="Y"THEN25
20 PRINT"■■ When the cursor appears, which is a    ■flashing ▒, type the ";
21 PRINT"following:-"
22 PRINT"■ LOAD"
23 PRINT"■Then press the [CR] key. The computer   ■will load the program."
24 PRINT:PRINT:PRINT:NEW
25 PRINT"■              Crazy Kingdom"
26 PRINT"               ═══════════"
27 PRINT:PRINT
28 PRINT" The scene is set in the year 3001, the "
29 PRINT"entire world seems to have gone mad and "
30 PRINT"you appear to be the only sane person   "
31 PRINT"left. Your mission is to explore the    "
32 PRINT"the land in search of the key to sanity,"
33 PRINT"the Almighty Polo Mint. On the way you  "
34 PRINT"will have to overcome many problems and "
35 PRINT"hazards such as rabid shop-assistants   "
36 PRINT"and cabinet ministers, thirst and weakn-"
37 PRINT"ess."
38 GOSUB71
```

```
39 PRINT"▣ You will be able to purchase food and  "
40 PRINT"weapons to help you on your mission or   "
41 PRINT"you can trade with salesmen you may meet"
42 PRINT"Once you have retrieved the Polo Mint    "
43 PRINT"you must escape the land but to do this "
44 PRINT"you must fight with the most horrific    "
45 PRINT"monster of them all."
46 GOSUB71
47 PRINT"▣ Elixirs are magic potions which can    "
48 PRINT"replenish any factor you wish,eg.stamina"
49 PRINT"Telescopes are usefull to show you what "
50 PRINT"lies ahead of you and updates show your "
51 PRINT"condition. You will be asked what you   "
52 PRINT"wish to do next and a list of possibili-"
53 PRINT"ties will be shown."
54 PRINT"▯ Spells and magic weapons can defeat a  "
55 PRINT"monster but hand-to-hand combat cannot   "
56 PRINT"be avoided indefinitely."
57 GOSUB71
58 PRINT"▣ There are many other things that you   "
59 PRINT"may encounter or do but I'll leave you   "
60 PRINT"find them out for yourself."
61 PRINT:PRINT" You choose how large the kingdom is    "
62 PRINT"and the skill level involved. Magic      "
63 PRINT"objects are usefull to trade with sales-"
64 PRINT"men."
65 PRINT:PRINT:PRINT" Good luck,the world is counting on you."
66 GOSUB71
67 PRINT"▣  Do you wish to see the instructions   ▯ again ? (Y/N)"
68 GETA$:IFA$="Y"THEN25
69 IFA$="N"THEN20
70 GOTO68
71 PRINT"▯▯▯▯▯▯▯▯▯▯▯▯▯▯▯▯▯▯▯▯▯▯▯▯▯▯       PRESS [SPACE] TO CONTINUE"
72 GETA$:IFA$=" "THENRETURN
73 GOTO72
```

```
5 REM...NINEMM 31/1/84
10 PRINT ".NINE MEN'S MORRIS"
15 REM "." IS THE "CLEARSCREEN" CHAR
20 DIM B(24): REM...BOARD
25 BC=53758: REM..BOARD CENTRE
30 FOR Z=1 TO 24: READ Y
40 B(Z)=Y+BC
50 DATA -246,-240,-234,6
51 DATA 246,240,234,-6
52 DATA -164,-160,-156,4
53 DATA 164,160,156,-4
54 DATA -82,-80,-78,2
55 DATA 82,80,78,-2
70 POKE B(Z), 46
80 POKE B(Z)-20, Z
90 NEXT Z
91 DIM LL(9), PT(6)
92 FOR Z=1 TO 9: READ LL(Z)
93 DATA 0,1,2,0,-1,-2,0,1,-1
94 NEXT Z
95 REM...DISPLAY PHASE COMPLETE
100 DIM C(2), R(2), N(2)
105 REM...CHAR, ROUTINE, NO/PEGS
110 C(1)=24: C(2)=15: REM.."X","O"
120 N(1)=0: N(2)=0: A=2: D=1
140 REM...PLAYER 2 ACTIVE, 1 DORMANT
150 FOR Y=1 TO 2
160 PRINT "..";CHR$(C(Y)+64);" strategy (1 for human)? "
170 GET R(Y): IF R(Y)=0 THEN 170
180 IF R(Y)>2 THEN 170
190 NEXT Y
210 REM...INIT AND HUM/MAC COMPLETED
220 FOR T=1 TO 18
230 Z=A: A=D: D=Z
240 ST$=" to play     "
250 GOSUB 5050
260 IF Z<>46 GOTO 240
270 POKE B(L), C(A)
280 N(A)=N(A)+1
290 GOSUB 5340: REM...TAKE?
300 NEXT T
310 REM...ALL PEGS NOW PLAYED
320 Z=A: A=D: D=Z
330 IF N(A)=3 THEN 410
340 FOR L=1 TO 24
350 IF PEEK(B(L))<>C(A) THEN 391
360 GOSUB 5150
370 FOR V=1 TO 6: LO=PT(V)
380 IF PEEK(B(LO))<>46 THEN 390
385 GOSUB 5530: IF X=0 THEN 400
390 NEXT V
391 NEXT L: GOTO 530
395 IF N(A)=3 THEN 410
400 ST$=" to move    ": GOTO 420
410 ST$=" to hop     "
420 GOSUB 5050: REM...CHOOSE
430 IF Z<>C(A) THEN 395
440 LO=L: ST$=" to ?       "
450 GOSUB 5050: IF X=0 THEN 480
455 IF Z<>46 THEN 400
460 IF N(A)=3 THEN 480
470 GOSUB 5530: IF X=1 THEN 400
```

```
480 POKE B(L), C(A)
485 POKE B(LO), 46
490 GOSUB 5340: REM...TAKE?
500 IF N(D)>2 THEN 320
510 ST$=" wins     ": GOTO 540
530 ST$=" is forced to a draw"
540 PRINT "..";CHR$(C(A)+64);ST$
550 INPUT "Another game, Y(es) or N(o)? "; IN$
560 IF ASC(IN$)=89 THEN RESTORE: GOTO,10
570 END
5050 REM...CHOOSE
5060 PRINT "..";CHR$(C(A)+64);ST$;"              "
5070 ON R(A) GOSUB 6000,6050
5080 Z=0
5085 IF L<25 THEN Z=PEEK(B(L))
5090 RETURN
5100 REM...Z=L+Y 'MOD' 8
5110 Z=L-1: ZX=INT(Z/8)*8
5120 Z=Z+Y
5130 Z=Z-INT(Z/8)*8+ZX+1
5140 RETURN
5150 REM...GETLINES
5160 IF INT(L/2)*2=L THEN 5200
5170 FOR X=1 TO 6
5180 Y=LL(X): GOSUB 5100
5190 PT(X)=Z: NEXT X: RETURN
5200 FOR X=7 TO 9
5210 Y=LL(X): GOSUB 5100
5220 PT(X-6)=Z: NEXT X
5230 Z=L-INT(L/8)*8: IF Z=0 THEN Z=8
5240 FOR X=4 TO 6: PT(X)=Z
5250 Z=Z+8: NEXT X: RETURN
5260 REM...LINEVALS IN V,W
5270 GOSUB 5150: Z=1
5280 W=0: FOR Y=Z TO Z+2
5290 X=PEEK(B(PT(Y)))
5300 IF X=C(A) THEN W=W+1
5310 IF X=C(D) THEN W=W-2
5320 NEXT Y: IF Z=4 THEN RETURN
5330 Z=4: V=W: GOTO 5280
5340 REM...TAKE?
5350 GOSUB 5260: REM...LINEVALS
5360 IF (V<>3)*(W<>3) THEN RETURN
5380 ST$=" to take   "
5390 GOSUB 5050: REM...CHOOSE
5400 IF Z<>C(D) THEN 5380
5410 GOSUB 5260
5420 IF (V<>-6)*(W<>-6) THEN 5500
5430 L2=L: FOR L=1 TO 24
5440 IF PEEK(B(L))<>C(D)THEN 5470
5450 GOSUB 5260
5460 IF (V<>-6)*(W<>-6) THEN 5380
5470 NEXT L
5490 L=L2
5500 POKE B(L), 46
5510 N(D)=N(D)-1: RETURN
5530 REM...X=0 IF L,LO ADJACENT
5540 X=0
5550 IF L<>INT(L/2)*2 THEN 5570
5560 IF ABS(LO-L)=8 THEN RETURN
5570 FOR Y=-1 TO 1 STEP 2
```

```
5580 GOSUB 5100: IF Z=LO THEN RETURN
5590 NEXT Y: X=1: RETURN
6000 REM...HUMAN INPUT
6010 INPUT "..."; IN$: L=ASC(IN$)-64
6020 IF L<1 THEN 6000
6030 IF L>24 THEN 6000
6040 X=1: RETURN
6050 REM...MACHINE INPUT
6060 IF MID$(ST$,5,1)="?" THEN 6080
6070 L=INT(24*RND(1))+1: RETURN
6080 FOR L=1 TO 24: X=1
6090 IF PEEK(B(L))<>46 THEN 6120
6100 GOSUB 5530
6110 IF X=0 THEN RETURN
6120 NEXT L: RETURN
```

RULES FOR PLAYING NINE MEN'S MORRIS

Nine Men's Morris is an excellent and ancient two-handed game. (It is mentioned in Shakespeare.) On running the program the board is displayed on the right of the screen as a matrix of dots representing holes into which pegs may be put. On the left is a similar matrix of letters which is a key to naming the holes in the board. Each player starts with nine pegs in hand; when these are on the board an X or an O replaces the dot.

Before the game can start each player must be given a strategy. Strategy 1 allows a human player to **refer** to a hole by keying the appropriate letter followed by CR. In Strategy 2 the machine makes **references** at random. (Better machine strategies can be added as routines alternative to those in 6000 and 6050 and made accessible by appending their entries to line 5070 and appropriately increasing the 2 in line 180. Most of the subroutines you would need in defining a new strategy are already in the program for the purpose of enforcing the rules.)

The game proceeds in three Phases. In Phase 1, reference to an empty hole causes a peg (X and O alternately) to be **played** into it. In Phase 2 a player **moves** one of his pegs to an adjacent (vertically or horizontally but not diagonally) hole by referring first to the source and and then to the destination. In Phase 3 the adjacency restriction is removed and the player **hops**. Whatever the phase, a player whose action completes a line (vertical or horizontal but not diagonal) of three (of his/her/its own) pegs must **take** one of the opponent's pegs by referring to it. The peg chosen must not be one of a line of three alike unless there is no alternative. The players reach Phase 3 independently when reduced to three pegs on the board; they win by reducing the opponent to two pegs or draw by so boxing in the opponent that no legal action is available.

The next action required is displayed at the top of the screen. Illegal actions are simply ignored. (E.g., if a **take** seems not to work, it will probably be found that the player has overlooked the fact that it is part of a line of three.)

Dear Sharpsoft,

I hope this will not be the last year of publication as hinted at in your recent Editorial. What will A, B and K owners do without you in a field which lacks any other significant support?

I am taking this opportunity to enclose some notes and a listing which may be of interest to fellow readers who, like me, find they develop 10 thumbs when it comes to typing in long programs.

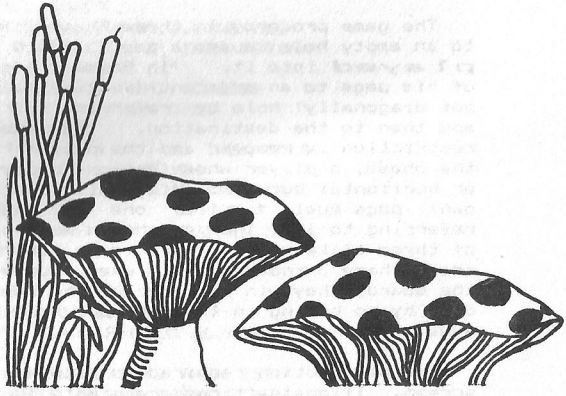
Finally, a couple of queries:

a) Do you know of any method of using Disc Basic SA-6510 to save Machine Language files direct to disc without having to firstly save to tape and then use CMT?

Sorry! We can't help you with this. Can anyone else? From the sound of what you are presently doing, it seems the easiest way.

b) Do you still market the 80 column conversion kit for the MZ-80A? If so, what is the cost and does it need any special knowledge or skills to install it?

Indeed we do, this kit will allow an MZ-80A to be converted to 80 columns. The 40 column capability is retained and the entire screen may be switched from 40 to 80 columns either from the keyboard or under program control in the monitor, Sharp Disk or cassette BASIC and CP/M. It is #57.70 (pounds sterling) including V.A.T. Fitting the modification is fairly easy as long as the inst ructions are followed carefully. It involves soldering, cutting tracks and replacing the Monitor ROM. We would not recommend anyone fitting it that has had no experience with a soldering iron, especially if the machine is still under guarantee, which is unlikely.



USER DEFINED SINGLE KEY PROGRAMMING UTILITY FOR THE SHARP MZ-80A

by P.J.Rawson. June 1984

User defined keys can be a great labour saver when typing in large amounts of program.This utility for the MZ-80A allows the user to call up strings of characters by a single keystroke.

The program as presented is essentially a modification of the Get 1 Line routine which is buried in the SA-1510 monitor.This approach was chosen in order to retain the ability of full screen editing and the use of the AUTO command, both of which would otherwise be lost with shorter alternative routines.

The program is designed to LOAD from Basic having firstly reserved sufficient free memory using LIMIT $C000. The utility is activated by the direct command USR($C000).

Having reached this stage the user may now define one or all of the following Shifted keys: Z,X,C,V,B,N,M.
To initiate the process type CTRL+ ? key which will clear the screen and cause the following prompt to appear: Z→.

This means that the shifted Z key may now be defined.You may enter any string of characters, GOTO, PRINT, RETURN etc, or even a whole line of program if desired.
Up to 80 characters may be included in the string and full screen editing is available.

When entry is finished, type CR/ENT and the next define key prompt (X→) will be displayed.

If you have reached the end of the required list of strings simply keep typing CR/ENT until Ready is displayed indicating you are back to the normal Basic mode.

To extract the pre determined function from a programmed key, simply type Shift and the required key.The previously stored string will now appear as though it had just been typed.

If it is in a line of program it will automatically become part of the program line being entered.

If the system is in the Command Mode then the function will be executed immeadiately CR/ENT is typed.

For example, try the following:

Define Z→ to: FOR K=1TO20:PRINT"TEST":NEXT

To execute, type Shift Z and CR/ENT

Both a full Assembler listing and a Hex dump are provided.

If an Editor/Assembler is available you can use the full listing to produce a system tape and/or assemble to a location to suit your needs. It should be noted though that 570 bytes of Ram are needed after the program end, for string storage.

The Hex dump is provided for quick reference and to facilitate entry of the program without an Editor/Assembler.

Whilst the Assembly listing contains various comments, here are a few more which should help understanding of the program operation.

The INIT: segment revectors Basic to the modified Get 1 Line routine and fills the string storage area with ODs.

As presented the program is written for use with tape Basic SA-5510.

For use with Disc Basic SA-6510 the lable symbol BASIC should be changed to - BASIC: EQU 1422H

If using the Hex dump change the following locations:
$C004 to 22H and $C005 to 14H.

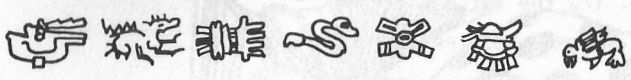
The remainder of the program can be divided into three main blocks.

START: is the modified Get 1 Line routine. In addition to providing normal keyboard operation this segment looks up the defined key table and when required calls up the Define and Display routines.

DEFKEY: this segment looks to see which key is to be defined and then calls POINT to get the address of the appropriate string storage area.

DSPKEY: is the display function routine and is called from the START segment when the appropriate shifted key is pressed.

Doubtless modifications and improvements can be made to suit individual requirements. Additionally, those more skilled than I in Machine Code progamming should be able to reduce the overall size of the program, but thats half the fun of utility programs.



```
*;_____________________________
*;HEX DUMP FOR USER DEFINED
*;SINGLE KEY PROGRAMMING
*;UTILITY FOR THE MZ-80A
*;_____________________________


*TC000 C16F
C000  21 17 C0 22 39 13 21 6B
C008  C1 3E 0D 06 07 C5 06 51
C010  CD DD 0F C1 10 F7 C9 F5
C018  C5 E5 D5 CD 63 02 CD CA
C020  08 FE CB 28 F9 CD CA 08
C028  CD FF 09 28 F8 F5 AF 32
C030  93 11 F1 47 CD F5 05 3A
C038  9D 11 B7 CC E5 02 78 FE
C040  E7 CA DE C0 FE 3E CA E5
C048  C0 C5 21 56 C1 01 07 00
C050  ED B1 C1 2B CA 21 C1 FE
C058  E6 28 6A FE EE 28 63 FE
C060  E5 28 6F FE E0 28 6F 30
C068  BC E6 F0 FE C0 20 16 78
C070  FE CD CA 5B 08 FE CB CA
C078  4E 08 FE C7 30 3F 3A 70
C080  11 B7 78 28 38 78 CD B5
C088  0D CD 63 02 3A 93 11 B7
C090  20 14 1E 14 CD CA 08 20
C098  9A CD F1 09 38 87 1D 20
C0A0  F3 3E 01 32 93 11 CD A7
C0A8  0D CD A7 0D CD CA 08 CD
C0B0  FF 09 C2 2D C0 CD F1 09
C0B8  38 E2 C3 34 C0 CD DC 0D
C0C0  18 C7 AF 18 02 3E FF 32
C0C8  91 11 3E C6 CD DC 0D C3
C0D0  1B C0 06 5A 18 AF 21 8F
C0D8  11 7E 2F 77 18 F1 11 FC
C0E0  09 DF C3 89 C0 11 3A C1
C0E8  CD 93 08 CD 80 09 CD 80
C0F0  09 21 56 C1 01 00 07 C5
C0F8  7E 23 E5 2B CD 2B C1 D5
C100  01 20 C6 D6 40 EB 77 23
C108  70 23 71 D1 DF CD A8 07
C110  E1 C1 CD 80 09 10 E0 11
C118  50 C1 DF CD 80 09 C3 5B
C120  08 CD 2B C1 13 13 13 DF
C128  C3 89 C0 B7 01 56 C1 ED
C130  42 29 01 5D C1 09 5E 23
C138  56 C9 16 11 11 11 44 45
C140  46 49 4E 45 20 55 53 45
C148  52 20 4B 45 59 53 3A 0D
C150  52 92 A1 9C BD 0D 9A 98
C158  83 96 82 8E 8D 6B C1 BC
C160  C1 0D C2 5E C2 AF C2 00
C168  C3 51 C3 00 00 00 00 00
```

```
**  Z80 ASSEMBLER SP-2102 PAGE 01  **

01 0000                 ;-------------------------------
02 0000                 ;USER DEFINED SINGLE KEY
03 0000                 ;  PROGRAMMING UTILITY
04 0000                 ;    FOR THE MZ-80A
05 0000                 ;-------------------------------
06 0000                 ;
07 0000                 ;** MONITOR SA1510 SUBROUTINES **
08 0000                 ;
09 0000  P              ?SAVE:  EQU   0263H          ;FLASHING DATA SAVE
10 0000  P              ?BELL:  EQU   02E5H          ;BELL
11 0000  P              ?LOAD:  EQU   05F5H          ;FLASHING DATA LOAD
12 0000  P              ?GETL:  EQU   07A8H          ;GET 1 LINE
13 0000  P              GETLC:  EQU   084EH          ;BREAK IN ROUTINE
14 0000  P              GETL3:  EQU   085BH          ;END GET 1 LINE
15 0000  P              ?MSG:   EQU   0893H          ;PRINT MESSAGE
16 0000  P              ?KEY:   EQU   08CAH          ;INPUT 1 KEY
17 0000  P              ?LTNL:  EQU   0980H          ;NEW LINE
18 0000  P              AUTCK:  EQU   09F1H          ;AUTO REPEAT CHECK
19 0000  P              ?FLAS:  EQU   09FFH          ;FLASHING DATA
20 0000  P              DLY12:  EQU   0DA7H          ;12 M SEC DELAY
21 0000  P              ?DSP:   EQU   0DB5H          ;DISPLAY ON POINTER
22 0000  P              ?DPCT:  EQU   0DDCH          ;DISPLAY CONTROL
23 0000  P              ?DINT:  EQU   0FDDH          ;FILL RAM
24 0000                 ;
25 0000                 ;** RAM LOCATIONS **
26 0000                 ;
27 0000  P              MSG1:   EQU   09FCH          ;MESSAGE 00
28 0000  P              KANAF:  EQU   1170H
29 0000  P              SFTLK:  EQU   118FH
30 0000  P              SPAGE:  EQU   1191H
31 0000  P              STRGF:  EQU   1193H
32 0000  P              SWRK:   EQU   119DH
33 0000  P              BASIC:  EQU   1339H          ;LINK TO BASIC
34 0000                 ;
35 0000                 ;
36 0000                 ;
37 0000                 ;** INITIALISATION **
38 0000                 ;
39 0000 211700          INIT:   LD    HL,START       ;REVECTOR BASIC
40 0003 223913                  LD    (BASIC),HL
41 0006 216B01                  LD    HL,BSTART      ;START OF STRING AREA
42 0009 3E0D                    LD    A,0DH
43 000B 0607                    LD    B,07H          ;NUMBER OF STRINGS
44 000D C5              LOOP0:  PUSH  BC
45 000E 0651                    LD    B,51H          ;LENGTH OF STRINGS
46 0010 CDDD0F                  CALL  ?DINT          ;FILL WITH 0D
47 0013 C1                      POP   BC
48 0014 10F7                    DJNZ  LOOP0
49 0016 C9                      RET                  ;RETURN TO BASIC
50 0017                 ;
```

```
**  Z80 ASSEMBLER SP-2102 PAGE 02  **

01 0017                 ;
02 0017                 ;** GET ONE LINE **
03 0017                 ;
04 0017 F5              START:  PUSH  AF            ;ENTRY FROM BASIC
05 0018 C5                      PUSH  BC
06 0019 E5                      PUSH  HL
07 001A D5                      PUSH  DE
08 001B CD6302          GETL0:  CALL  ?SAVE
09 001E CDCA08                  CALL  ?KEY          ;TAKE ONE CHARACTER
10 0021 FECB                    CP    CBH           ;INTO A REG
11 0023 28F9                    JR    Z,-5
12 0025 CDCA08          GETL1:  CALL  ?KEY
13 0028 CDFF09                  CALL  ?FLAS         ;WITH CURSOR FLASHING
14 002B 28F8                    JR    Z,-6          ;AGAIN IF NO KEY INPUT
15 002D F5                      PUSH  AF
16 002E AF                      XOR   A
17 002F 329311                  LD    (STRGF),A
18 0032 F1                      POP   AF
19 0033 47              AUTO3:  LD    B,A           ;SAVE KEY INPUT
20 0034 CDF505                  CALL  ?LOAD
21 0037 3A9D11                  LD    A,(SWRK)
22 003A B7                      OR    A
23 003B CCE502                  CALL  Z,?BELL
24 003E 78                      LD    A,B
25 003F FEE7                    CP    E7H           ;IF KEY = OO
26 0041 CADE00                  JP    Z,DSPLN1      ;DISPLAY MESSAGE1
27 0044 FE3E                    CP    3EH           ;IF CTRL+?
28 0046 CAE500                  JP    Z,DEFKEY      ;DEFINE KEY FUNCTION
29 0049 C5                      PUSH  BC            ;ALREADY PROGRAMMED?
30 004A 215601                  LD    HL,TABLE      ;START OF KEY TABLE
31 004D 010700                  LD    BC,0007H      ;SET REGS FOR LOOKUP
32 0050 EDB1                    CPIR                ;IS KEY IN TABLE?
33 0052 C1                      POP   BC
34 0053 2B                      DEC   HL            ;ADJUST FOR CPIR
35 0054 CA2101                  JP    Z,DSPKEY      ;DISPLAY FUNCTION
36 0057 FEE6                    CP    E6H
37 0059 286A                    JR    Z,CHGPK       ;CTRL+[ = PAGE MODE K
38 005B FEEE                    CP    EEH
39 005D 2863                    JR    Z,CHGPA       ;CTRL+] = PAGE MODE A
40 005F FEE5                    CP    E5H
41 0061 286F                    JR    Z,DMT         ;CTRL+Z
42 0063 FEE0                    CP    E0H
43 0065 286F                    JR    Z,LOCK        ;CTRL+A = SHIFTLOCK
44 0067 30BC                    JR    NC,GETL1
45 0069 E6F0                    AND   F0H
46 006B FEC0                    CP    C0H           ;IF INPUT PRINTABLE
47 006D 2016                    JR    NZ,GETL2      ;DISPLAY ON VDU
48 006F 78                      LD    A,B           ;RESTORE KEY INPUT
49 0070 FECD                    CP    CDH           ;IF CR KEY
50 0072 CA5B08                  JP    Z,GETL3       ;RETURN TO BASIC
```

```
**  Z80 ASSEMBLER SP-2102 PAGE 03  **

01 0075 FECB                    CP    CBH           ;IF BREAK KEY
02 0077 CA4E08                  JP    Z,GETLC       ;GOTO BREAK IN
03 007A FEC7                    CP    C7H           ;IF EDIT KEY
04 007C 303F                    JR    NC,GETL5      ;GOTO DISPLAY CONTROL
05 007E 3A7011                  LD    A,(KANAF)
06 0081 B7                      OR    A
07 0082 78                      LD    A,B
08 0083 2838                    JR    Z,GETL5
09 0085 78                GETL2: LD   A,B           ;RESTORE KEY INPUT
10 0086 CDB50D                  CALL  ?DSP          ;DISPLAY ON VDU
11 0089 CD6302            AUTO2: CALL ?SAVE
12 008C 3A9311                  LD    A,(STRGF)
13 008F B7                      OR    A
14 0090 2014                    JR    NZ,AUTO5
15 0092 1E14              AUTOL: LD   E,14H
16 0094 CDCA08                  CALL  ?KEY
17 0097 209A                    JR    NZ,AUTO3
18 0099 CDF109                  CALL  AUTCK         ;IF KEY HELD DOWN
19 009C 3887              GETL6: JR   C,GETL1       ;REPEAT INPUT/DIPLAY
20 009E 1D                      DEC   E
21 009F 20F3                    JR    NZ,AUTOL+2
22 00A1 3E01                    LD    A,01H
23 00A3 329311                  LD    (STRGF),A
24 00A6 CDA70D            AUTO5: CALL DLY12
25 00A9 CDA70D                  CALL  DLY12
26 00AC CDCA08                  CALL  ?KEY
27 00AF CDFF09                  CALL  ?FLAS
28 00B2 C22D00                  JP    NZ,AUTO3-6    ;INPUT NEWKEY
29 00B5 CDF109                  CALL  AUTCK
30 00B8 38E2                    JR    C,GETL6
31 00BA C33400                  JP    AUTO3+1
32 00BD CDDC0D            GETL5: CALL ?DPCT          ;UPDATE VDU CONTROL
33 00C0 18C7                    JR    AUTO2         ;INPUT NEXT KEY
34 00C2                   ;
35 00C2                   ;** CHANGE PAGE MODE **
36 00C2                   ;
37 00C2 AF                CHGPA: XOR  A             ;MODE A
38 00C3 1802                    JR    +4
39 00C5 3EFF              CHGPK: LD   A,FFH         ;MODE K
40 00C7 329111                  LD    (SPAGE),A
41 00CA 3EC6                    LD    A,C6H         ;CLEAR SCREEN
42 00CC CDDC0D                  CALL  ?DPCT
43 00CF C31B00            CHGP1: JP   GETL0         ;JUMP TO KEY INPUT
44 00D2                   ;
45 00D2                   ;** PRINT DMT **
46 00D2                   ;
47 00D2 065A              DMT:   LD   B,5AH         ;DISPLAY CODE
48 00D4 18AF                     JR   GETL2         ;SEND TO VDU
49 00D6                   ;
50 00D6                   ;
```

```
**  Z80 ASSEMBLER SP-2102 PAGE 04  **

01 00D6                 ;
02 00D6                 ;
03 00D6                 ;** SHIFT LOCK **
04 00D6                 ;
05 00D6 218F11          LOCK:   LD      HL,SFTLK
06 00D9 7E                      LD      A,(HL)
07 00DA 2F                      CPL                     ;SHIFT ON/OFF
08 00DB 77                      LD      (HL),A
09 00DC 18F1                    JR      CHGP1           ;BACK TO KEY INPUT
10 00DE                 ;
11 00DE                 ;** PRINT 00 **
12 00DE                 ;
13 00DE 11FC09          DSPLN1: LD      DE,MSG1         ;00 IN ASCII
14 00E1 DF                      RST     3H
15 00E2 C38900                  JP      AUTO2           ;INPUT NEXT KEY
16 00E5                 ;
17 00E5                 ;** DEFINE USER KEYS **
18 00E5                 ;
19 00E5 113A01          DEFKEY: LD      DE,MSG2         ;CLEAR SCREEN AND
20 00E8 CD9308                  CALL    ?MSG            ;PRINT TITLE
21 00EB CD8009                  CALL    ?LTNL
22 00EE CD8009                  CALL    ?LTNL
23 00F1 215601                  LD      HL,TABLE        ;START OF KEY DATA
24 00F4 010007                  LD      BC,0700H        ;SEVEN KEY BUFFERS
25 00F7 C5              LOOP1:  PUSH    BC
26 00F8 7E                      LD      A,(HL)          ;GET CHARACTER INTO A
27 00F9 23                      INC     HL              ;SAVE NEXT CHARACTER
28 00FA E5                      PUSH    HL              ;LOCATION
29 00FB 2B                      DEC     HL
30 00FC CD2B01                  CALL    POINT           ;GET STRING ADDRESS
31 00FF D5                      PUSH    DE              ;SAVE FOR LATER
32 0100 0120C6                  LD      BC,C620H        ;PROMPTS IN ASCII
33 0103 D640                    SUB     40H             ;MAKE KEY DATA ASCII
34 0105 EB                      EX      DE,HL
35 0106 77                      LD      (HL),A          ;LOAD KEY DATA
36 0107 23                      INC     HL
37 0108 70                      LD      (HL),B          ;LOAD PROMPT
38 0109 23                      INC     HL
39 010A 71                      LD      (HL),C          ;AND AGAIN
40 010B D1                      POP     DE              ;RESTORE STRING ADDRESS
41 010C DF                      RST     3H              ;PRINT CONTENTS
42 010D CDA807                  CALL    ?GETL           ;INPUT OR MODIFY DATA
43 0110 E1                      POP     HL              ;NEXT LOCATION
44 0111 C1                      POP     BC
45 0112 CD8009                  CALL    ?LTNL
46 0115 10E0                    DJNZ    LOOP1           ;NEXT KEY
47 0117 115001                  LD      DE,MSG3         ;PRINT READY
48 011A DF                      RST     3H
49 011B CD8009                  CALL    ?LTNL           ;LINE FEED
50 011E C35B08                  JP      GETL3           ;RETURN TO BASIC
```

```
**  Z80 ASSEMBLER SP-2102 PAGE 05  **

01 0121                 ;
02 0121                 ;
03 0121                 ;** PRINT USER DEFINED FUNCTION **
04 0121                 ;
05 0121 CD2B01          DSPKEY: CALL  POINT             ;GET STRING ADDRESS
06 0124 13                      INC   DE                ;SKIP PROMPTS
07 0125 13                      INC   DE
08 0126 13                      INC   DE
09 0127 DF                      RST   3H                ;PRINT FUNCTION
10 0128 C38900                  JP    AUTO2             ;INPUT NEXT KEY
11 012B                 ;
12 012B                 ;** GET STRING ADDRESS **
13 012B                 ;
14 012B B7              POINT:  OR    A                 ;PREPARE FOR SUBTRACT
15 012C 015601                  LD    BC,TABLE          ;START OF KEY DATA
16 012F ED42                    SBC   HL,BC             ;POSITION IN TABLE
17 0131 29                      ADD   HL,HL
18 0132 015D01                  LD    BC,BUFTB          ;BUFFER ADDRESS TABLE
19 0135 09                      ADD   HL,BC             ;COMPUTE OFFSET
20 0136 5E                      LD    E,(HL)
21 0137 23                      INC   HL
22 0138 56                      LD    D,(HL)
23 0139 C9                      RET                     ;STRING ADDRESS IN DE
24 013A                 ;
25 013A                 ;** MESSAGE DATA **
26 013A                 ;
27 013A 16111111        MSG2:   DEFM  "■■DEFINE USER KEYS:"
28 013E 44454649
29 0142 4E452055
30 0146 53455220
31 014A 4B455953
32 014E 3A
33 014F 0D                      DEFB  0DH
34 0150 5292A19C        MSG3:   DEFM  "Ready"
35 0154 BD
36 0155 0D                      DEFB  0DH
37 0156                 ;
38 0156                 ;** KEY TABLE **
39 0156                 ;
40 0156 9A              TABLE:  DEFB  9AH               ;SHIFT Z
41 0157 98                      DEFB  98H               ;SHIFT X
42 0158 83                      DEFB  83H               ;SHIFT C
43 0159 96                      DEFB  96H               ;SHIFT V
44 015A 82                      DEFB  82H               ;SHIFT B
45 015B 8E                      DEFB  8EH               ;SHIFT N
46 015C 8D                      DEFB  8DH               ;SHIFT M
47 015D                         SKP   5
```

```
**  Z80 ASSEMBLER SP-2102 PAGE 06  **


 03 015D                    ;
 04 015D                    ;** BUFFER ADDRESS TABLE **
 05 015D                    ;
 06 015D 6B01               BUFTB:  DEFW  BSTART
 07 015F BC01                       DEFW  BFPT1
 08 0161 0D02                       DEFW  BFPT2
 09 0163 5E02                       DEFW  BFPT3
 10 0165 AF02                       DEFW  BFPT4
 11 0167 0003                       DEFW  BFPT5
 12 0169 5103                       DEFW  BFPT6
 13 016B                    ;
 14 016B                    ;** USER STRING BUFFERS **
 15 016B                    ;
 16 016B                    BSTART: DEFS  51H
 17 01BC                    BFPT1:  DEFS  51H
 18 020D                    BFPT2:  DEFS  51H
 19 025E                    BFPT3:  DEFS  51H
 20 02AF                    BFPT4:  DEFS  51H
 21 0300                    BFPT5:  DEFS  51H
 22 0351                    BFPT6:  DEFS  51H
 23 03A2                    ;
 24 03A2                            END
```

```
**  Z80 ASSEMBLER SP-2102 PAGE 07  **

?BELL   02E5  ?DINT   0FDD  ?DPCT   0DDC  ?DSP    0DB5  ?FLAS   09FF
?GETL   07A8  ?KEY    08CA  ?LOAD   05F5  ?LTNL   0980  ?MSG    0893
?SAVE   0263  AUTCK   09F1  AUTO2   0089  AUTO3   0033  AUTO5   00A6
AUTOL   0092  BASIC   1339  BFPT1   01BC  BFPT2   020D  BFPT3   025E
BFPT4   02AF  BFPT5   0300  BFPT6   0351  BSTART  016B  BUFTB   015D
CHGP1   00CF  CHGPA   00C2  CHGPK   00C5  DEFKEY  00E5  DLY12   0DA7
DMT     00D2  DSPKEY  0121  DSPLN1  00DE  GETL0   001B  GETL1   0025
GETL2   00B5  GETL3   085B  GETL5   00BD  GETL6   009C  GETLC   084E
INIT    0000  KANAF   1170  LOCK    00D6  LOOP0   000D  LOOP1   00F7
MSG1    09FC  MSG2    013A  MSG3    0150  POINT   012B  SFTLK   118F
SPAGE   1191  START   0017  STRGF   1193  SWRK    119D  TABLE   0156
```

QUIZMASTER by IAN GUDE

Quizmaster User Guide

This program was written in 18.5k, in SA-5510 BASIC on the MZ-80A. It is a general knowledge quiz, consisting of one hundred questions. Each time the program is run, fifteen questions will be asked, along with four possible answers. A question will not be asked twice in the same game. A running score and percentage is kept, and a final grade is given at the end.

If you wish to alter the questions, they are in the form:

QUESTIONS.
1000 DATA Complete the foursome Matthew,Mark,Luke,_____

ANSWERS
2000 DATA Fred,John,Henry,Bill,2

The 2 on the end is the number of the correct answer in the data statement.

The game is saved under "QUIZMASTER" and is on both sides of the cassette.

```
2 GOTO10000
5 PRINT"■"
10 REM *QUIZMASTER MZ80A*
20 REM oI.Gude 19830
30 POKE11520,24
70 REM BREAK KEY OFF ON INPUT
75 REM Variable Setup
80 DIMQ$(100),A$(100,4),H(100),A(100)
90 CO=1
100 TEMPO5
110 REM Read Questions And Answers
120 FORV=1TO100
130 READQ$(V)
140 NEXTV
150 FORV=1TO100
160 FORT=1TO4:READA$(V,T):NEXTT
165 READA(V)
170 NEXTV
180 GOTO10110
190 REM Random Question
200 N=INT(100*RND(1))+1
210 IFCO=16THEN610
220 IFH(N)=1THEN200
230 H(N)=1
240 REM Print Question
245 CURSOR0,0:PRINT"■**************Quiz Master**************"
250 CURSOR0,1:PRINT"*QUESTION-";CO
260 CURSOR15,1:PRINT"*SCORE-";S
270 CURSOR25,1:PRINT"*PERCENT-";P;"%"
280 CURSOR0,2:PRINT"*************************************"
285 CURSOR0,4:PRINT"*Question:":PRINTTAB(39);"*":PRINT
290 CURSOR0,5:PRINTQ$(N)
```

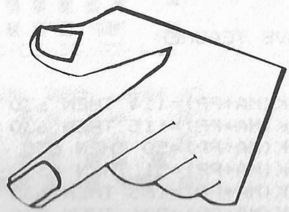
```
300 CURSOR0,10:PRINT"*1~";A$(N,1);TAB(38);"*"
310 CURSOR0,11:PRINT"*2~";A$(N,2);TAB(38);"*"
320 CURSOR0,12:PRINT"*3~";A$(N,3);TAB(38);"*"
330 CURSOR0,13:PRINT"*4~";A$(N,4);TAB(38);"*"
331 CURSOR0,15:PRINT"****************************************"
332 CURSOR0,23:PRINT"****************************************"
335 REM Input
340 CURSOR0,16:PRINT"Input your choice (1 to 4)."
350 CURSOR2,17:INPUT"→";CH
355 IF(CH=0)+(CH>4)THEN340
370 IFCH=A(N)THEN500
380 CURSOR0,20:PRINT"Your answer was WRONG!":MUSIC"-G-C"
390 CURSOR0,22:PRINT"Correct answer was ";A$(N,A(N))
395 P=(S/CO)*100:CO=CO+1
400 FORV=1TO3000:NEXTV
410 PRINT"■":GOTO190
490 REM Correct answer
500 S=S+1
510 CURSOR0,20:PRINT"Correct answer!":MUSIC"+C+G"
520 P=(S/CO)*100:CO=CO+1
530 FORV=1TO3000:NEXTV
540 PRINT"■":GOTO190
590 REM END
610 CURSOR5,5:PRINT"Your final mark was ";P;"%"
615 GOSUB700
620 CURSOR5,10:PRINT"Would you like to go again ?"
630 CURSOR5,12:PRINT"PRESS Y OR N"
640 GETZ$:IFZ$=""THEN640
650 IFZ$="Y"THENPRINT"■":GOTO3000
660 IFZ$="N"THENPRINT"■":NEW
670 GOTO640
700 REM Give score a grade
710 IFP<20 PRINT"Try again!!!"
720 IF(P>19)*(P<40) PRINT"It could be better!!"
730 IF(P>39)*(P<60) PRINT"What an average score! Try again!!"
740 IF(P>59)*(P<80) PRINT"Very Good!!"
750 IF(P>79)*(P<100) PRINT"Aren't we clever!!"
760 IFP=100 PRINT"You are too good for this program!!!"
770 RETURN
1000 DATAComplete this Matthew Mark Luke ___
1001 DATAWhich planet is associated with War ?
1002 DATAHow many books are there in a Trilogy ?
1003 DATAComplete this name-Wolfgang Amadeus _____
1004 DATAIf it is midnight in New York what time is it in Greenwich ?
1005 DATAWhich Spanish painter is the Father Of  Modern Art ?
1006 DATAWhat is the name for a river of ice ?
1007 DATAWhat was the name for the U.S.A/Russian Space project of 1975 ?
1008 DATAWhich bank is on Threadneedle Street ?
1009 DATAWhat does M stand for in M1 M6 and M18 ?
1010 DATAWhere are the Yorkshire Wolds ?
1011 DATAWho composed an exiting set of Hungarian Rhapsodies ?
1012 DATAWhat was Elgars nationality ?
1013 DATAWhat are the stars that fly across the  sky called ?
1014 DATAWhich is the planet farthest from the   Sun ?
1015 DATAWhich composer wrote the Planet suite ?
1016 DATAWhat is the modern name for the Roman   town Mamucium ?
1017 DATAWhich city is the centre of the Cutlery trade ?
1018 DATAHow many airlines cross the Atlantic    every day ?
1019 DATAWhat is an Erg ?
```

```
1020 DATAWhat occurs when Iron and Oxygen combine
1021 DATAWhat part of the light bulb lights up ?
1022 DATAWhat is Cu the chemical symbol of ?
1023 DATAHow many mm in 5M ?
1024 DATAHow much longer is the circumference    of a circle than the radius ?
1025 DATAWhat is the area of a carpet 4M by 3M ?
1026 DATA3x-12=48.What is the value of x ?
1027 DATAWhich country has women who make carpets
1028 DATAWho built the Pyramids ?
1029 DATAWhen was Ceasars first invasion ?
1030 DATAWho accepted the Magna Carta ?
1031 DATAWhen was Britains first general strike ?
1032 DATAWhen was the attack on Pearl Harbor ?
1033 DATAWhich President was assassinated in 1963
1034 DATAWho lives at 11 Downing Street ?
1035 DATAHow many cigarettes are smoked per head  of the population each day ?
1036 DATAWhat % of homes have a car ?
1037 DATAHow often do people buy records ?
1038 DATAWhich is the most popular place for      Britons to go to ?
1039 DATAWhat % of homes own a T.V ?
1040 DATAWhat % of homes own a Video ?
1041 DATAWhat does the average Briton spend most  of his money on ?
1042 DATAHow many people are there in the British Household ?
1043 DATAWhen was Everest first climbed ?
1044 DATAWhich Princess is the Granddaughter to  King George VI ?
1045 DATAWhat is French for a Pen name ?
1046 DATAWho won the European Cup 5 year together
1047 DATAHow many games does a 1st division club  play in a season ?
1048 DATAWhich club plays at Hampden Park ?
1049 DATAHow many Meters is the penalty spot from the goal ?
1050 DATAWhat is Caerphilly ?
1051 DATAWhich British PM was once a Bricklayer ?
1052 DATAWho resigned as President of the USA ?
1053 DATAWhich Tolstoy novel has been serialised  by BBC 2 ?
1054 DATAWhich concert hall was named after the   Queens consort ?
1055 DATAWhich London Orchestra conductor was    once a Jazz pianist ?
1056 DATAWhere is the tomb of the unknown soldier
1057 DATAWho created Donald Duck ?
1058 DATAWho said 'Dr Livingstone I presume ' ?
1059 DATAWho composed The Water Music ?
1060 DATAWho Wrote the music to West Side Story ?
1061 DATAWho composed the Enigma Variations ?
1062 DATAWhat does cresc. mean in Music ?
1063 DATAWhich English King won at Agincourt ?
1064 DATAWho wrote Alexanders Ragtime Band ?
1065 DATAWhat game is called Checkers in the USA
1066 DATAWhat did Prof. Rontgen discover in 1895
1067 DATAWhat is the symbol for Sulphuric Acid ?
1068 DATAWho invented the Gramaphone ?
1069 DATAHow long is a Watch at sea ?
1070 DATAWhich artist invented the Girls of       St.Trinian ?
1071 DATAWho painted the Mona Lisa ?
1072 DATAWho designed the LIons in Trafalger Sqr?
1073 DATAWho invented the Spinning Jenny ?
1074 DATAWhat does LTD mean ?
1075 DATAWhere was the first Co-op ?
1076 DATAWhat is the name of New Yorks Large Park
1077 DATAHow long does it take Saturn to go round the Sun?
1078 DATAWhat is the name of the Galaxy that we  live in ?
1079 DATAIn which sport do you have a Clear round
```

```
1080 DATAWhat game is played on a Crown Green ?
1081 DATAUnder whose leadership did the USA      abolish slavery ?
1082 DATAWhat is the name for the Boeing 747 ?
1083 DATAHow many degrees are there in three     triangles ?
1084 DATATo which city do Moslems turn ?
1085 DATAIn which play is there a famous balcony scene ?
1086 DATAWhat musical instrument is associated   with Ireland ?
1087 DATAHow many crotchets are in two semibreves
1088 DATAWho wrote The Great Gatsby ?
1089 DATAIn which game would you here PUCK ?
1090 DATAHow many people take part in the Boat   Race ?
1091 DATAWhen was the school leaving age risen to Fifteen ?
1092 DATAHow many degrees are there in 2.25 turns
1093 DATA3x+12=x+26.What does x=?
1094 DATAWhat is the cube root of 216 ?
1095 DATAWhat % of USA homes have 2+ cars ?
1096 DATA30 Fathoms = ???? Meters How many ?
1097 DATAWhere did the Usa beat England at Soccer
1098 DATAWhat lawn tennis championship is held in The Usa ?
1099 DATAWhere is Ekofisk ?
2000 DATAFred,Jim,Genesis,John,4
2001 DATAJupiter,Mars,Saturn,Venus,2
2002 DATA2,3,4,5,2
2003 DATABeethoven,Bach,Mozart,Grieg,3
2004 DATA5am,9am,12pm,1pm,1
2005 DATAVerdi,Picasso,Van Gogh,Herd,2
2006 DATABlock,Jase,Dam,Glacier,4
2007 DATAMoon5,Apollo-Soyuz,Gose III,Pointer 1487,2
2008 DATABank of England,Westminster,Midland,Abbey National,1
2009 DATAMiles,Mean,Motorway,Madway,3
2010 DATAYorkshire,Lancashire,Midlands,Devon,1
2011 DATAMozart,Listz,Grieg,Webber,2
2012 DATABritish,German,Greek,Welsh,1
2013 DATAPlanets,Commets,The Milky Way,Jupites,2
2014 DATAEarth,Venus,Mars,Pluto,4
2015 DATAHolst,Beethoven,Grieg,Bach,1
2016 DATAMendip,Manchester,Monglunter,Handilop,2
2017 DATASheffield,Wolverhampton,Leeds,London,1
2018 DATA600,700,800,900,2
2019 DATABullet,Plant,Unit of Energy,Creature,3
2020 DATABangs,Turns green,Turns yellow,Rusts,4
2021 DATAElement,Filament,Gelement,Segament,2
2022 DATALead,Copper,Magnese,Magnesium,2
2023 DATA5000,500,50,5,1
2024 DATA6 2/7,4 3/4,3,8,1
2025 DATA52M,12.5M,12M,7M,3
2026 DATA12,47,20,32,3
2027 DATAIndia,Poland,England,Persia,4
2028 DATAEgyptians,Greeks,Nomads,Jews,1
2029 DATA54BC,55BC,56BC,58BC,2
2030 DATAJohn,Henry,Jim,Albert,1,1927,1935,1947,1926,4
2031 DATA1939,1940,1941,1942,3
2032 DATACarter,Reagan,Donevan,Kennedy,4
2033 DATAPrime Minister,Chancelor,Cleaner to No.10,Nobody,2
2034 DATA21,45,68,66,4
2035 DATA47,78,41,75,4
2036 DATAEvery week,Every 2 Weeks,Every Month,Every Year,2
2037 DATAFrance,Austria,Usa,Spain,4,65,74,84,94,4
2038 DATA10%,20%,33.3333%,50%,2
2039 DATAFood,Car,Videos,Family Clothes,1
2040 DATA2,3.5,5,4,2
```

```
2041 DATA1952,1949,1874,1953,4
2042 DATAMargaret,Anne,Lucy,Julie,2
2043 DATANom de plume,Gorte,Pen-Pale,RSVP,1
2044 DATAEngland,Wales,Scotland,Madrid,4
2045 DATA14,22,56,42,4
2046 DATARotherham,QPR,Everton,Liverpool,2
2047 DATA10M,12M,54M,11M,4
2048 DATABread,Chocolate,Cheese,Milk,3
2049 DATAThatcher,Churchill,Foster,Madli,2
2050 DATAReagan,Nixon,Carter,Lokis,2
2051 DATAWar & Peace,Loser,Lord of the Rings,Juolio,1,Albert,Fred,Jim
2052 DATAJoe,1,Clark,Holst,Previn,Hul,3
2053 DATASt Pauls,Hyde Park,Westminster Abbey,Selfriges,3
2054 DATAHanna & Barbera,N.M.Ertis,J.Curtis,W.Disney,4
2055 DATAReagan,Stanley,Fred,Burt M Killi,2
2056 DATABeethoven,Bach,Handel,Jacobs,3
2057 DATABerstien,Josephs,Mancini,Rodgers,1
2058 DATABeethoven,Stravinsky,Elgar,Bach,3
2059 DATAGet quiter,Turn page,Louder,End,3
2060 DATAHenryVI,HenryV,HenryIV,GeorgeVI,2
2061 DATAMancini,Berlin,McCartney,Lennon,2
2062 DATADraughts,Chess,Rumy,Monopoly,1
2063 DATARadium,Radiation,Ber,Magnesium,4
2064 DATAH3SO4,H2SO4,DES,SUAC,2
2065 DATAMadison,Edder,Eddison,Mathews,3
2066 DATA4hrs,5hrs,6hrs,3hrs,1
2067 DATAJohnson,Christer,Maser,Searle,4
2068 DATALe Bon,Da Vinci,Van Gough,Holst,2
2069 DATAMullins,Litterly,Liers,Landseer,4
2070 DATADavy,Mullins,Hargreaves,Pitley,3
2071 DATALitter,Limited,Lomley,No Entry,2
2072 DATARochdale,London,Rotherham,Sheffield,1
2073 DATACentre,Lomolrey,Central,Clifton,3
2074 DATA5yrs,7yrs,50yrs,30yrs,4
2075 DATAMilky Way,Mars,Jupiter,Hemisphere,1
2076 DATAGolf,Show Jumping,Darts,Rugby,2
2077 DATAGolf,Darts,Balls,Bowls,4
2078 DATACarter,Reagan,Lincon,Kennedy,3
2079 DATALion,Concord,Jumbo,737,3
2080 DATA540,535,80,149,1
2081 DATAMexborough,Mecca,London,Rio,2
2082 DATACleo,Gerti,Tertes,Romeo and Juliet,4
2083 DATAHarp,Trombone,Trumpet,Guitar,1
2084 DATA4,8,6,2,2
2085 DATATolkien,Happs,Fitzgerald,Morgan,3
2086 DATAChess,Ice Hockey,Bowls,Rugby,2
2087 DATA16,18,20,22,2
2088 DATA1945,1946,1948,1949,4
2089 DATA810,800,850,880,1
2090 DATA3,1,,5,7,4
2091 DATA2,6,4,8,2
2092 DATA10,30,50,80,2
2093 DATA54,55,54.6,58,3
2094 DATAUSA,England,France,Brazil,4
2095 DATAForest Hills,Hillside,Jokle,Wimley,1
2096 DATAFrance,North Sea,Egypt,USA,2
3000 CO=0:S=0:P=0:Z=0
3010 FORQ=1TO100:H(Q)=0:NEXTQ:GOTO190
10000 PRINT"■";TAB(10);"QUIZMASTER"
10010 PRINTTAB(10);"♣♣♣♣♣♣♣♣♣♣"
```

```
10020 PRINT:PRINT" Welcome to Quizmaster.This is a multi-"
10030 PRINT:PRINT"choice quiz.For each question there will"
10040 PRINT"be four answers given.Out of these you"
10050 PRINT:PRINT"have to choose which you think is the"
10060 PRINT:PRINT"correct one.There are 100 questions"
10070 PRINT:PRINT"in all,and you will be asked them 15"
10080 PRINT:PRINT"at a time."
10090 CURSOR8,20:PRINT"Please wait.."
10100 USR(62):GOTO75
10110 USR(62):CURSOR8,20:PRINT"Please press a key."
10120 GETC$:IFC$=""THEN10120
10130 GOTO190
```



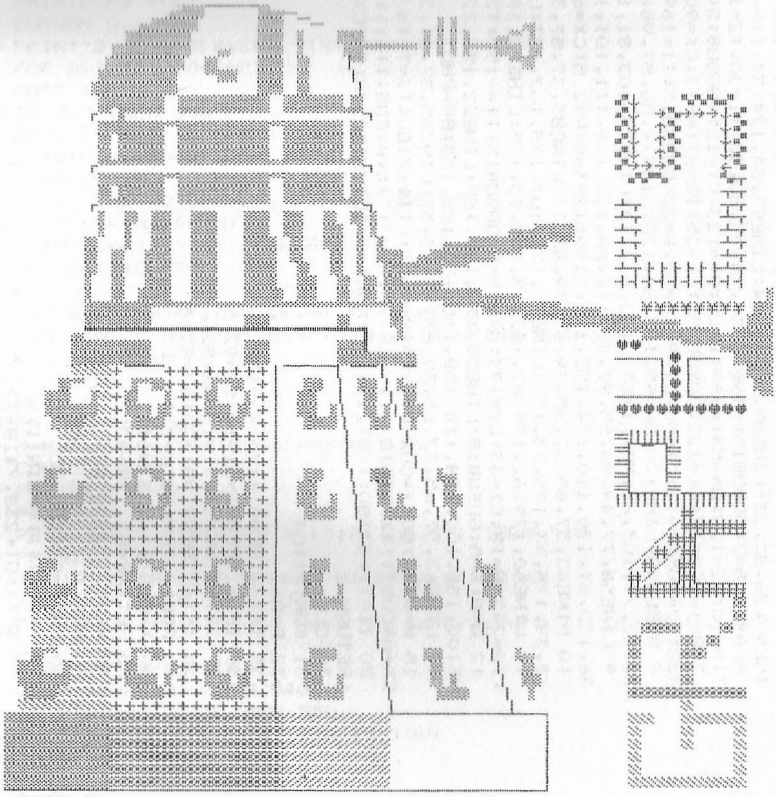
```
10 REM ▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒
20 REM ▒                   ▒
30 REM ▒      CHEAT        ▒
40 REM ▒                   ▒
50 REM ▒    BY S.JONES     ▒
60 REM ▒                   ▒
70 REM ▒   DECEMBER 83     ▒
80 REM ▒                   ▒
85 REM ▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒
86 REM
90 GOTO 2500
100 PRINT"▣"
110 DIM A(20):SC=0:TI$="000000"
115 N=0:P=0:A=0
116 REM
117 REM CREATE WALL
118 REM
120 FOR P=53248 TO 53287:POKE P,$A6:NEXT
130 FOR P=53287 TO 54247 STEP40:POKE P,$A6:NEXT
140 FOR P=54247 TO 54207 STEP-1:POKE P,$A6:NEXT
150 FOR P=54208 TO 53248 STEP-40:POKE P,$A6:NEXT
160 FOR P=54049 TO 54087:POKE P,$A6:NEXT
165 CURSOR 2,22
170 PRINT "SCORE";SC;TAB(20);"TIME ";MID$(TI$,3,2);":";RIGHT$(TI$,2)
175 REM
176 REM CREATE DESKS
177 REM
180 A$="▛▀▀███◄◄◄◄___█▜"
190 PRINT"███"
195 FOR L=1 TO 4:P=1
200 PRINT TAB(4);A$;SPACE$(4);A$;SPACE$(4);A$;SPACE$(4);A$;SPACE$(4);A$;"███"
210 NEXT:TEMPO7
215 REM
216 REM CREATE PUPILS
217 REM
220 FOR A=53333 TO 53361 STEP 7:POKE A,207:N=N+1:A(N)=A:NEXT
230 FOR A=53493 TO 53493+28 STEP 7:POKE A,207:N=N+1:A(N)=A:NEXT
240 FOR A=53653 TO 53653+28 STEP 7:POKE A,207:N=N+1:A(N)=A:NEXT
250 FOR A=53813 TO 53813+28 STEP 7:POKE A,207:N=N+1:A(N)=A:NEXT
260 MA=53983:POKE MA,202
270 FOR P=1 TO 5:TEMPO 6:USR(62):NEXT
280 REM
290 REM CHECK FOR KEY
300 REM
310 GET T$
```

```
315 CURSOR 20,22:PRINT"TIME ";MID$(TI$,3,2);":";RIGHT$(TI$,2)
316 IF MID$(TI$,3,2)="05" THEN 1500
320 IF T$="8" THEN PO=202:PP=-40:POKE MA,PO:GOTO 530
330 IF T$="2" THEN PO=205:PP=40:POKE MA,PO:GOTO 530
340 IF T$="6" THEN PO=204:PP=1:POKE MA,PO:GOTO 530
350 IF T$="4" THEN PO=203:PP=-1:POKE MA,PO:GOTO 530
360 P=P+1:IF P=20 THEN P=0
370 RA=INT(RND(1)*8+1)
375 CP=PEEK(A(P))
380 IF CP=207 THEN IF RA=1 THEN POKE A(P),206
390 IF CP=206 THEN IF RA=2 THEN POKE A(P),207
410 GOTO 310
500 REM
510 REM MOVE TEACHER
520 REM
530 REM
545 IF PEEK(MA+PP)=114 THEN 630
546 IF PEEK(MA+PP)=115 THEN 630
547 IF PEEK(MA+PP)=50 THEN 630
548 IF PEEK(MA+PP)=51 THEN 630
549 IF PEEK(MA+PP)=166 THEN 635
550 IF PEEK(MA+PP)=206 THEN 930
555 IF PEEK(MA+PP)=207 THEN 1000
556 IF PEEK(MA+PP)=60 THEN 630
560 IFPEEK(MA+PP)=0 THEN MA=MA+PP:POKE MA,PO:POKE MA-PP,0
565 POKE 4514,13:USR(68):USR(71)
570 GOTO 360
600 REM
610 REM HIT A DESK OR WALL
620 REM
630 S$="HIT A DESK!!!!!":GOTO 636
635 S$="HIT A WALL!!!!!"
636 PRINT"■"
640 PRINT"
660 PRINT"
670 PRINT"
680 PRINT"
700 PRINT"
710 PRINT"■■"
720 PRINT"          ";S$
730 PRINT"■■"
740 PRINT"
750 PRINT"
760 PRINT"
770 PRINT"
780 PRINT"                    POINTS
790 PRINT"
800 PRINT"
810 PRINT"
815 IF O=1 THEN O=0:RETURN
820 FOR O=1 TO 100
830 FI=INT(RND(1)*255+1)
840 POKE 4514,FI:USR(68)
850 NEXT:POKE 4514,100:FOR L=1 TO 600:USR(68):NEXT:USR(71)
860 SC=SC-100:P=0:N=0:PRINT"■":GOTO 120
900 REM
910 REM INCREASE SCORE AND CATCH CHEAT
920 REM
930 SC=SC+10
940 POKE MA+PP,207
```

```
950 CURSOR 2,22:PRINT"SCORE ****"
955 FOR L=1 TO 100:NEXT
960 TEMPO7:MUSIC"A1B1"
970 CURSOR 2,22:PRINT"SCORE";SC;"    "
980 GOTO 360
1000 REM
1010 REM WRONG!!!
1020 REM
1030 PRINT"■
1040 PRINT"   ▒▒ ▒ ▒▒ ▲ ▒▒ ▒ ▒▒ ▲  ▲"
1060 PRINT"   ▒  ▒ ▒ ▒  ▒ ▒ ▒ ▒ ▒  ▒"
1070 PRINT"   ▒  ▒▒ ▒▒ ▒▒ ▒ ▒ ▒ ▒  ▒"
1080 PRINT"   ▌  ▌▌ ▌  ▌▌ ▌ ▌ ▌ ▌  ▌"
1100 PRINT"   ▬  ▌ ▌▬ ▌▌ ▌ ▌ ▌ ▼  ▌
1120 TEMPO 6:MUSIC"-D2-E2-E3-D2-D3-C3-D3-G3-#D3
1130 PRINT"▒"
1140 PRINT"▒▲ ▲  ▒ ▒▒▲ ▲▒▲ ▲▒ ▒"
1150 PRINT"▒ ▒ ▒▒ ▒ ▒ ▒▒ ▒ ▒ ▒ ▒ ▒"
1160 PRINT"▒ ▒ ▒▒ ▒ ▒ ▒▒ ▒ ▒ ▒ ▒ ▒"
1170 PRINT"▌ ▌ ▌▌  ▌ ▌▌ ▌ ▌ ▌ ▌ ▌"
1180 PRINT"▌ ▌ ▼▼  ▌ ▌▼ ▌ ▌ ▌ ▼ ▌"
1190 O=1:GOSUB 730
1200 FOR L=1 TO 3000:NEXT:SC=SC-100:P=0:N=0:A=0:PRINT"■":GOTO120
1500 TEMPO4
1510 MUSIC"^A2^D2^F3^A3^F3^G3^D3^A2^D9
1520 PRINT"■"
1530 PRINT"          ▒ ▲ ▲"
1540 PRINT"          ▒ ▒ ▒ ▒"
1550 PRINT"          ▒ ▒ ▒ ▒"
1560 PRINT"          ▌ ▌ ▌ ▌"
1570 PRINT"          ▬ ▌ ▌ ▼"
1580 PRINT"▒"
1590 PRINT"            ▲ ▒"
1600 PRINT"            ▒ ▒ ▒"
1610 PRINT"            ▒ ▒ ▒"
1620 PRINT"            ▌ ▌ ▌"
1630 PRINT"            ▼ ▌ ▌"
1640 PRINT"▒"
1650 PRINT"
1660 PRINT"      ▒ ▒▒ ▒▒ ▲ ▲"
1670 PRINT"      ▒ ▒ ▒ ▒ ▒ ▒ ▒"
1690 PRINT"      ▒ ▒▒ ▒▒ ▒ ▒ ▒"
1700 PRINT"      ▌ ▌ ▌ ▌ ▌ ▌ ▌"
1720 PRINT"      ▬ ▬ ▬ ▬ ▼ ▌ ▌"
1730 TEMPO4
1740 MUSIC"^A2^D2^F3^A3^F3^G3^D3^A2^D9
1750 FOR P=1 TO 1000:NEXT
1760 PRINT"■"
1770 IF SC<0 THEN R$="LOLLY POP LADY"
1771 IF SC>10 THEN R$="CARE-TAKER"
1772 IF SC>100 THEN R$="JUNIOR TEACHER"
1773 IF SC>400 THEN R$="SENIOR TEACHER"
1774 IF SC>800 THEN R$="DEPUTY HEAD"
1775 IF SC>=900  THEN R$="HEAD MASTER"
1776 PRINT"YOU ARE PROMOTED TO ";R$
1780 IF SC>HS THEN HS=SC
1790 PRINT"▒▒"
```

```
1800 PRINT"
1810 PRINT"
1820 PRINT"
1830 PRINT"
1840 PRINT"
1850 PRINT"
1860 PRINT"
1870 PRINT"
1880 PRINT"
1890 PRINT"
1900 PRINT"
2000 S$="■■■TRY AGAIN Y or N"
2010 FOR L=1 TO LEN(S$)
2020 FOR O=1 TO 30:NEXT
2030 CURSOR 9,17:PRINT LEFT$(S$,L);
2040 NEXT
2050 USR($09B3)
2060 GET T$
2080 IF T$="Y" THEN GOTO 2640
2090 IF T$="N" THEN PRINT"■■■■■■■■■■■■■";"NO!":GOTO 2110
2100 GOTO 2050
2110 PRINT"■■■■■■■■■■■"
2120 PRINT"
2130 END
2500 PRINT"■"
2510 PRINT"
2520 PRINT"
2530 PRINT"
2540 PRINT"
2550 PRINT"
2560 PRINT"
2570 PRINT"
2580 PRINT"
2590 PRINT"
2600 PRINT"■■■■■          WRITTEN AND DESIGNED BY"
2610 PRINT"■■               SIMON JONES."
2620 PRINT"■■■        PRESS ANY KEY WHEN READY."
2630 GET T$:IF T$="" THEN 2630
2640 PRINT"■■■■■"
2650 PRINT"                    CHEAT"
2660 PRINT"                    ─────"
2670 PRINT"■"
2680 PRINT"             1. Full instuctions."
2690 PRINT"■■            2. Key usage only."
2700 PRINT"■■            3. Start game."
2705 PRINT"■■            4. End"
2710 PRINT"■■■            SELCECT OPTION 1-4"
2720 GET T:ON T GOTO 3000,3170,100,2740
2730 GOTO 2720
2740 END
2750 GOTO 2740
3000 REM
3010 REM INSTRUCTIONS
3020 REM
3030 PRINT"■"
```

```
3040 PRINT"                CHEAT"
3050 PRINT"                ─────■"
3060 PRINT"You are a new teacher at a school and"
3070 PRINT"■in order to gain promotion you must"
3080 PRINT"■try and find all the cheats in the "
3090 PRINT"■classroom. When a pupil is cheating"
3100 PRINT"■its face will turn white with guilt"
3110 PRINT"■and it is your job to spot it before"
3120 PRINT"■he or she will notice you."
3130 PRINT"■At the end you will be promoted to"
3140 PRINT"■whatever the school governer sees fit."
3150 PRINT"■■          PRESS ANY KEY WHEN READY."
3160 GET A$:IF A$="" THEN 3160
3170 PRINT"■■■"
3180 PRINT"The keys to remember are:-■■■"
3190 PRINT"          ┌──┐   ┌──┐   ┌──┐   ┌──┐"
3200 PRINT"          | 8 |   | 2 |   | 4 |   | 6 |"
3210 PRINT"          └──┘   └──┘   └──┘   └──┘"
3220 PRINT"          ■UP     DOWN  LEFT  RIGHT"
3230 PRINT"■■■YOU HAVE FIVE MINUTES. GOOD LUCK.■■■"
3240 PRINT"          PRESS ANY KEY TO BEGIN"
3250 GET T$:IF T$="" THEN 3250
3260 CLR:GOTO 100
```



TWO FUN BUT CLEVER PROGRAMS FROM R. BIRNBAUM

Take time out to key this program;
Enter **YOUR OWN SLOGAN** in Lines 100 and 110;
Hey Presto - A caricature of 'the Boss' thinking YOUR WORDS!!!!

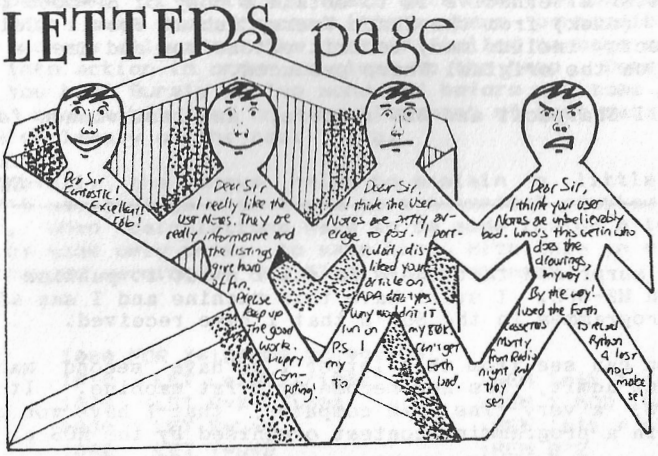
```
 1 REM      DON COSME
 2 CONSOLEC40
 3 GRAPHI1,C,01
 4 PRINTCHR$(6):T1=0:T2=360:W=23:CX=65:CY=56:A=24:B=13:GOSUB15:T1=-165:T2=155:CX
=95:CY=51:A=46:B=35:W=16:GOSUB15:T1=0:T2=360:W=0:CX=63:CY=37:A="":B=4:GOSUB15
 5 T1=0:T2=360:W=0:CX=67:CY=37:A=7:B=4:GOSUB15:LINE60,24,70,34:LINE64,22,70,34:L
INE90,26,82,33:LINE88,20,80,34:LINE93,34,124,34:T1=-80:T2=90:W=0:CX=124:CY=41
 6 A=10:B=7:GOSUB15:LINE71,34,74,33,80,35:T1=30:T2=140:R=16:CX=82:CY=90:GOSUB20:
T1=-10:T2=128:W=-54:A=57:B=29:CX=123:CY=121:GOSUB15:T1=15:T2=190:W=60:A=52
 7 B=16:CX=37:CY=122:GOSUB15:T1=-25:T2=67:W=-3:CX=90:CY=106:A=75:B=35:GOSUB15:T1
=68:T2=205:W=12:CX=50:CY=97:A=33:B=22:GOSUB15:T1=169:T2=210:R=78:CX=135:CY=93
 8 GOSUB20:LINE120,80,95,103,66,128:LINE79,86,57,98:LINE82,86,92,106:LINE68,93,7
2,102,79,103,86,95:LINE72,102,61,114:LINE79,103,81,115:LINE66,132,62,154,64,170
 9 LINE58,77,44,94,55,97,42,112,66,132,116,111,101,101,123,98,121,80:LINE14,168,
36,172,61,170,110,174,152,170:T1=0:T2=360:R=2.5:CX=68:CY=153:GOSUB20
 10 LINE63,37,65,37,65,39,63,39,63,37:LINE85,37,87,37,87,39,85,39,85,37:LINE39,1
72,39,175,73,175,73,171:LINE73,175,107,175,107,173:LINE31,184,61,178
 11 LINE60,179,62,179,62,182,73,182,73,175:LINE73,182,85,182,85,179,87,179:T1=39
:T2=242:W=18:CX=33:CY=179:A=8:B=5:GOSUB15:T1=-150:T2=120:W=18:CX=114:CY=179
 12 A=8:B=5:GOSUB15:LINE88,178,110,185:LINE72,155,72,158,40,158,40,155,22,155:LI
NE100,155,100,158,118,158,118,155,100,155:GRAPH01
 13 LINE63,37,65,37,65,39,63,39,63,37:LINE85,37,87,37,87,39,85,39,85,37:GOTO30
 15 W=W*π/180:X=COS(W):Y=SIN(W):T1=T1*π/180:T2=T2*π/180:FORT=T1TOT2STEP1.1/A:SET
(X+A*COS(T)*X-B*SIN(T)*Y,CY-(B*SIN(T)*X+A*COS(T)*Y)):NEXTT:RETURN
 20 T1=T1*π/180:T2=T2*π/180:FORT=T1TOT2STEP1/R:SETCX+R*COS(T),CY-(R*SIN(T))):NEXT
:RETURN
 30 CLR
 31 FORT=1TO4
 32 R=R+2
 35 IFT=1THENS1=125:S2=15
 36 IFT=2THENS1=S1+10:S2=S2-5
 37 IFT=3THENS1=S1+18:S2=S2
 38 IFT=4THENS1=S1+20:S2=S2+5
 40 FORI=0TO360STEP2
 50 X=COS(I):Y=SIN(I)
 60 SETX*R+S1,Y*R+S2
 70 NEXT
 80 NEXTT
 85 FORI=0TO360
 90 X=COS(I):Y=SIN(I)
 95 SETX*81+238,Y*18+37
 97 NEXT
 100 CURSOR24,3:PRINT"Ralph is the"
 110 CURSOR24,4:PRINT" greatest"
```

```
2 REM  ****** BUSINESS GAME ******
5 CONSOLE C40:GRAPH C
10 REM BUSINESS GAME
40 CONSOLEC40
50 ON ERROR GOTO 5000
110 FOR A=1 TO 5 :PRINT:NEXT
120 PRINT TAB(12);"BUSINESS GAME"
125 PRINT TAB(172);"***CAPRICORN*** "
130 CURSOR 0,3
140 PRINTSTRING$("-",39)
150 CURSOR 0,13
155 TEMPO7
160 PRINTSTRING$("-",39):MUSIC"CDEFGAB"
170 FOR A=1 TO 3200
180 NEXT
182 PRINT"DO YOU WANT INSTRUCTIONS (Y/N)?"
183 GET IN$:IF IN$=""GOTO183
184 IF IN$="N" GOTO 190
185 IF IN$<>"Y"GOTO 183
186 GOTO 5000
190 IN$="":CONSOLEC40
220 FOR A=1 TO 5:PRINT:NEXT
230 PRINT TAB(1);"HOW MANY PLAYERS (2-6)";TAB(30);:INPUT N
240 IF 1<N THEN 275
250 PRINTCHR$($06)
260 CURSOR 0,6
265 PRINT"2 TO 6 PLAYERS !TRY AGAIN"
266 FOR A=1 TO 3200:NEXT
267 GOTO 190
275 IF N<7 THEN 280
276 GOTO 250
280 PRINTCHR$($06)
310 U=750000/N
320 PRINT TAB(92);"EVERY PLAYER HAS :"
330 PRINT:PRINT:PRINT
340 PRINT TAB(12);U;"DOLLARS"
350 FOR A=1 TO 3200
360 NEXT
370 DIM A1(N),B(N),C(N),W(N),A2(N),YO(N),J(N)
372 DIM D(N),E(N),F(N),G(N),H(N),X(N),P(N),SL(N),SH(N)
375 FOR A=1 TO N
380 A1(A)=U
382 NEXT A
390 PRINTCHR$($06)
400 M=M+1:FORA=1TON:SL(A)=A1(A):NEXT
405 CONSOLE C40
410 FOR A=1 TO N
420 PRINT
430 PRINTTAB(5);"PLAYER # :";A;TAB(5);"TERM ";M
450 PRINT
460 INPUT"PURCHASING OF RAW MATERIALS:";B(A)
462 IF B(A)=>5000 THEN 470
464 PRINT"impossible you have to manufacture at least 100 articles"
466 GOTO 460
470 W(A)=INT(B(A)/50)
480 IF B(A)>A1(A) THEN 540
490 IF B(A)>A1(A)/2 THEN 550
500 A2(A)=A1(A)-B(A)-INT(B(A)*5/100)
510 IF A2(A)<0 THEN 540
520 A1(A)=A2(A)
530 GOTO 560
```

```
540 GOSUB 2100 :GOTO 460
550 GOSUB 2200 :GOTO 460
560 INPUT "MANUFACTURING BUDGET:";C(A)
562 IF C(A)/W(A)<10 THEN 564
563 GOTO 570
564 PRINT"not enough , try again "
566 GOTO 560
570 IF C(A)>A1(A) THEN 640
580 IF C(A)>A1(A)/1.5 THEN 650
590 A2(A)=A1(A)-C(A)-W(A)*20-X(A)*5-INT(W(A)*0.95*5)
600 IF A2(A)<0 THEN 640
610 A1(A)=A2(A)
620 Z0=Z0+C(A)
630 GOTO 660
640 GOSUB 2100:GOTO 560
650 GOSUB 2200:GOTO 560
660 INPUT "SALES FORCE :";D(A)
670 IF D(A)<A1(A) THEN 690
680 GOSUB 2100:GOTO 660
690 A1(A)=A1(A)-D(A)
700 Z2=Z2+D(A)
710 IF A1(A)=0 THEN 890
720 INPUT"PUBLICITY:";E(A)
730 IF E(A)<A1(A) THEN 750
740 GOSUB 2100 :GOTO 720
750 A1(A)=A1(A)-E(A)
760 Z3=Z3+E(A)
770 IF A1(A)=0 THEN 890
780 INPUT "CONDITIONING BUDGET:";F(A)
790 IF F(A)<A1(A) THEN 810
800 GOSUB 2100:GOTO 780
810 A1(A)=A1(A)-F(A)
820 Z4=Z4+F(A)
830 IF A1(A)=0 THEN 890
840 INPUT"SALES PROMOTION ";G(A)
850 IF G(A)<A1(A) THEN 870
860 GOSUB 2100:GOTO 840
870 A1(A)=A1(A)-G(A)
880 Z5=Z5+G(A)
890 INPUT"sales price per article ";H(A)
900 IF(H(A)<=160)*(H(A)>0)THEN 930
905 IF H(A)<=0THENPRINT"TO LOW TRY AGAIN!!!":GOTO 890
910 PRINT "much too high ,try again "
920 GOTO 890
930 W(A)=W(A)+X(A)
940 PRINTCHR$(&06)
950 NEXT
970 Q=INT(100*RND(0))
980 DIM Y1(N),Y2(N),Y3(N),Y4(N),Y5(N)
990 DIM Y6(N),Y7(N),Y(N),V(N),PV(N)
1010 S=4950+Q
1015 FOR A=1TON:Z6=Z6+1/H(A):NEXT
1020 FOR A=1 TO N
1030 Y1(A)=1/H(A)
1040 Y2(A)=C(A)*24/Z0
1050 Y3(A)=D(A)*14/Z2:Z1=Z1+D(A)
1060 Y4(A)=E(A)*12/Z3
1070 Y5(A)=F(A)*12/Z4
```

```
1080 Y6(A)=G(A)*6/Z5:Z1=Z1+G(A)
1100 Y(A)=(Y1(A)*29/Z6)+Y2(A)+Y3(A)+Y4(A)+Y5(A)+Y6(A)+Y7(A)
1110 V(A)=INT(Y(A)*S/100)
1120 IF V(A)>W(A) THEN V(A)=W(A)
1130 PV(A)=V(A)*H(A):Z7=Z7+V(A)
1140 A1(A)=A1(A)+PV(A)
1150 NEXT
1210 CONSOLE C80
1215 PRINTTAB(5);"TERM RESULTS ";M
1235 PRINT:PRINT
1240 PRINT"ENTREPRISE    PROFIT    CASH FLOW     ARTICLES   ARTICLES   MARKET "
1250 PRINTTAB(13);"PERIOD        TOTAL       SOLD         STOCK     SHARE "
1255 PRINTSTRING$("-",79)
1290 FOR A=1 TO N
1300 X(A)=W(A)-V(A)
1310 P(A)=INT((V(A)*100/Z7)*100+5)/100
1320 PRINTTAB(5);A;TAB(13);PV(A);TAB(24);A1(A);TAB(37);V(A);TAB(49);X(A);TAB(59
;INT(P(A))
1330 GOSUB2300
1350 NEXT
1380 PRINT:PRINT"HIT 'P' TO CONTINUE "
1390 GET B$:IF B$=""THEN 1390
1400 IF B$="P" THEN 2700
1405 GOTO 1390
1410 PRINTCHR$($06)
1510 PRINT"              MARKET STUDY              "
1530 PRINT:PRINT:PRINT"PERCEPTION OF PRODUCT, PUBLICITY AND   WRAPPING (/10)"
1540 PRINT"      MARKET SHARE (%)"
1550 PRINT"       ESTIMATION OF QUANTITY OF DISTRIBUTION POINTS  "
1560 PRINTSTRING$("-",79)
1570 PRINT:PRINT:PRINT"ENTERPRISE PRODUCT PUBLICITY WRAPPING  MARKET   POINTS
1580 PRINTSTRING$("-",79)
1620 FOR A=1 TO N
1630 Y2(A)=INT(Y2(A)*200/240)
1640 IF Y2(A)>10 THEN Y2(A)=10
1650 Y4(A)=INT(Y4(A)*200/120)
1660 IF Y4(A)>10 THEN Y4(A)=10
1670 Y5(A)=INT(Y5(A)*200/120)
1680 IF Y5(A)>10 THEN Y5(A)=10
1690 YO(A)=(D(A)+G(A))*100/Z1
1700 J(A)=INT(120*YO(A)/100)+INT(10*RND(RT))
1705 RT=J(A)
1720 PRINT TAB(4);A;TAB(14);Y2(A);TAB(22);Y4(A);TAB(32);Y5(A);TAB(43);YO(A);TAB
(53);J(A)
1750 NEXT
1760 PRINTSTRING$("-",79)
1780 PRINT"HIT 'P' TO CONTINUE"
1790 GET B$:IF B$="" THEN 1790
1800 IF B$="P" THEN1810
1805 GOTO 1790
1810 K=0:PRINTCHR$($06)
1820 FOR A=1 TO N
1830 IF A1(A)>10000 THEN 1860
1840 L=L+1
1850 GOTO 1900
1860 NEXT
1870 Z0=0:Z1=0:Z2=0:Z3=0:Z4=0:Z5=0:Z6=0:Z7=0
1880 GOTO 400
1900 PRINTCHR$($06)
1920 CONSOLE C40
1930 IF L=1 THEN 1960
1940 PRINT L;" PLAYER HAS ";
1950 GOTO 1970
```

```
1960 PRINTL;" PLAYER HAS ";
1970 PRINT "LESS THAN 10000 $"
1980 PRINT"AND IT'S INSUFFISANT TO   "
1990 PRINT"CONTINUE  THE GAME  ..."
2000 PRINT:PRINT
2010 END
2100 PRINT"IMPOSSIBLE , YOU ONLY HAVE ";A1(A);"$ LEFT--TRY AGAIN ..."
2110 RETURN
2200 PRINT"BE CAREFUL YOU ONLY HAVE ";A 1 (A);"$ LEFT"
2210 RETURN
2300 GRAPH 00,11
2400 LINE 0,100,318,100
2410 LINE 106,0,106,199
2420 LINE 212,0,212,199
2430 LINE 318,0,318,199
2440 LINE 0,199,318,199
2442 LINE 0,49,318,49
2445 LINE 0,149,318,149
2450 FF=(M-1)*2
2460 IF (A=1)+(A=4) THEN FF=FF
2470 IF (A=2)+(A=5) THEN FF=FF+106
2480 IF (A=3)+(A=6) THEN FF=FF +212
2490 GG=149:IF A<4 THEN GG=49
2495 FORR=1TON:SH(R)=A1(R)-SL(R):NEXT
2496 IF SH(A)<0 THEN 3000
2500 FOR HH=0 TO SH(A)/10000
2510 FOR QQ=0 TO 1
2520 LINE FF+00,GG,FF+00,GG-HH
2530 NEXT
2540 NEXT:RETURN
2700 PRINTCHR$(*06):CONSOLE C40:GRAPH 01
2710 PRINT"1";TAB(14);"2";TAB(27);"3"
2720 CURSOR 0,13:PRINT"4";TAB(14);"5";TAB(27);"6"
2730 CURSOR 29,0:PRINT"Press P "
2732 GET QQ$
2735 IF QQ$="" THEN 2732
2740 IF QQ$<>"P" THEN 2730
2750 CONSOLEC80:  GRAPH00:GOTO 1410
3000 FOR HH=0 TO SH(A)/10000STEP-1
3010 FOR QQ=0TO1
3020 LINE FF+00,GG,FF+00,GG-HH
3030 NEXT
3040 NEXT:RETURN
5000 CONSOLEC40:PRINT"1) [illegible]:50$ per artical+5%transportation costs."
5010 PRINT:PRINT"2) [illegible]:min 10$ per artical + a extra 20 $ wil
l be taken automatically from your budget to pay for your employees."
5020 PRINT:PRINT"3) [illegible]:commisions you pay your salesman ."
5030 PRINT:PRINT"4) [illegible]:no comment.."
5040 PRINT:PRINT"5) [illegible]:presentation you give your product f.ex
.wrapping."
5050 PRINT:PRINT"6) [illegible]:expences to stimulate the consumtion (f.ex.
presents,lotteries,special discounts,etc.)."
5051 PRINT:PRINT:PRINT:PRINTTAB(5);"TO CONTINUE HIT ANY KEY"
5052 GET KJ$:IF KJ$=""GOTO5052
5060 CONSOLEC40:PRINT"You must produce at lease 100 articals,so you shouldn't h
ave to fire any of your workers."
5070 PRINT:PRINT"Keeping stocks will cost you 5$ per artical."
5080 PRINT:PRINT"Distribution (transports) cost are variabel)."
5090 PRINT:PRINT"You have less then 10000$ you are unable to pay your workers a
nd are forced to bankrupcy."
5100 PRINT:PRINT:PRINT"To see these explanation during the game you only have t
o fill a letter in,in place of a number."
5110 PRINT:PRINTTAB(5);"HIT ANY KEY TO CONTINUE"
5120 GET KJ$:IF KJ$=""GOTO5120
5125 IF IN$="Y"THEN190
5130 RESUME
```



Dear Sharpsoft,

I am writing to say thank you for the help and interest provided by SUN since you started publication. Because I have now bought a Wren and retired my well-used MZ-80K I will not be renewing my subscription for 1985.

In Issue 15 of SUN Sr. Aschieri asked about AND, OR and NOT in SP BASIC. I have successfully patched both 5025 and 6015 to give AND and OR, but have not tried to implement NOT. Although the reserved words AND, OR and NOT are included in both tape and disk BASIC, the corresponding vectors are all directed to the syntax error routines. My trick is to alter these vectors so that AND points at multiply and OR points at addition. AND and OR then act in the same way as the + and * used for logical operations in the unaltered BASIC and obey the same rules.

In 5025, the AND jump to be altered is at addresses 9996 and 9997: POKE 9996,77:POKE 9997,45 (i.e. to point at $2D4D). OR addresses are at 9999 and 10000: POKE 9999,89:POKE 10000,46 (point at $2E59). If the above POKEs are entered from the command line straight after 5025 has been loaded, the revised BASIC can be saved to tape by the standard USR(33):USR(36).

In 6015, the corresponding pokes are POKE$1EBF,$3B:POKE 1BF0,$2B for AND and POKE$1EC2,$47:POKE$1EC3,$2C for OR. But for disk BASIC there is no simple way of saving the modified version. I used ZENDOS, which makes the whole operation very easy. For those without such a program, there are two alternatives. First the above POKEs can be included at the beginning of a program. Alternatively, the modified version can be saved to tape with the header containing startfile $1200, endfile $6529, execute $21FA. (By the way, 6015 warm starts at $123F.) The new 6015 can then be transferred back to disk as a machine code file using the tape-to-disk utility provided with 6015. The new BASIC can then be executed from the directory after booting standard 6015 in the usual way.

The better alternative is to obtain a copy of SP-5060 (tape) or SP-7011 (disk) from the Sharp Users Club at Yeovil College. These dialects include many toolkit extensions and are a vast improvement on the original Sharp products.

Farewell Sharpsoft and SUN readers, and best wishes for the future.

D. JACKSON
GWYNEDD

Dear Sirs,

I am surprised that there is still a lot to publish about the good old MZ-80K. I still have this machine and I saw already some fine programmes in the SUN's that I have received.

As you can see from this letter I do have second machine, which I must admit, has now become my first machine. It is an EPSON QX-10, a very fine CP/M computer, that I have won a few months ago in a programming contest organised by the NOS a Dutch broadcaster.

The aim of the contest was to make a basic program using the so called BASICODE-protocol, to make it run on every popular computer. I did so with my programme "CHORDS" that displays almost every possible finger position for chords on the guitar. It has been transmitted by NOS and was for instance loaded by someone in North Yorkshire in his Video Genie.

Because CP/M also supports BASICODE I am able to transfer my basic programmes from the 'K' to the QX-10, by using cassette tapes!!

WOUT VAN HAASTER
THE NETHERLANDS

Dear Sharpsoft,

1) In SUN #15, p.22, Mr. Flewitt airs his problem concerning a BASIC SP-5025 floating point inaccuracy. The proposed cure doesn't help because INT returns only a number's integer part but performs no rounding. As positive numbers are assured by ABS, we could use INT(ABS(X-((D+E)^2))+0.5). Unfortunately also the latter method represents a treatment of symptoms, not a real cure.

The fault lies in the use of x^2 instead of x*x, as the former way chases x through a logarithmic function, which isn't only less accurate than a simple multiplication but slower to boot. Even x*x*x is still faster than x^3.

Now that we have got the main obstacle out of the way, let's take a closer look at the remaining code; not to criticise but as a sort of exercise on efficiency (I assume that the code is basically correct, not the accompanying text, which says something about a product's square, whereas the programme does squares of sums).

Whenever the run of the mill BASIC interpreter handles variables of type STRING, it does so dynamically, thereby affording a large amount of comfort for the programmer. But this also necessiates a dynamic storage area, the so-called heap. Whenever a string variable is referenced on the left hand side of an assign-

ment operator, it's storage space gets newly allocated on the heap. Once this heap reaches it's maximum permissible height (i.e. storage allowance) the dustman (called garbage collection) comes into action in order to clean up the heap. Does this take long? You bet! Surely you've wondered before why some programmes perform reasonably fast on a small amount of test data but seem to chew endlessly on the real thing.

Hopefully the above helps to explain a little why one shouldn't use strings when there is a numerical problem to solve. Further, when calculations have to be made inside a loop, they should be made only once, to save time. With this in mind I submit a changed version of Mr. Flewitt's programme.

```
1000 FOR X=100000 TO 999999
1010   LET L=INT(X/1000)          :REM left 3 digits
1020   LET R=X-L*1000             :REM X MOD 1000
1030   LET B=L+R                  :REM left + right
1040   LET Y=B*B                  :REM B^2
1050   LET Z=ABS(X-Y)
1060   IF Z<50 THEN PRINT X, Y, Z
1070   IF X=Y THEN PRINT "One answer is "; X
1080 NEXT X
1090 END
```

The absence of the GOTO saves time as well. If jumps can't be avoided, they should be used on the less frequent condition. In our example X will not equal Y most of the time, hence we test whether X equals Y.

2) Senior Aschieri (SUN #15, p.21) tries to do a bitwise AND on two integers. Sadly BASIC SP-5025 can't do this sort of thing. Crystal Research's Xtal-BASIC does bitwise logical operations, and, provided you have CP/M, you've also got CBASIC on your disc, which does all sorts of wonderful things, including 14 digits precision BCD math.

3) S. Coleby (SUN #15, p.11) might be interested to hear that Avalon's ZEN doesn't recognize EX AF,AF'. One has to use EX AF,AF instead. LABEL: DS doesn't work on the tape version, there has to be a linefeed between the colon and the DS. The disc version seems to be o.k. there. ZEN's documentation includes a complete assembler listing, Sharp's SP-2102/2202/2301 are documented in Englipaneese and sometimes a treat for your diaphragm. Zilog's Z80-Assembly Language Programming Manual in a Sharp cover comes together with the Systems Program manual. The Sharp Assembler generates relocatable files, in contrast to the absolute code from the ZEN Assembler. Both Assemblers don't like to do arithmetic, especially not on negative quantities. Sharp has no current address counter reference ($), and ZEN's source file input lines can't be longer than 40 characters.

4) Re Mr. Arens' query on screen oriented text editors under CP/M, (SUN #15, p.25) shouldn't WordMaster and WordStar be mentioned, too?

5) As I can't find Mr. Halliday's original letter (#14,p.47) I am not sure what kind of information he seeks. But here are some port addresses (as far as I know them): FF = printer data, FE = printer control, FB = FDC data register, FA = FDC status/ command register, F9=FDC status/track register, F8 = FDC select/ sector register. All of the memory mapped ports in the E-page are used, some even twice (Xtal CP/M 2.23 80 cols. and Quantum high resolution graphics).

EDMUND RAMM
FED. REP. OF GERMANY

Dear Sharpsoft,

In response to the letter from G.D. Way - Australia concerning changing Hisoft source code listings developed on the MZ-80K to run on the MZ-80B I can offer this useful tip. Source code developed on the MZ-80K/A and indeed the MZ-700 can be loaded directly into the MZ-80B by following these simple steps:-

1) Load HP4T into the B in the usual way.

2) Return to Monitor using the PASCAL 'B' command.

3) Use the Monitor 'M' command to change the byte at Hex 0557 from Hex 41 to Hex 61.

4) Use the Monitor 'J'command to re-enter PASCAL at Hex 123E.

5) Now load the MZ-80K/A/700 source code using the normal 'G,,Filename' command.

6) Return to the Monitor and switch the byte at Hex 0557 back to Hex 41 and use the Monitor 'J' codmmand to re-enter PASCAL at Hex 1241.

The code is fully compatible with the MZ-80B compiler and will compile as normal but, of course, watch out for machine specific POKES, INLINES and USER calls. The jump to hex 1241 will, by the way leave the screen in 40 column mode this can be changed back to 80 column mode by running a short program containing 'USER(€0CA6)' (a call to USER(€0D18) will switch the display to 40 columns.

P.M. OPACIC

SHARPSOFT

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