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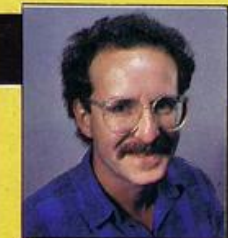
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THEN THE RACE IS ON!!!

DEvised BY IAN LIVINGSTONE

The storylines for "Eureka!" are by Ian Livingstone, whose "Fighting Fantasy" books have sold over 2,000,000 copies. He's dreamed up some rather nasty tricks and twists for you in this Epic, because he has also devised the cryptic clues and conundrums in the booklet that goes with the program. He's the one who knows the answers.

"Eureka!" was programmed by Andromeda teams led by Hungarians Donat Kiss and András Császár. It took the equivalent of 5 YEARS to create, and the skills of 4 graphic artists, 2 musicians and a professor of logic too. We told them to stretch the hardware's capabilities, and make sure you were kept awake for hours!! They've done it...

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Contents

GRAPHICS INSTRUCTIONS	3	SOFT FOCUS	29
LETTERS	27	PROGRAM TUTOR	34

Zx81

PRO-PRINTOUT COTHELLO	10	TEN PIN BOWLING	44
DEFENCE FORCE	12	HONEYMAN	45
LOG JUMP	20	MARTIAN DOME	48
		OILRIG	49

Beginners

ZX-81		SPECTRUM	
BEGINNERS' TUTOR		SKATEBOARD	
GHOST HUNT	14	STUNTMAN	16
HUNT THE THIMBLE	15	CHEESE THIEF	16
BARRAGE BALLOONS	17	PRIME CALCULATOR	17

Spectrum

PROGRAM OF THE MONTH		WEB RUNNER	36
PHOTOFIT	4	PENGUIN	39
MOW THE LAWN	9	EMILY'S TANTRUM	41
EGG SAVER	11	BURGER BAR	42
CRAZY PAINTER	19	JAM SANDWICH	43
LONE ATTACKER	20	CONCENTRATION	47
SCIENTIST RESCUE	25	COAL COLLECTOR	52
LASER TURRET	26	AIR RAID	54
		HURDLER	55
		MATHS FARM	56

Instructions for graphics characters are printed in lower-case letters in our listings. They are enclosed by brackets and separated by colons to distinguish them and the brackets and colons should not be entered.

Inverse characters are represented by the letter "i" and graphics characters by "g". Thus an inverse W would be represented by "iw", a graphics W by "gw", and an inverse graphics W by "igw".

Spaces are represented by "sp" and inverse spaces by "isp". Whenever any character is to be used more than once, the number of times it is to be used is shown before it, together with a multiplication sign. Thus "6*isp" means six inverse spaces and "(g4:4*i4:g3)" would be entered as a graphic four, followed by an inverse four repeated four times, followed by a graphics three.

Where whole words are to be written in inverse letters they appear in the listings as lower-case letters. Letters to be entered in graphics mode on the Spectrum are underlined.

Inverse characters may be entered on the ZX-81 by changing to graphics mode and then typing the appropriate characters and on the Spectrum by changing to inverse video and typing the appropriate letters. Graphics characters may be entered on the ZX-81 by changing to graphics mode and then pressing symbol shift while the appropriate characters are entered. On the Spectrum graphics characters may be obtained by changing to graphics mode and then pressing the appropriate character. User-defined graphics will appear as normal letters until the program has been RUN.



PHOTOFIT

MAKE a photofit picture of the villain. You are able to choose the eyes, mouth, nose and hair from a variety of features. If you think the end result looks like the villain you have a chance to put him behind bars.

Photofit was written for the 48K Spectrum by Peter White of Gravesend, Kent who wrote the program to test his knowledge of plotting, drawing and defining graphics. Although he admits that the program is rather long for what it does he also points out that more experienced programmers could have fun tidying it up and experimenting with the graphics. Peter's children Chris, aged 12, and Julia, aged 10, enjoy using the program and the game holds a lot of appeal for younger children.

For clarity the program has been divided into several sections which are explained below.

Line numbers	Section
3-190	SETUP
200-210	EYES
211-214	NOSE
215-228	MOUTH
600-650	OUTLINE
700-705	EYEDRAW
706-708	NOSEDRAW
710-713	MOUTHDRAW
800-830	HAIR

900-914
1600-1720
2000-2011
3000-4065
4500-4545
5000-6040
7000-7500

FACEHAIR
GLASSES
HAIRDRAW
FHDRAW
USERHAIR
GAMEEND
UDGS

Graphics

The four groups of eyes are represented by the graphic pairs AB, CD, EF and GH. The three noses are represented by graphics IJK, LMNO, and PQRS; and the man by graphics T and U.

Variables

a=eye type (1 to 6)
b=nose type (1 to 3)
c=mouth type (1 to 4)
d=hair type (1 to 4)
e=face hair (1 to 5)
f=glasses (yes/no)
h=identity flag
a\$, w\$=characters
n, a, y=loop counters

SETUP:

Call UDG subroutine
Introduction and call OUTLINE

EYES:

Input type (a). Jump to EYEDRAW

NOSE:

Draw available types of nose.

Input type (b). Jump to

NOSEDRAW

MOUTH:

Draw available types of mouth

Input type (c)

Jump to MOUTHDRAW

OUTLINE:

Draw outline of face with ears, brows and photofit border.

Print available types of eyes.

EYEDRAW:

Draw specified eyes

NOSEDRAW:

Draw specified nose

MOUTHDRAW:

Draw specified mouth

HAIR:

Print description of available types of hair. Input type (d)

Jump to HAIRDRAW or USERHAIR

FACEHAIR:

Print description of available types of facial hair. Input type (e)

Jump to FHDRAW

GLASSES:

Prompt for glasses (yes/no)

If yes THEN draw glasses

HAIRDRAW:

Draw specified hair (three programmed types)

FHDRAW:

Draw specified facial hair

USERHAIR (for user-defined hair):

Print cursor instructions

Erase top of head. Set up start x, y



coordinates. DRAW hair with PLOTS on adjacent pixels.

GAMEEND:

Input identification flag h
IF not identified THEN restart
ELSE draw bars (for jail)
Clear screen and print "villain running away" (graphics T, U)
Input "Want another game" and restart if yes.

UDGS:

Setup user defined graphics

COMMENTS

As this month's Program Tutor is about programming efficiency, this program can be used to demonstrate how a long program could be condensed.

1) Lines 205-210 can be replace by:
GOTO 699+(a=1)+(a=2)*2+(a=3)*3+(A=4)*4+(a=5)*5+(a=6)*6
Lines 212-214 by:
GOTO 705+(b=1)+(b=2)*2+(b=3)*3

Lines 225-228 by:
GOTO 709+(c=1)+(c=2)*2+(c=3)*3+(c=4)*4

Lines 815-825 by:
GOTO 1999+(d=1)+(d=2)*6+(d=3)*11

Lines 910-914 by:
GOTO (e=1)*1600+(e=2)*3000+

(e=3)

*3050+(e=4)*3060+(e=5)*4050

These substitutions eliminate the need for many IF ... THEN statements. Limit checks should be included, as the program cannot handle invalid entries. Therefore, if you enter line 205 as the GOTO, also enter:

204 IF a>6 OR a<0 THEN GOTO 200

2) The sound effect only statements can be simplified. For example, line 130 could become:

130 DATA 0,4,2,5,4,7,5,9,7,11,9

140 FOR n=1 TO 11:READ p: BEEP 0.1,p: NEXT n

RESTOREs would also be required (for UDGS and 130) to ensure that data was read in the correct sequence.

3) Lines 4040-4055 (for moustache and beard) unnecessarily duplicate lines 3050-3055, which deal with the moustache only. The solution here would be to write a separate subroutine for drawing the moustache.

4) One variable name could be used for a,b,c,d,e,f as it is unnecessary for the computer to remember, for instance, what type of eyes were used when moving on to nose types.

5) Lines 205-210 could be extended to include lines 700-705. Similarly, lines 212-214 could take in lines 706-

708.

6) Most of the draw routines can also be simplified using DATA (with RESTORE) and FOR/NEXT loops, as they nearly all follow the PLOT, BEEP, DRAW, BEEP pattern. Line 2000, for example would become:
2000 FOR n=1 TO 5: READ x, y: PLOT x,y: READ x,y: BEEP x,y: READ x,y: DRAW x,y, PI: READ x,y: BEEP x, y: NEXT n

All the numbers in line 2000 can then be placed in a single data statement.

```
3 PRINT AT 10,10: INVERSE 1;
" PLEASE WAIT "
5 GO SUB 7000
100 FOR n=15 TO 30: BEEP .01,n:
BEEP .05,n-2: NEXT n
120 PRINT AT 5,8: BRIGHT 1:"**
* PHOTOFIT ***": AT 10,4: BRIGHT
0:"Can you remember what the";
AT 12,6:"villain looked like ?":
PAUSE 200: CLS
130 BEEP .1,0: BEEP .1,4: BEEP
.1,2: BEEP .1,5: BEEP .1,4: BEEP
.1,7: BEEP .1,5: BEEP .1,9: BEEP
.1,7: BEEP .1,11: BEEP .1,9: B
EEP .5,12
190 PAUSE 30: GO SUB 600
200 INPUT "Which eyes ";a
205 IF a=1 THEN GO TO 700
206 IF a=2 THEN GO TO 701
207 IF a=3 THEN GO TO 702
208 IF a=4 THEN GO TO 703
209 IF a=5 THEN GO TO 704
210 IF a=6 THEN GO TO 705
```



```

211 PRINT AT 2,2; INK 2;"1="
; AT 2,6; INK 1;"2="; AT 2,11
; INK 0;"3="; AT 3,2; INK 2;"
; AT 3,6; INK 1;"MNO"; AT 3
,11; INK 0;"RS"; AT 4,2; INK 2
;"K"; AT 4,6; INK 1;"
; AT 4,11; INK 0;" : INPUT "Wh
ich nose ? ";b
212 IF b=1 THEN GO TO 706
213 IF b=2 THEN GO TO 707
214 IF b=3 THEN GO TO 708
215 PRINT AT 0,0;"1=" ; A
T 0,9;"2=" ; AT 0,17;"3="
; AT 6,0;"4=" ; AT 2,0;"
; AT 3,2;"
; AT 3,6;" ; AT 3,10;"
; AT 4,2;" ; AT 4,6;"
; AT 4,10;"
216 PLOT 20,160: DRAW 5,-3: DRA
W 3,-5: DRAW 15,0: DRAW 3,5: DRA
W 5,3: DRAW -10,3: DRAW -5,0, PI
: DRAW -5,0, PI : DRAW -10,-3:
DRAW 31,0
217 PLOT 90,160: DRAW 8,-5: DRA
W 12,0: DRAW 8,5: DRAW -28,0: DR
AW 14,3: DRAW 14,-3
218 PLOT 162,160: DRAW 5,5: DRA
W 5,3: DRAW 3,1: DRAW 3,-1: DRAW
5,-3: DRAW 5,-5: DRAW -25,0, PI
219 PLOT 22,130: DRAW 3,-6: DRA
W 6,-4: DRAW 6,0: DRAW 6,4: DRAW
3,6: DRAW -6,-2: DRAW -4,-3: DR
AW -4,0: DRAW -4,2: DRAW -6,4
220 INPUT "Which mouth ? ";c
225 IF c=1 THEN GO TO 710
226 IF c=2 THEN GO TO 711
227 IF c=3 THEN GO TO 712
228 IF c=4 THEN GO TO 713
600 BORDER 3: PLOT 130,12: BEEP
.03,40: DRAW 0,140: BEEP .03,39
: DRAW 120,0: BEEP .03,38: DRAW
0,-140: BEEP .03,37: DRAW -120,0
: BEEP .03,36
601 PAUSE 20: PLOT 128,10: BEEP
.03,40: DRAW 0,144: BEEP .03,39
: DRAW 124,0: BEEP .03,38: DRAW
0,-144: BEEP .03,37: DRAW -124,0
: BEEP .03,36
610 PLOT 230,105: BEEP .01,35:
DRAW -80,0, PI : BEEP .01,34: PL
OT 230,105: BEEP .01,33: DRAW 0,
-22: BEEP .01,32: DRAW -5,-22: B
EEP .01,31: DRAW -7,-10: BEEP .0
1,30: DRAW -10,-15: BEEP .01,29
611 PLOT 150,105: BEEP .01,28:
DRAW 0,-22: BEEP .01,27: DRAW 5,
-22: BEEP .01,26: DRAW 7,-10: BE
EP .01,25: DRAW 10,-15: BEEP .01
,24: PLOT 173,35: BEEP .01,23: D
RAW 35,0, PI : BEEP .01,22
612 PLOT 150,90: BEEP .01,21: D
RAW -6,0, PI : BEEP .01,20: DRAW
4,-18: BEEP .01,19: DRAW 5,0, P
I : BEEP .01,18: PLOT 227,72: BE
EP .01,17: DRAW 5,0, PI : BEEP .
01,16: DRAW 4,18: BEEP .01,15: D
RAW -6,0, PI : BEEP .01,14
613 PLOT 185,95: BEEP .01,13: D
RAW -16,0, PI : BEEP .01,12: PLO
T 215,95: BEEP .01,11: DRAW -16,
0, PI : BEEP .01,10: PAUSE 10: B
EEP .2,30: BEEP .2,28: BEEP .2,3
0
620 PRINT AT 2,2; INK 1;"1=AB"
; AT 2,6; INK 0;"2=CD"; AT 2,10;
INK 1;"3=EF"
621 PRINT AT 4,2;"4=GH"; AT 4,
6; INK 5;"5=AB"; AT 4,10; INK 2;
"6=CD"
625 PRINT AT 21,0;"MAKE SELECT
ION AND PRESS 'ENTER'"
650 RETURN
700 PRINT AT 10,21; INK 1;"AB"
; AT 10,25; INK 1;"AB": BEEP .05
,-10: PAUSE 10: BEEP .05,0: GO T
O 211
701 PRINT AT 10,21; INK 0;"CD"
; AT 10,25;"CD": BEEP .05,-20: P
AUSE 10: BEEP .05,10: GO TO 211
702 PRINT AT 10,21; INK 1;"EF"

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; AT 10,25;"EF": BEEP .05,-30: P
AUSE 10: BEEP .05,-20: GO TO 211
703 PRINT AT 10,21;"GH"; AT 10
,25;"GH": BEEP .05,20: PAUSE 10:
BEEP .05,30: GO TO 211
704 PRINT AT 10,21; INK 5;"AB"
; AT 10,25;"AB": BEEP .05,15: PA
USE 10: BEEP .05,25: GO TO 211
705 PRINT AT 10,21; INK 2;"CD"
; AT 10,25;"CD": BEEP .05,50: PA
USE 10: BEEP .05,40: GO TO 211
706 PRINT AT 11,24; INK 2;"I";
AT 12,24;"J"; AT 13,24;"K": FOR
1=-10 TO 0: BEEP .05,1: BEEP .0
5,1+3: NEXT 1: GO TO 215
707 PRINT AT 11,24; INK 1;"L";
AT 12,23;"MNO": FOR b=10 TO -10
STEP -1: BEEP .05,b: BEEP .05,b
+3: NEXT b: GO TO 215
708 PRINT AT 11,23;"PD"; AT 12
,23;"RS": FOR k=40 TO 0 STEP -1:
BEEP .007,k: NEXT k: GO TO 215
710 PLOT 178,52: BEEP .008,10:
DRAW 5,-3: BEEP .008,11: DRAW 3,
-5: BEEP .008,12: DRAW 15,0: BEE
P .008,13: DRAW 3,5: BEEP .008,1
4: DRAW 5,3: BEEP .008,15: DRAW
-10,3: BEEP .008,16: DRAW -5,0,
PI : BEEP .008,17: DRAW -5,0, PI
: BEEP .008,19: DRAW -10,-3:
BEEP .008,20: DRAW 31,0: BEEP .08,
21: GO TO 800
711 PLOT 180,52: BEEP .05,6: DR
AW 8,-5: BEEP .008,8: DRAW 12,0:
BEEP .05,6: DRAW 8,5: BEEP .008
,10: DRAW -28,0: BEEP .05,6: DRA
W 14,3: BEEP .008,14: DRAW 14,-3
: BEEP .05,6: GO TO 800
712 PLOT 180,46: BEEP .1,15: DR
AW 5,5: BEEP .1,14: DRAW 5,3: BE
EP .1,13: DRAW 3,1: BEEP .1,12:
DRAW 3,-1: BEEP .1,13: DRAW 5,-3
: BEEP .1,14: DRAW 5,-5: BEEP .1
,15: DRAW -25,0, PI : BEEP .5,15
: GO TO 800
713 PLOT 182,54: BEEP .05,30: D
RAW 3,-6: BEEP .05,20: DRAW 6,-4
: BEEP .05,29: DRAW 6,0: BEEP .0
5,21: DRAW 6,4: BEEP .05,28: DRA
W 3,6: BEEP .05,22: DRAW -6,-2:
BEEP .05,27: DRAW -4,-3: BEEP .0
5,23: DRAW -4,0: BEEP .05,26: DR
AW -4,2: BEEP .05,24: DRAW -6,4:
BEEP .1,25: GO TO 800
800 PRINT AT 0,0;"
; AT 1,0;"
; AT 2,0;"
; AT 3,0;"
"
801 PRINT AT 1,0;"1= some hair
2= a little hair"; AT 3,0;"3=
punk !!!"; AT 5,0;"4= DRAW IT"; A
T 6,0;" YOURSELF ?"
805 INPUT "What kind of hair ?"
; d
815 IF d=1 THEN GO TO 2000
820 IF d=2 THEN GO TO 2005
825 IF d=3 THEN GO TO 2010
830 IF d=4 THEN GO TO 4500
900 PRINT AT 0,0;"
; AT 1,0;"
; AT
2,0;" ; AT 3,0;"
; AT 4,0;"
; AT 5,0;" ; AT
6,0;"
902 PRINT AT 1,0;"1= none"; AT
3,0;"2= stubble"; AT 5,0;"3= mo
ustache"; AT 7,0;"4= beard"; AT
9,0;"5= moustache and"; AT 10,3;
"a beard"
905 INPUT "Facial hair ? ";e
910 IF e=1 THEN GO TO 1600
911 IF e=2 THEN GO TO 3000
912 IF e=3 THEN GO TO 3050
913 IF e=4 THEN GO TO 3060

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```

914 IF e=5 THEN GO TO 4050
1600 PRINT AT 1,0;"
; AT 3,0;"1=no 2=yes "; AT 5,0
;" ; AT 7,0;"
; AT 9,0;"
; AT 10,0;" : INPUT
"Did he wear glasses ?";f
1605 IF f=1 THEN GO TO 1700
1610 IF f=2 THEN GO TO 1710
1700 GO TO 5000
1710 CIRCLE 175,94,12: BEEP .5,1
2: CIRCLE 175,94,14: BEEP .5,9:
CIRCLE 207,94,12: BEEP .5,11: CI
RCLE 207,94,14: BEEP .5,7: PLOT
187,94: BEEP .5,9: DRAW 8,0: BEE
P .5,5: PLOT 163,94: BEEP .5,7:
DRAW -12,-4: BEEP .5,4: PLOT 218
,94: BEEP .5,5: DRAW 12,-4: BEEP
.5,2: BEEP 1,0
1720 GO TO 5000
2000 PLOT 155,120: BEEP .01,-10:
DRAW 40,20, PI : BEEP .01,-9: P
LOT 157,125: BEEP .01,-8: DRAW 3
5,20, PI : BEEP .01,-7: PLOT 159
,130: BEEP .01,-6: DRAW 30,15, P
I : BEEP .01,-5: PLOT 163,133: B
EEP .01,-4: DRAW 25,10, PI : BEE
P .01,-3: PLOT 167,136: BEEP .01
,-2: DRAW 20,8, PI : BEEP .01,-1
: PLOT 171,138: BEEP .01,0: DRAW
15,6, PI : BEEP .01,1
2001 PLOT 210,140: BEEP .01,2: D
RAW 15,-25, PI : BEEP .01,3: PLO
T 212,138: BEEP .01,4: DRAW 13,-
22, PI : BEEP .01,5: PLOT 214,13
6: BEEP .01,6: DRAW 11,-18, PI :
BEEP .01,7: PLOT 215,134: BEEP
.01,8: DRAW 9,-16, PI : BEEP .01
,9: PLOT 216,132: BEEP .01,10:
DRAW 8,-13, PI : BEEP .01,11: PLO
T 218,130: BEEP .01,12: DRAW 6,-
11, PI : BEEP .01,13: PLOT 220,1
28: BEEP .01,14: DRAW 4,-8, PI :
BEEP .01,15: GO TO 900
2005 PRINT AT 3,23;"?": FOR g=3
5 TO 55: BEEP .007,g: PAUSE 5: N
EXT g: GO TO 900
2010 FOR f=.1 TO .02 STEP -.01:
BEEP f,-10: NEXT f: INK 2: CIRCL
E 150,70,3: FOR f=.1 TO .02 STEP
-.01: BEEP f,0: NEXT f: PAUSE 2
0: INK 3: PLOT 185,126: DRAW -7,
12: BEEP .04,-20: PLOT 185,130:
DRAW -6,12: BEEP .04,0: PLOT 185
,134: DRAW -5,12: BEEP .04,-20:
PLOT 185,138: DRAW -4,12: BEEP .
04,0: PLOT 185,139: DRAW -2,12:
BEEP .04,-20: PLOT 185,139: DRAW
0,12: BEEP .04,0
2011 INK 4: PLOT 195,126: DRAW 7
,12: BEEP .04,-20: PLOT 195,130:
DRAW 6,12: BEEP .04,0: PLOT 195
,134: DRAW 5,12: BEEP .04,-20: P
LOT 195,138: DRAW 4,12: BEEP .04
,0: PLOT 195,139: DRAW 2,12: BEE
P .04,-20: PLOT 195,139: DRAW 0,
12: BEEP .04,0: INK 0: GO TO 900

```




```

3000 PLOT 160,70: BEEP .005,20:
PLOT 162,68: BEEP .005,30: PLOT
165,63: BEEP .005,20: PLOT 166,6
6: BEEP .005,30: PLOT 167,58: BE
EP .005,20: PLOT 170,45: BEEP .0
05,30
3005 PLOT 215,69: BEEP .005,20:
PLOT 221,71: BEEP .005,30: PLOT
213,59: BEEP .005,20: PLOT 211,6
5: BEEP .005,30: PLOT 209,63: BE
EP .005,20: PLOT 211,60: BEEP .0
05,30: PLOT 207,58: BEEP .005,20
: PLOT 200,44: BEEP .005,30: PLO
T 198,38: BEEP .005,20: PLOT 193,
35: BEEP .005,30: PLOT 187,33:
BEEP .005,20: PLOT 188,35: BEEP
.005,30
3010 PLOT 177,28: BEEP .005,20:
PLOT 174,27: BEEP .005,30: PLOT
173,30: BEEP .005,20: PLOT 181,2
5: BEEP .005,30: PLOT 183,26: BE
EP .005,20: PLOT 187,28: BEEP .0
05,30: PLOT 189,20: BEEP .005,30
: PLOT 191,21: BEEP .005,20: PLO
T 193,23: BEEP .005,30: PLOT 194,
21: BEEP .005,20: PLOT 195,22:
BEEP .005,30: PLOT 196,24: BEEP
.005,20: PLOT 199,26: BEEP .005,
30: PLOT 202,24: BEEP .005,20: P
LOT 200,24: BEEP .005,30
3012 GO TO 1600
3050 PLOT 180,57: DRAW 2,5: BEEP
.01,-30: PLOT 182,58: DRAW 2,5:
BEEP .01,-20: PLOT 184,60: DRAW
2,5: BEEP .01,-30: PLOT 186,62:
DRAW 2,5: BEEP .01,-20: PLOT 18
8,64: DRAW 2,3: BEEP .01,-30: PL
OT 190,64: DRAW 2,3: BEEP .01,-2
0
3055 PLOT 198,67: DRAW 2,-3: BEE
P .01,-30: PLOT 200,67: DRAW 2,-
3: BEEP .01,-20: PLOT 202,67: DR
AW 2,-5: BEEP .01,-30: PLOT 204,
65: DRAW 2,-5: BEEP .01,-20: PLO
T 206,63: DRAW 2,-5: BEEP .01,-3
0: PLOT 207,62: DRAW 2,-5: BEEP
.01,-20: GO TO 1600
3060 PLOT 180,17: BEEP .02,11: D
RAW -8,20: BEEP .02,12: PLOT 182
,16: BEEP .02,11: DRAW -9,21: BE
EP .02,12: PLOT 184,15: BEEP .02
,11: DRAW -9,21: BEEP .02,12: PL
OT 186,14: BEEP .02,11: DRAW -8,
20: BEEP .02,12: PLOT 187,14: BE
EP .02,11: DRAW -7,20: BEEP .02,
12: PLOT 188,14: BEEP .02,11: DR
AW -5,19: BEEP .02,12: PLOT 188,
14: BEEP .02,11: DRAW -3,18: BEE
P .02,12
3061 PLOT 189,13: BEEP .02,11: D
RAW -2,17: BEEP .02,12: PLOT 190
,12: BEEP .02,11: DRAW -1,17: BE
EP .02,12: PLOT 191,12: BEEP .02
,11: DRAW 0,17: BEEP .02,12: PLO
T 191,12: BEEP .02,11: DRAW 1,17
: BEEP .02,12: PLOT 192,12: BEEP
.02,11: DRAW 2,17: BEEP .02,11:
PLOT 193,12: BEEP .02,11: DRAW
3,17: BEEP .02,12: PLOT 194,13:
BEEP .02,11: DRAW 3,17: BEEP .02
,12: PLOT 196,13: BEEP .02,11: D
RAW 3,17: BEEP .02,12
3062 PLOT 197,14: BEEP .02,11: D
RAW 4,17: BEEP .02,12: PLOT 198,
15: BEEP .02,11: DRAW 5,17: BEEP
.02,12: PLOT 199,16: BEEP .02,1
1: DRAW 6,18: BEEP .02,12: PLOT
200,17: BEEP .02,11: DRAW 6,19:
BEEP .02,12: PLOT 201,18: BEEP .
02,11: DRAW 7,19: BEEP .02,12:
PLOT 203,19: BEEP .02,11: DRAW 7,
19: BEEP .02,12
3070 GO TO 1600
4050 PLOT 180,57: DRAW 2,5: BEEP
.05,-30: PLOT 182,58: DRAW 2,5:
BEEP .05,-20: PLOT 184,60: DRAW
2,5: BEEP .05,-30: PLOT 186,62:
DRAW 2,5: BEEP .05,-20: PLOT 18
8,64: DRAW 2,3: BEEP .05,-30: PL
OT 190,64: DRAW 2,3: BEEP .05,-2
0

```



```

4055 PLOT 198,67: DRAW 2,-3: BEE
P .05,-30: PLOT 200,67: DRAW 2,-
3: BEEP .05,-20: PLOT 202,67: DR
AW 2,-5: BEEP .05,-30: PLOT 204,
65: DRAW 2,-5: BEEP .05,-20: PLO
T 206,63: DRAW 2,-5: BEEP .05,-3
0: PLOT 207,62: DRAW 2,-5: BEEP
.05,-20
4060 PLOT 180,17: BEEP .05,11: D
RAW -8,20: BEEP .05,12: PLOT 182
,16: BEEP .05,11: DRAW -9,21: BE
EP .05,12: PLOT 184,15: BEEP .05
,11: DRAW -9,21: BEEP .05,12: PL
OT 186,14: BEEP .05,11: DRAW -8,
20: BEEP .05,12: PLOT 187,14: BE
EP .05,11: DRAW -7,20: BEEP .05,
12: PLOT 188,14: BEEP .05,11: DR
AW -5,19: BEEP .05,12: PLOT 188,
14: BEEP .05,11: DRAW -3,18: BEE
P .05,12
4061 PLOT 189,13: BEEP .05,11: D
RAW -2,17: BEEP .05,12: PLOT 190
,12: BEEP .05,11: DRAW -1,17: BE
EP .05,12: PLOT 191,12: BEEP .05
,11: DRAW 0,17: BEEP .05,12: PLO
T 191,12: BEEP .05,11: DRAW 1,17
: BEEP .05,12: PLOT 192,12: BEEP
.05,11: DRAW 2,17: BEEP .05,11:
PLOT 193,12: BEEP .05,11: DRAW
3,17: BEEP .05,12: PLOT 194,13:
BEEP .05,11: DRAW 3,17: BEEP .05
,12: PLOT 196,13: BEEP .05,11: D
RAW 3,17: BEEP .05,12
4062 PLOT 197,14: BEEP .05,11: D
RAW 4,17: BEEP .05,12: PLOT 198,
15: BEEP .05,11: DRAW 5,17: BEEP
.05,12: PLOT 199,16: BEEP .05,1
1: DRAW 6,18: BEEP .05,12: PLOT
200,17: BEEP .05,11: DRAW 6,19:
BEEP .05,12: PLOT 201,18: BEEP .
05,11: DRAW 7,19: BEEP .05,12:
PLOT 203,19: BEEP .05,11: DRAW 7,
19: BEEP .05,12
4065 GO TO 1600
4500 PRINT AT 0,0: " USE CURSOR
KEYS TO DRAW. WHEN FINISH
ED "; AT 2,0: " PR
ESS THE 1 KEY"; AT 3,0: "
"; AT 5,0: " "; AT 6
,0: "
4501 OVER 1: PLOT 230,105: DRAW
-80,0, PI : OVER 0
4502 LET x=180: LET y=144
4510 LET w$= INKEY$
4515 IF w$="5" THEN LET x=x-1:
BEEP .01,-10
4520 IF w$="8" THEN LET x=x+1:
BEEP .01,0
4525 IF w$="6" THEN LET y=y-1:
BEEP .01,10
4530 IF w$="7" THEN LET y=y+1:
BEEP .01,20
4535 IF w$="1" THEN GO TO 900
4540 PLOT x,y
4545 GO TO 4510
5000 INPUT "IS THIS WHAT HE LOOK
ED LIKE ? ";h

```

```

5010 IF h=1 THEN CLS : GO TO 19
0
5015 IF h=2 THEN GO TO 5020
5020 PRINT AT 1,3: "WE HAD BETTE
R PUT HIM BEHIND BARS THEN !"
; AT 3,0: " "; AT 21,0
; "
": PAUSE 100
5030 FOR x=3 TO 20: FOR y=19 TO
28 STEP 3: PRINT AT x,y: "(ig@)"
: NEXT y: NEXT x
5050 PAUSE 150
5060 CLS
5070 FOR n=30 TO 2 STEP -1
5080 PRINT AT 10,n: "I ": BEEP .
002,0: PAUSE 4
5090 PRINT AT 10,n-1: "U ": BEEP
.002,6: PAUSE 4: NEXT n
6000 CLS : PRINT AT 10,2: BRIGH
T 1; INK 1: "TOO LATE ! HE'S RUN
AWAY !!!"
6010 PRINT AT 21,0: "DO YOU WANT
TO PLAY AGAIN ? y/n": INPUT a$
6030 IF a$="y" THEN CLS : GO TO
190
6040 IF a$="n" THEN CLS : PRINT
AT 10,8: INK 2: "THANKS FOR PLA
YING": STOP
7000 FOR a=USR "a" TO USR "u"+
7
7010 READ b: POKE a,b
7020 NEXT a
7030 DATA 1,6,24,33,193,48,12,3
7040 DATA 128,96,24,132,131,12,4
8,192
7050 DATA 1,6,24,17,17,16,12,3
7060 DATA 128,96,24,136,136,8,48
,192
7061 DATA 192,112,63,35,18,10,7,
3
7062 DATA 3,14,252,196,72,80,224
,192
7063 DATA 3,15,31,30,61,123,123,
252
7064 DATA 192,240,252,60,222,239
,239,31
7070 DATA 129,66,36,36,36,36,36,
36
7080 DATA 36,36,36,36,36,36,66,6
6
7090 DATA 129,129,129,129,231,66
,60,0
7100 DATA 36,36,36,36,36,36,66,6
6
7110 DATA 1,6,8,8,8,4,3,0
7120 DATA 0,0,0,0,0,231,255,24
7130 DATA 128,96,16,16,16,32,192
,0
7160 DATA 0,1,3,6,4,4,4,4
7170 DATA 128,192,96,48,16,16,16
,16
7180 DATA 28,48,32,48,27,15,7,1
7190 DATA 28,6,2,6,108,120,112,1
28
7210 DATA 24,88,40,24,60,42,104,
24
7220 DATA 24,26,12,120,10,62,32,
96
7500 RETURN

```


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HELP gardener Joe to Mow The Lawn. If Joe mows the flower borders he will be sacked, and he will be killed if he runs over a giant spider. There are weeds, short grass and long grass to be mown, all worth varying points.

Written for the 16K Spectrum by David Anderson, Edinburgh.

MOW THE LAWN

```
~ 10 RESTORE : INK 7: PAPER 4: B
ORDER 0: BRIGHT 0: FLASH 0: CLS
```

```
20 DIM b(32,22)
30 FOR x=USR "a" TO USR "g"+
7: READ b: POKE x,b: NEXT x: DAT
A 0,2,2,6,6,10,118,101,0,64,64,9
6,96,80,110,166,16,24,60,24,36,3
6,60,60,60,60,36,36,24,60,24,16,
6,9,13,14,8,74,60,16,16,8,100,24
,18,44,16,8,66,36,165,9,255,36,3
6,66
```

```
31 GO SUB 9000
40 LET l=1: LET lc=1: LET d=0:
LET msc=0: LET sc=0: LET tsc=0:
LET s=7
```

```
45 PAPER 0: CLS : PAPER 4
46 INPUT "What speed?(0-3) ":s
p: LET sp=sp/0200
```

```
47 INK 7
50 FOR y=1 TO 21: FOR x=1 TO 3
1: LET r=INT ( RND *20)+lc-14:
IF r<5 THEN LET msc=msc+1: LET
b(x,y)=1: PRINT AT y,x;" ": NEX
T x: NEXT y
```

```
51 IF r=5 OR r=6 THEN LET b(x
,y)=2: PRINT AT y,x: INK ( RND
*7)+1: PAPER 0;"E": NEXT x: NEXT
y
```

```
52 IF r=7 THEN LET b(x,y)=3:
LET msc=msc+10: PRINT AT y,x;"E
": NEXT x: NEXT y
```

```
53 IF r=8 THEN LET msc=msc+20
: LET b(x,y)=4: PRINT INK 0: AT
y,x;"G"
```

```
54 NEXT x: NEXT y: LET x=1: LE
T y=1
```

```
55 LET b(1,1)=1: INK 7: PRINT
AT 1,1;"A"
```

```
60 IF INKEY$="q" THEN GO TO
180
```

```
65 BEEP sp,40
```

```
70 IF INKEY$="a" AND y>1 THE
N LET d=1
```

```
80 IF INKEY$="z" AND y<21 TH
EN LET d=2
```

```
90 IF INKEY$="o" AND x>1 THE
N LET d=3
```

```
100 IF INKEY$="p" AND x<31 TH
EN LET d=4
```

```
110 IF d=1 AND y>1 THEN PRINT
BRIGHT 1: AT y,x;" ": LET b(x,y
)=0: LET y=y-1: PRINT INK s: AT
y,x;"D": GO TO 120
```

```
112 IF d=2 AND y<21 THEN PRINT
BRIGHT 1: AT y,x;" ": LET b(x,
y)=0: LET y=y+1: PRINT INK s: A
T y,x;"C": GO TO 120
```

```
115 IF d=3 AND x>1 THEN PRINT
BRIGHT 1: AT y,x;" ": LET b(x,y
)=0: LET x=x-1: PRINT INK s: AT
y,x;"A": GO TO 120
```

```
118 IF d=4 AND x<31 THEN PRINT
BRIGHT 1: AT y,x;" ": LET b(x,
y)=0: LET x=x+1: PRINT INK s: A
T y,x;"B"
```

```
120 IF b(x,y)=0 THEN LET tsc=t
sc-.5: GO TO 150
```

```
125 IF b(x,y)=1 AND d<>0 THEN
LET tsc=tsc+1: LET b(x,y)=.5:
GO TO 150
```

```
130 IF b(x,y)=2 THEN GO TO 165
```

```
135 IF b(x,y)=3 THEN LET tsc=t
sc+10: LET b(x,y)=0.5: GO TO 150
```

```
140 IF b(x,y)=4 AND d<>1 THEN
GO TO 160
```

```
145 IF b(x,y)=4 AND d=1 THEN L
ET tsc=tsc+20: LET b(x,y)=.5
```

```
150 GO TO 60
```

```
160 LET sc=sc-(msc/4)+tsc: PRIN
T INK 7: PAPER 0: AT 0,1;"Level
s ";l;" Score ";sc: PAPER 4: INK
0: AT 10,2;"You didnt attack th
at spider from BEHIND."
```

```
161 GO TO 170
```

```
165 LET sc=sc-(msc/4)+tsc: PRIN
T INK 7: PAPER 0: AT 0,1;"Level
s ";l;" Score ";sc: INK 0: PAPER
4: AT 10,2;"DONT step on the bo
rders "
```

```
170 PRINT FLASH 1: INK 0: PAPE
R 7: AT 21,5;" PRESS TO PLAY "
```

```
171 PAUSE 0: PAUSE 0: LET l=1:
LET lc=1
```

```
172 LET sc=0: LET msc=0: LET ts
c=0: LET d=0: GO TO 45
```

```
180 LET sc=sc-(msc/4)+tsc: PRIN
T AT 10,2;"You have tried ";l;"
levels You have ";sc;"points"
: PRINT INK 0: PAPER 7: FLASH 1
: AT 21,4;" PRESS TO PLAY ": PAU
SE 0: PAUSE 0: LET l=l+1: IF lc<
3 THEN LET lc=lc+1
```

```
181 LET d=0: GO TO 45
```

```
9000 INK 0: PRINT AT 0,5;"MOW T
HE LAWN
```

```
Help gard
ener Joe to mow the lawns for
Her Majesty. Joe....
```

```
.A or B or C or D
```

```
Joe will
```

```
get sacked if he mows a border (E)
```

```
or killed if he runs over a gia
```

```
nt spider (G) any way but from b
```

```
ehind. From behind it is worth 2
```

```
0 points, a weed (F) is worth 10 p
```

```
oints, uncut grass (dull. gree
```

```
n) is worth 1 point, but cut grass (
```

```
brighter green) is -.5 points
```

```
p.....right
```

```
a.....u
```

```
z.....d
```

```
q.....g
```

```
own
```

```
o to next level"
```

```
9001 PRINT FLASH 1: INK 0: PAPE
```

```
R 7: AT 21,4;" PRESS TO CONTINUE
```

```
": PAUSE 0
```

```
9002 CLS: PRINT AT 10,3;"Will you
```

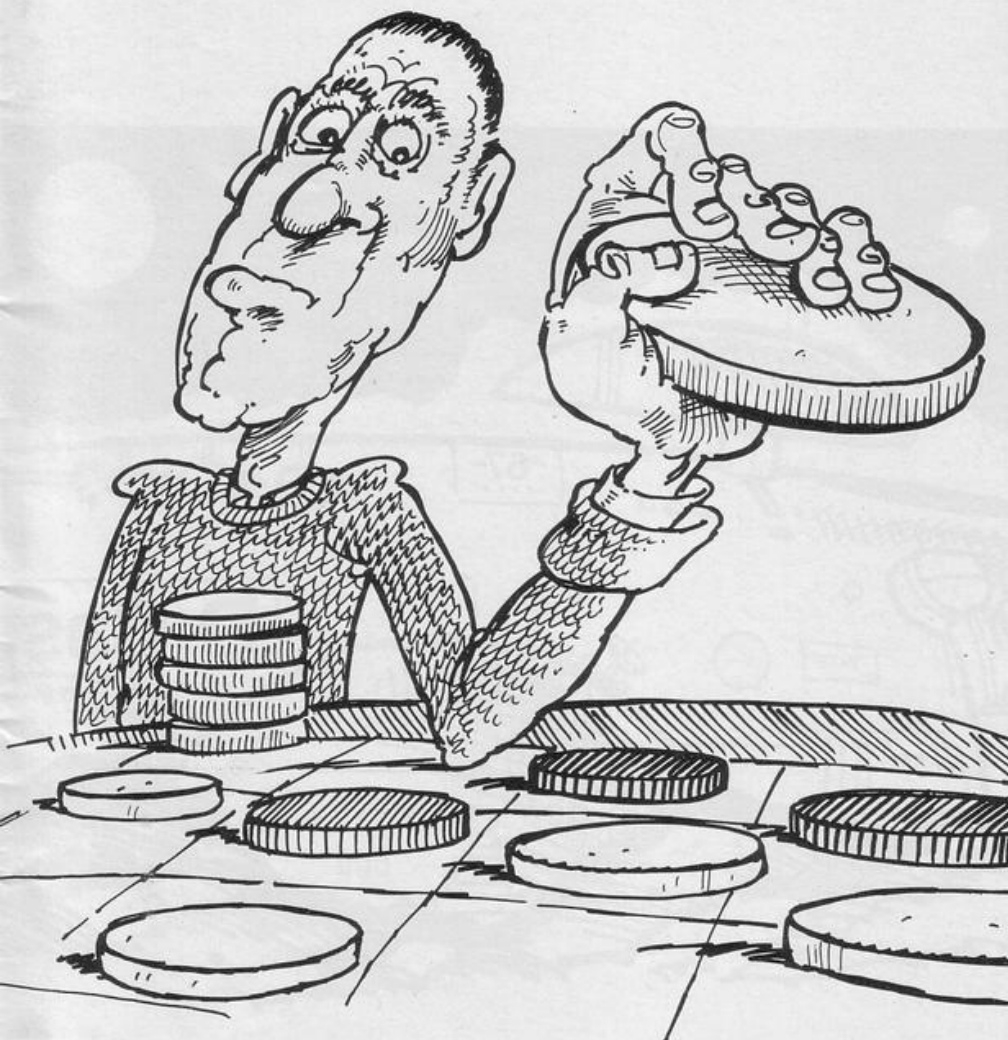
```
ever work out the scoring s
```

```
ystem?": FLASH 1: INK 0: PAPER 7
```

```
; AT 21,6;" PRESS TO PLAY.": PAU
```

```
SE 0: RETURN
```


Pro Printout



```

390 LET B=(CODE Z$-38)+33*(CODE
Z$(2)-29)+115
395 IF PEEK (A+B)<>21 THEN GOTO
400
400 POKE 16446,A+B-256*INT ((A+
B)/256)
405 POKE 16444,PEEK 16446
410 POKE 16447,INT ((A+B)/256)
415 POKE 16445,PEEK 16447
420 POKE 16508,0
430 RAND USR 16532
440 IF PEEK 16449<>0 THEN GOTO
490
450 PRINT AT 21,0;"ILLEGAL MOVE
460 GOTO 370
470 IF USR 16911=1 THEN GOTO 49
0
480 IF USR 16652=0 AND X=0 THEN
GOTO 570
485 IF PEEK 16448=0 THEN GOTO 5
00
490 LET Z=Z-1
500 RAND USR 16754
510 IF Z=0 THEN GOTO 570
520 IF PEEK 16507=180 THEN GOTO
550
530 IF PEEK 16507=52 THEN POKE
16507,180
540 GOTO 330
550 POKE 16507,52
560 GOTO 330
570 LET X=USR 16970
580 LET Z=54-Z
590 IF X>Z/2 THEN PRINT AT 20,0
;"I HAVE WON WITH ";X;" COUNTERS
610 IF X<Z/2 THEN PRINT AT 20,0
;"YOU HAVE WON WITH ";Z-X;" COUN
TERS"
620 IF X=Z/2 THEN PRINT AT 20,0
;"WE HAVE DRAWN"
630 PRINT "DO YOU WANT ANOTHER
GAME?"
640 INPUT Z$
650 IF Z$="NO" OR Z$="N" THEN N
EW
660 CLS
670 GOTO 100
9000 IF A$="" THEN RETURN
9010 LET B$=A$(1 TO 2)
9020 LET A$=A$(3 TO )
9030 POKE X,16*CODE B$(1)+CODE B
$(2)-476
9040 LET X=X+1
9050 GOTO 9000

```

```

20 LET hi=0
30 FOR a= USR "a" TO USR "f"+
7: READ udg: POKE a,udg: NEXT a

40 DATA 3,15,63,35,65,65,193,2
27,192,240,252,196,130,130,131,1
99
50 DATA 255,255,63,15,14,30,62
,126,255,255,252,240,112,120,124
,126
60 DATA 60,126,255,255,255,255
,126,60,90,255,171,255,170,255,1
09,219
70 BRIGHT 1: BORDER 0: PAPER 0
: INK 9: CLS
90 PRINT AT 18,5; INK 9; PAPE
R 1; FLASH 1;"PRESS ANY KEY TO B
EGIN"
100 PRINT AT 2,10; PAPER 5;"EG
G CATCHER!"
110 PRINT AT 4,7; PAPER 4;"198
4 BY M.R.WALKER."
120 PRINT AT 7,12; PAPER 6;"CD
NTROLS"
130 PRINT AT 10,12; PAPER 3;"P
= RIGHT"
140 PRINT AT 12,12; PAPER 2;"Q
= LEFT"; AT 14,12; PAPER 1;"H =
HOLD"
150 OUT 254,1: OUT 254,2: OUT 2
54,3: OUT 254,4: OUT 254,5: OUT
254,6:
160 IF INKEY$ <> "" THEN GO
TO 190
170 OUT 254,1: OUT 254,2: OUT 2
54,3: OUT 254,4: OUT 254,5: OUT
254,6:
180 GO TO 150
190 FOR a=0 TO 30: BEEP .010,40
: BEEP .015,50: NEXT a
200 CLS
205 PRINT #1; INK 9; BRIGHT 1;
INK 9;" 1984 MARTIN WALKER
"
210 LET mo=0: LET eg=0

```

```

220 LET po=15
230 LET re= INT ( RND *30)+1: L
ET eg=eg+1: IF eg>50 THEN GO TO
500
240 PRINT AT 0,0; PAPER 4; INK
9;"MONEY #";mo
250 PRINT AT 0,13; PAPER 5; IN
K 0;"EGGS ";eg
260 PRINT AT 0,23; INK 0; PAPE
R 6;"HI #";hi
270 PRINT AT 1,0; INK 3;"FFFFF
FFFFFFFFFFFFFFFFFFFFFFFF"
280 PRINT AT 21,0; INK 3;"FFFF
FFFFFFFFFFFFFFFFFFFFFFFF"
290 FOR c=3 TO 18
300 PRINT AT 19,po; INK 5;" AB
"; AT 20,po;" CD "
310 PRINT AT C-1, re;" "; AT c,
re; INK 6;"E"
320 IF c+3=20 AND po+1=re+1 OR
c+3=20 AND po+2=re+1 OR c+3=20 A
ND po+2=re THEN LET mo=mo+ INT
( RND *100)+1
340 LET po=po+( INKEY$ ="p" AND
po<28)-( INKEY$ ="q" AND po>0)

350 IF INKEY$ ="h" THEN PAUSE
0: PAUSE 0
360 NEXT c
370 PRINT AT c-1, re;" "
375 BEEP .05,5: BEEP .05,10
380 GO TO 230
500 PRINT AT 10,8;"G A M E O
V E R"
510 FOR a=0 TO 30: BEEP .005,5:
BEEP .005,10: BEEP .005,15: BEE
P .005,20: BEEP .005,25: NEXT a

520 IF mo>hi THEN FOR a=0 TO 1
00: PRINT AT 0,23; FLASH 1;"NEW
HIGH": NEXT a: LET hi=mo
550 FOR a=0 TO 60: BEEP .0010,5
0: BEEP .005,30: NEXT a: GO TO 7
0
560 GO TO 540

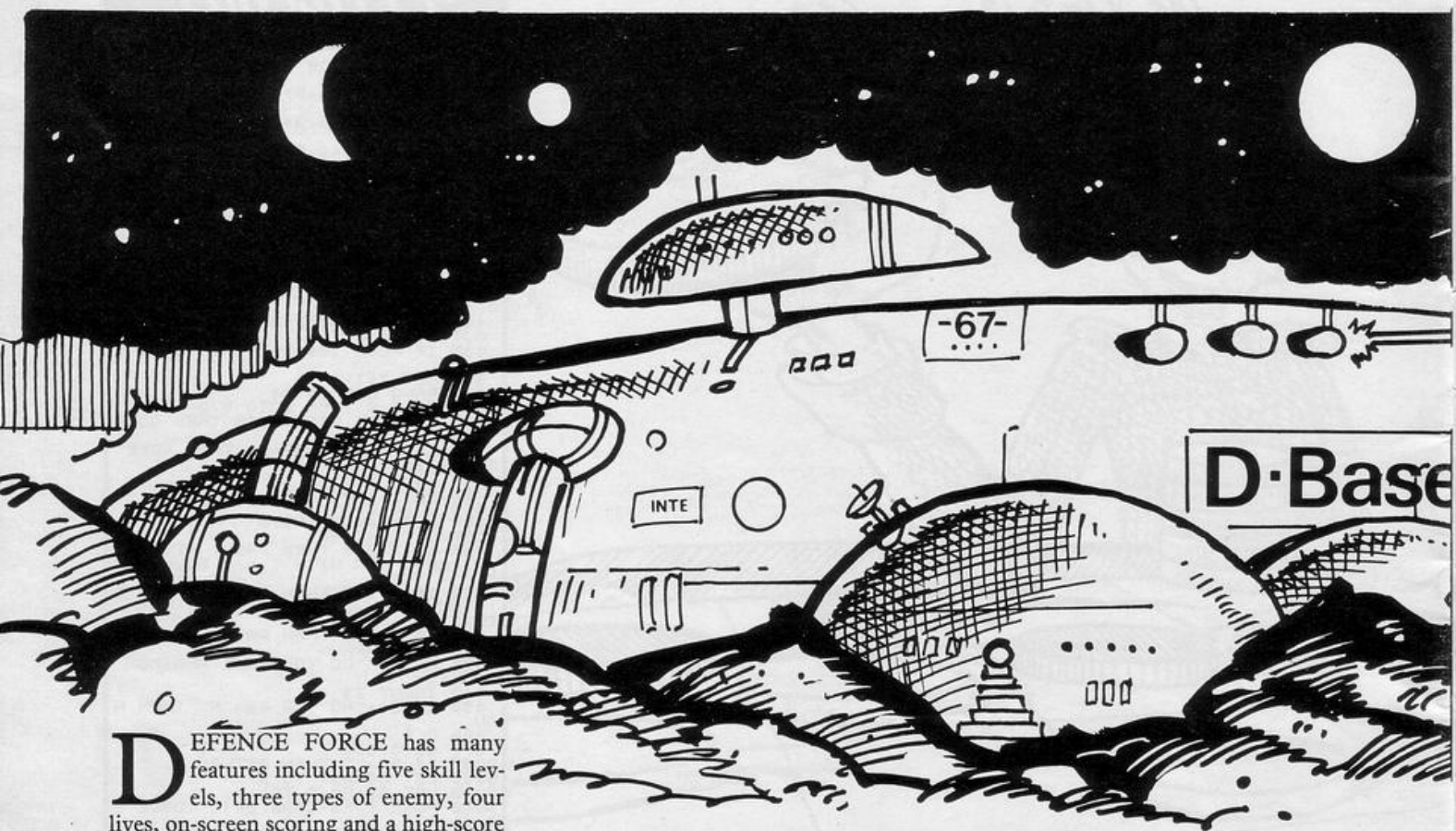
```



EGG SAVER

YOU have been employed by the Bird Protection Society to catch the eggs which fall from the birds' nests during high winds. For the fifty eggs which fall you will be paid between one and a hundred pounds depending on their condition. The keys to use are P and Q for right and left and H to hold.

Egg Saver was written for the 16K Spectrum by Martin Walker of Rugeley, Staffs.



DEFENCE FORCE has many features including five skill levels, three types of enemy, four lives, on-screen scoring and a high-score table. As always, the object is to protect your base from the approaching enemy. You have a forcefield to protect you but once this has gone, defeat is imminent. The game contains some machine code, so the following must be typed in before the rest of the program is entered: 1 REM (10 spaces); POKE 16514,42; POKE 16515,14; POKE 16516,64; POKE 16517,78; POKE 16518,6; POKE 16519,0; POKE 16520,201.

Written for the 16K ZX-81 by Greg Jarvis, aged 14, of Bridgwater, Somerset.

DEFENCE FORCE

```

1 REM E=END? TAN
2 PRINT AT 8,9; "DEFENCE FORCE"
...
7 PRINT AT 10,10; "PLEASE WAIT"
...
8 FOR G=0 TO 50
9 NEXT G
10 DIM H$(10,10)
20 LET H$(1)= "1880 GREG"
30 FOR G=2 TO 10
40 LET H$(G)= "100 ????"
50 NEXT G
60 DIM M$(10,10)
70 FOR G=1 TO 10
80 LET M$(G)= ""
90 NEXT G
100 LET A=12
110 LET R=INT (RND*15)+5
120 LET E=27
130 LET SC=0
140 LET FU=30
150 LET LI=4
160 DIM C$(3,3)
170 LET C$(1)= ""
180 LET C$(2)= ""
190 LET C$(3)= ""
200 LET H$=C$(3H)
210 LET W=15
220 LET SK=.12
230 LET PRINT=500
240 LET KEYS=550
250 LET FIRE=900
260 LET HIT=800
270 GOSUB 9000
280 GOSUB PRINT
290 GOSUB HIT
300 GOSUB KEYS
310 GOSUB FIRE
320 GOTO 250
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5040 PRINT AT 10,10;" "
5050 NEXT H
5055 LET FU=30
5060 PRINT AT 1,0;"FUEL:";
5070 GOTO 1000
5080 PRINT AT 10,9;"SHEET COMPLE"
5090 PRINT AT 12,12;"BONUS:"
5100 PRINT TAB 18;"000 PT:"
5110 PRINT TAB 18;"1 LIFE:"
5120 FOR G=0 TO 75
5130 NEXT G
5140 LET SC=SC+200
5150 LET SK=SK+.02
5160 LET LI=LI+1
5170 LET L=L+400
5180 LET FU=30
5190 LET W=16
5200 LET A=12
5210 LET R=INT (RND*12)+5
5220 LET E=27
5230 LET SH=SH+1
5240 IF SH>3 THEN LET SH=3
5250 LET W=14
5260 LET S=C$(SH)
5270 GOSUB 9500
5280 GOTO 250
5290 STOP
5300 FOR G=0 TO 7
5310 PRINT AT 10,10;"FORCEFIELD"
5320 TAB 10;"PENETRATED"
5330 PRINT AT 10,10;" "
5340 TAB 10;" "
5350 NEXT G
5360 LET W=15
5370 GOTO 1000
5380 GOSUB 9500
5390 LET Q$=STR$ SC
5400 FOR G=1 TO LEN Q$
5410 LET Q$(G)=CHR$ (CODE Q$(G)+
128)
5420 NEXT G
5430 PRINT AT 7,7;"YOU SCORED "
5440 LET J$=" DEFENSE FORCE BY G
REG JARVIS GAME OVER HIT
A KEY "
5450 LET J$=J$+J$
5460 LET D=1
5470 PRINT AT 11,0;J$(D TO D+31)
5480 LET D=D+1
5490 IF D=65 THEN LET D=1
5500 IF INKEY$="" THEN GOTO 7560
5510 GOTO 8000
5520 STOP
5530 IF SC>VAL H$(10) ( TO 5)
THEN GOTO 8500
5540 IF H$(10,1)<>" " THEN GOTO
8055
5550 PRINT AT 16,10;"PLEASE WAIT

```

```

8003 FOR G=0 TO 50
8004 NEXT G
8005 FAST
8010 FOR G=1 TO 10
8020 FOR H=1 TO 10
8030 LET H$(G,H)=CHR$ (CODE H$(G
H)+128)
8040 NEXT H
8050 NEXT G
8060 POKE 16418,0
8070 FOR G=2 TO 22
8080 PRINT AT G,0;" "
8090 NEXT G
8100 PRINT AT 4,6;"DEFENSE FORCE
HEROES"
8110 SLOW
8120 FOR G=1 TO 9
8130 PRINT AT G+6,9;CHR$ (G+156)
8140 NEXT G
8150 PRINT TAB 8;"10 "M$(10)
8160 PRINT AT 18,11;"HIT A KEY"
8170 PRINT AT 20,6;"OR PRESS S T
O STOP"
8180 LET P=1
8190 PRINT AT 23,0;" "
8200 LET S$=" "
8210 PRINT AT 22,0;S$(P TO P+31)
8220 LET P=P+1
8230 IF P=33 THEN LET P=1
8240 IF INKEY$="" THEN GOTO 8160
8250 IF INKEY$="S" THEN GOTO
8260
8270 CLS
8280 GOTO 60
8290 FOR G=0 TO 20
8300 NEXT G
8310 CLS
8320 LIST 1
8330 STOP
8340 CLS
8350 POKE 16418,2
8360 PRINT AT 7,0;" WELL DONE.YO
U HAVE GOT ONE OF
TODAYS HIGHE
ST SCORES. PLEASE
NAME (4 LETTERS)
8370 INPUT N$
8380 IF LEN N$>4 OR N$="" OR COD
E N$<38 OR CODE N$>63 THEN GOTO
8390
8400 PRINT AT 13,10;"PLEASE WAIT
8410 LET P=11
8420 FOR I=10 TO 1 STEP -1
8430 IF SC>VAL H$(I) ( TO 5) THEN
LET P=P-1

```

```

8440 NEXT I
8450 FOR I=9 TO P STEP -1
8460 LET H$(I+1)=H$(I)
8470 NEXT I
8480 LET H$(P) ( TO 5)=STR$ SC
8490 LET H$(P) (7 TO )=N$
8500 GOTO 8009
8510 STOP
8520 GOSUB 9500
8530 PRINT AT 6,4;"DEFENSE F
ORCE"
8540 PRINT AT 8,9;"USE KEYS:"
8550 PRINT AT 10,9;"O,U,E,R,T =
U"
8560 PRINT TAB 9;"A,S,D,F,G = DD
NN"
8570 PRINT TAB 9;"Y,U,I,O,P = FT
RS"
8580 PRINT AT 14,2;"SELECT SKILL
LEVEL (1 TO 5)"
8590 PRINT TAB 2;"BY PRESSING TH
E DESIRED KEY"
8600 PRINT AT 17,10;"1 2 3 4 5"
8610 LET A$=INKEY$
8620 IF A$="" THEN GOTO 8080
8630 IF CODE A$<29 OR CODE A$>33
THEN GOTO 8080
8640 FOR G=1 TO 5
8650 IF VAL A$=1 THEN GOTO 9140
8660 LET SK=SK+.02
8670 NEXT G
8680 PRINT AT 17,8+(VAL A$*2):A$
8690 FOR G=0 TO 50
8700 NEXT G
8710 GOTO 9500
8720 STOP
8730 POKE 16418,0
8740 FOR F=0 TO 1
8750 PRINT AT 0,0;"SCORE:";SC;
TAB 20;"LIVES:";LI
8760 PRINT TAB 0;"FUEL:"
8770 PRINT AT 1,0;" "
8780 LET J$=" "
8790 FOR G=5 TO 19
8800 PRINT " "
8810 NEXT G
8820 PRINT " "
8830 PRINT " "
8840 PRINT " "
8850 PRINT " "
8860 PRINT AT 22,10;H$(1)
8870 RETURN
8880 STOP
8890 REM ** AUTO RUN SAVE **
8900 SAVE "DE"
8910 RUN

```


GHOSH HUNT

WHEN the program is RUN you are shown at the centre of the screen. You will also see your power and a ghost which moves around the screen draining your energy. To prevent all your power being lost you must chase the ghost and put your cross on top of it. The ghost will then close its eyes and die. This must be done three times before you proceed to the next level where the same thing happens but you have less power. Do not chase the ghost to the edge of the screen as it will then be able to vanish and reappear anywhere on the screen.

Ghost Hunt was written for the 1K ZX-81 by A. Fogarty of Dukinfield, Cheshire.

In order to explain how this program works, it has been divided into several modules. What each of these modules does, and how each of the variables in the program is used are explained below.

Lines	Module name
10-40	SETUP 1
50-60	SETUP 2
70-80	SETUP 3
90-100	SETUP 4
110-240	MAIN
250-280	CAUGHT
290-330	LEVEL
340-350	SCORE

Variables

A,B	y,x coordinates of the ghost
C,D	y,x coordinates of player
W	number of ghosts caught
H	Level of difficulty
T	Power (or time left)
Z	Random number (0-3)
F	Score factor
E,K	Constants

What each module does:

SETUP 1

Gives values to the constants E and K. Sets the score to 0 and the game level to 1.

SETUP 2

Sets the number of ghosts caught to 0 and the power to $110-10 \times H$. This means that the power will start at 100 and decrease by 10 on each level.

SETUP 3

Defines where on the screen the player will start.

SETUP 4

Chooses a spot at random where the ghost will start the game.

MAIN

Clears the screen and then prints the positions of the players and the ghost. If there is no power left the computer then goes to the LEVEL module. Power is reduced by one. If the ghost and the player are in the same position the computer will move to the CAUGHT module. Reads the cursor keys and checks whether the player is at the edge of the screen, then moves player. The ghost is then moved, depending on the value of the random number z. If this means that the ghost would move off screen the computer returns to SETUP 4 to choose a random position for the ghost. The computer then begins the MAIN module again.

CAUGHT

The number of ghosts caught (w) is increased by one. The ghost is then



erased, and the value of w printed in its place. If three ghosts have been caught on the present level the computer will then move to the LEVEL module. The computer then moves to SETUP 3 to start the chase for the next ghost.

LEVEL

Prints the level. Score values are increased by $H \times W$ so that you score more highly on the difficult levels than on the easy ones. Level is increased by one. The computer moves to SETUP 2 to continue the game with three more ghosts and less power. The SCORE routine is called.

SCORE

Prints the score, which is $(F+W) \times 10$. If it is greater than one the computer then returns to LEVEL, otherwise the game ends.

This program could be improved in two ways. Firstly, lines 180-190 only compare the player's coordinates with those of the upper limits of the screen. Attempting to move through the top or left hand side of the screen will result in the movement controls being reversed. It would be better to omit lines 180 and 190, and to enter lines 160 and 170 as:
 160 LET D=D+(INKEY\$="8")
 AND D<VAL"28")-(INKEY\$="5")
 AND D>E)
 170 LET C=C+(INKEY\$="6")
 AND C<VAL"19")-(INKEY\$="7")
 AND C>E)



Secondly, the score routine at line 340 is slightly clumsy, as it is bad programming practice to exit from a subroutine. Better would be to delete lines 340-350 and to enter:
310 (as 340)
315 IF T<1 THEN STOP

```

10 LET E=SGN PI
20 LET K=SIN PI
30 LET F=K
40 LET H=E
50 LET W=K
60 LET T=VAL "110"-H*VAL "10"
70 LET C=VAL "11"
80 LET D=VAL "14"
90 LET A=INT (RND*VAL "22")
100 LET B=INT (RND*VAL "32")
110 CLS
120 PRINT AT C,D;"█";AT A,B;"█"
;AT K,K;"████████";T
130 IF T<=E THEN GOTO VAL "290"
140 LET T=T-E
150 IF A<C AND B<D THEN GOTO VAL "250"
160 LET D=D+(INKEY$="8")-(INKEY$="5")
170 LET C=C+(INKEY$="6")-(INKEY$="7")
180 IF C>VAL "19" THEN LET C=VAL "19"
190 IF D>VAL "28" THEN LET D=VAL "28"
200 LET Z=INT (RND*VAL "4")
210 LET A=A-(Z=K)+(Z=E)
220 LET B=B+(Z=E+E)-(Z=INT PI)
230 IF A>VAL "19" OR B>VAL "28" OR A<=E OR B<=E+E THEN GOTO VAL "90"
240 GOTO VAL "110"
250 LET W=W+E
260 PRINT AT A,B;"█";AT A,B;W
270 IF W>INT PI THEN GOTO VAL "290"
280 GOTO VAL "70"
290 PRINT "████████";H
300 LET F=F+H*T
310 GOSUB VAL "340"
320 LET H=H+E
330 GOTO VAL "50"
340 PRINT "████████";(F+W)*VAL "10"
350 IF T>E THEN RETURN

```

HUNT THE THIMBLE

CLUES to the whereabouts of the thimble are flashed up on the screen in the form of north, south, north east etc. Follow the clues and try to find the thimble in the fastest possible time.

Hunt the Thimble was written for the 16K ZX-81 by Paul Greathead, aged 14, of Bishop Auckland, Co. Durham.

```

10 LET BT=50
20 LET T=0
30 LET A=INT (RND*20)+2
40 LET B=INT (RND*31)+1
50 LET X=INT (RND*20)+2
60 LET Y=INT (RND*31)+1
70 FOR F=1 TO 21
80 PRINT AT F,0;"++++++"
90 NEXT F
100 PRINT AT A,B;"█"
110 PRINT AT 0,0;
120 IF A>X THEN PRINT "NORTH"
130 IF A<X THEN PRINT "SOUTH"
140 IF B>Y THEN PRINT AT 0,5;"E"
150 IF B<Y THEN PRINT AT 0,5;"W"
160 IF A=X AND B=Y THEN GOTO 20
170 PRINT AT A,B;"+"
180 LET A=A+(INKEY$="6") AND A<21
190 LET B=B+(INKEY$="8") AND B<32
200 PRINT AT 0,0;
210 LET T=T+1
220 GOTO 70
230 PRINT AT X,Y;"█"
240 IF T<BT THEN LET BT=T
250 PRINT AT 0,0;"TIME=";T;"
260 TIME=BT
270 PAUSE 454
280 CLS
290 GOTO 20

```




```
1: BORDER 0: PAPER 0: INK 7:
CLS
```

```
2 LET s=0
3 LET cheese=5
4 LET shot=0
5 GO SUB 6000
22 PRINT AT 6,28; INK 6;"A"
```

```
25 PRINT AT 5,0; INVERSE 1; I
NK 5;"(g2:ig3:q1)"
30 PRINT AT 6,0; INVERSE 1; I
NK 5;"(g5:ig8:ig5)"
```

```
40 LET n=1
41 LET sc=0
49 LET p=14
50 LET a=4
80 IF INKEY$="1" THEN LET p
=p-1
81 IF INKEY$="2" THEN LET p
=p+1
82 IF INKEY$="0" THEN FOR n
=19 TO 4 STEP -1: PRINT AT n,p+
1;" ": PRINT AT n+1,p+1;" ": LE
T shot=1
83 IF p=4 THEN LET p=p+1
84 IF p=28 THEN LET p=p-1
89 IF s=0 THEN LET a=a+1
90 IF s=1 THEN LET a=a-1
95 PRINT AT 4,0;" "
```

```
96 PRINT AT 0,0; INK 2;"SCORE
=";sc; INK 2;" CHEESE=";cheese
```

```
100 PRINT AT 6,a;" BC "
101 IF n=6 AND p=a OR n=6 AND p
-1=a THEN PRINT AT 10,4;"SQUE
EEEEEEK": BEEP .3,35: PAUSE 30:
PRINT AT 10,4;" "
LET sc=sc+10: LET s=0: PRINT AT
6,a;" ": LET a=4: GO TO 89
```

```
102 PRINT AT 20,p-1; INK 4;"
D "
105 IF cheese=0 THEN GO TO 900
110 IF a=26 THEN LET s=1
111 IF a<4 THEN LET s=0: PRINT
AT 6,28; INK 6;"A": LET cheese
```

Cheese Thief

SHOOT the mouse as it emerges from its house and runs across the floor to steal the cheese. There are ten pieces of cheese for the mouse to steal and, using keys 1, 2 and 0, you must save as many pieces as possible.

Cheese Thief was written for the 16K Spectrum by Mark Adams and Stephen Smith of Leicester.

```
=cheese-1
199 IF shot=1 THEN NEXT n: LET
shot=0
200 GO TO 80
6000 RESTORE : FOR f=USR "a" TO
USR "d"+7: READ a: POKE f,a: N
EXT f
6010 DATA 16,56,44,60,218,173,21
9,175
6020 DATA 64,33,19,39,47,79,84,3
8
```

```
6030 DATA 16,168,240,221,254,252
,64,96
6040 DATA 24,24,126,255,255,255,
255,255
6050 RETURN
9000 CLS : PRINT "NO CHEESE LEFT":
PRINT "YOU SC
DRED ";sc: PAUSE 0: FOR f=0 TO 2
0: BEEP .005,f: NEXT f: FOR z=40
TO 0 STEP -1: BEEP .006,z: NEXT
z: GO TO 1
```



SKATEBOARD STUNTMAN

GUIDE Stuntman Stan down onto his skateboard. Stan has jet engine shoes which prevent him from hitting the ground if the skateboard is not at the bottom of the shaft, but if the shoes overheat they blow up. Press 0 to operate the shoes.

Skateboard Stuntman was written for the 16K Spectrum by Patrick O'Brien, London N12.

```
5 LET hs=0: GO SUB 1000
10 LET sc=0: LET t=100: LET c=
0: LET l=3: PAPER 4
15 REM ****Title page****
17 CLS
20 PRINT AT 1,11;"Skateboard"
; AT 3,12;"Stunter"; AT 6,2;"Gui
de Stan the stuntman down "; AT
8,2;"onto his skateboard.He has
jet"; AT 10,2;"engine shoes but
```

```
these blow"; AT 12,2;"up after t
he time limit or if"; AT 14,2;"t
hey hit the ground."; AT 17,5;"
0' OPERATES THE SHOES"; AT 19,5;
"Press any key to play"
```

```
30 PAUSE 0
40 REM *****
90 CLS : BORDER c
92 PRINT AT 0,4;"HIGH ";hs; A
T 0,20;"SCORE ";sc
93 PRINT AT 6,22;"Time"; AT 1
3,22;"Lives ";l
95 FOR b=0 TO 17: PRINT AT b,
15;"(ig6)"; AT b,17;"(g6)": NEXT
b
100 LET x=3: LET z=INT (RND *
20)+5
110 REM **Main Program Loop**
120 FOR m=t TO 0 STEP -1: PRINT
AT 8,23;m;" "
130 PRINT AT 18,z;"_"
135 IF z>28 THEN LET z=3: PRIN
T AT 18,30;" "
145 PRINT AT x-1,16;" "
150 PRINT AT x,16; OVER 1;"A"
```

```
155 PRINT AT x+1,16;" "
157 IF INKEY$ <> "0" THEN LE
T x=x+1
160 IF INKEY$="0" THEN LET x
=x-1
162 IF x<3 THEN LET x=3
165 IF x=19 THEN GO TO 300
170 LET z=z+1
```

```
185 NEXT m
190 REM *****
200 PRINT AT 5,3;"Time Out": L
ET l=1-1: GO TO 700
300 IF z=15 THEN GO SUB 2000
305 IF z=15 THEN PRINT AT 5,9
; FLASH 1;"Super Landing!": LET
sc=sc+(c+1)*m: FOR r=0 TO 2: F
OR w=10 TO 30: BEEP .01,w: NEXT
w: NEXT r: LET t=t-10: LET c=c+1
: IF t=20 THEN GO TO 600
310 IF z <> 15 THEN PRINT AT
5,3;"Tough Luck!": LET l=1-1: GO
TO 700
350 GO TO 90
600 CLS : PRINT AT 5,10;"You A
re The"; AT 7,11;"CHAMPION"; AT
9,9;"SKATE STUNTER"
610 FOR k=0 TO 50: BEEP .004,k:
NEXT k: GO TO 610
700 FOR r=0 TO 2: FOR w=10 TO -
10 STEP -1: BEEP .01,w: NEXT w:
NEXT r
710 IF l <> 0 THEN GO TO 90
715 IF sc>hs THEN LET hs=sc: C
LS : PRINT AT 5,8; FLASH 1;"New
High Score!": PAUSE 0
720 CLS : PRINT AT 5,11;"GAME
OVER"; AT 10,9;"PRESS ANY KEY";
AT 15,10;"FOR NEW GAME": PAUSE 0
730 GO TO 10
1050 REM **U.D.G.**
1060 FOR a=0 TO 7: READ e: POKE
USR "A"+a,e: NEXT a
1300 DATA 24,36,24,16,124,16,40,
68
1400 RETURN
1500 REM *****
1900 REM ***Victory Skate***
2000 FOR d=16 TO 30
2010 PRINT AT 18,d;"A"; AT 18,
d; OVER 1;" ": PAUSE 3: NEXT d
2200 RETURN
2300 REM *****
```

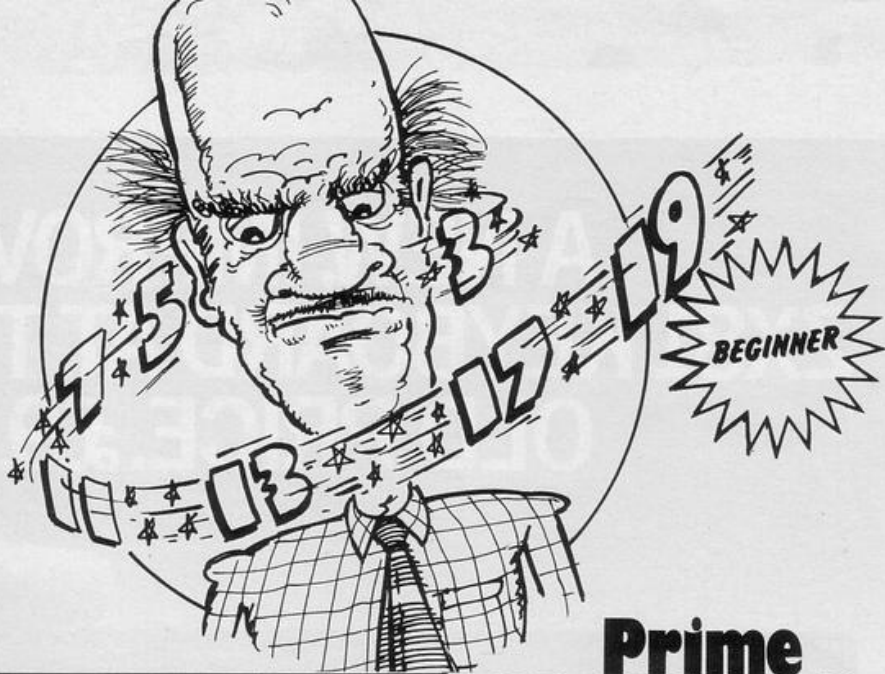


```

1 REM *****
2 REM ** PRIME **
3 REM ** COUNTER **
4 REM *****
5 REM
6 BORDER 6: PAPER 6: INK 0: C
LS
7 PRINT TAB 9;"PRIME COUNTER
"; TAB 9;"(5*3:sp:7*g3)": PRINT

10 PRINT "I WILL WORK OUT THE
PRIME"
15 PRINT "NUMBERS STARTING FRO
M ONE"
20 PRINT "NUMBER TO ANOTHER NU
MBER."
25 PRINT "WHAT DO YOU WANT THO
SE NUMBERS"
30 PRINT "TO BE? (SMALLEST FIR
ST,PLEASE).":
35 INPUT b: BEEP .2,1: INPUT a
: BEEP .5,0
40 IF b< VAL "2" OR b <> INT
b OR b >= a OR a< INT PI THEN
PRINT " INK 2;"NO GOOD,PLEASE T
RY AGAIN(ENTER)"THE NUMBERS ONE
AT A TIME).": GO TO 35
50 PRINT " INK 1;"Right,here w
e go!!"
55 FOR q=1 TO 500: NEXT q
60 PRINT : PRINT INK 1; BRIGH
T 1;b
65 IF b/2= INT (b/2) THEN LET
b=b+1
70 LET q=b: LET l= USR 32500:
IF 1 THEN GO TO 90
80 LET b=q: LET b=b+2: GO TO 7
0
90 POKE 23692,-1: PRINT q: IF
INKEY$ <> "" THEN BEEP .1,1:
PAUSE 50: PAUSE 0: BEEP .1,5
95 IF q<a THEN GO TO 80
100 FOR t=1 TO 20: BEEP .1,t: N
EXT t
105 BEEP 1,20: PRINT " INK 1;"N
ot bad,hey?"
110 PRINT " BRIGHT 1;"Do you wa
nt me to work out prime?"number
s from one number to:"another n
umber?": DIM z$(1)
115 INPUT z$: IF z$="y" OR z$="

```



Prime CALCULATOR

ENTER two numbers, the lowest of which should be three or higher. The program will then calculate all the prime numbers between these two integers. A small machine code routine is included to speed up the program and thus the whole program should be SAVED with SAVE "primec" LINE 200. This means that the machine code will load automatically.

Prime Calculator was written for the 16K Spectrum by Nigel Rosson of Manchester.

```

220 DATA 62,3,205,40,45,42,75,9
2,35,126,35,94,35,86,35,78,35,70
,205,182,42,239,192,1,193,5,49,3
9,3,48,48,0,8,224,225,3,48,48,0,
23,225,49,4,224
230 DATA 3,55,0,10,225,161,161,
15,15,224,56,24,220,56,1,1,0,201
,225,56,42,101,92,43,43,43,43,
237,91,75,92,19,1,5,0,237,176,2
39,2,56,1,0,0
240 DATA 201
Y" THEN CLS : GO TO 25
120 IF z$="n" OR z$="N" THEN S
TOP : RUN
125 CLS : PRINT FLASH 1: AT 11
,5;"PLEASE TYPE YES OR NO"
130 GO TO 115
200 CLEAR 32499
210 FOR f=32500 TO 32588: READ
a: POKE f,a: NEXT f: RUN

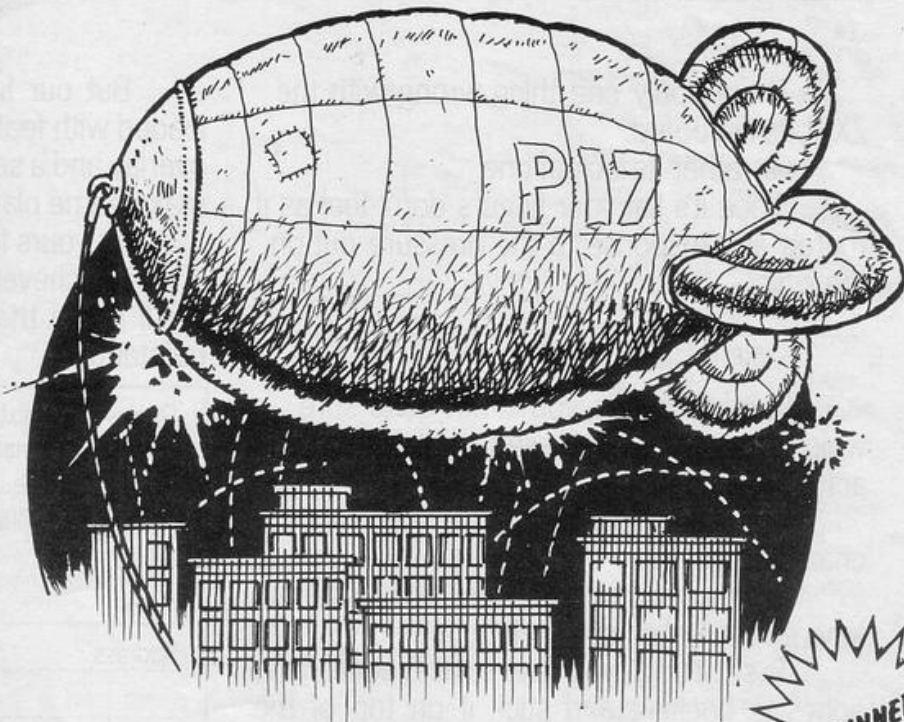
```

BARRAGE

```

1 REM BARRAGE BALLOONS
2 LET BL=0
10 FOR F=SGN PI TO INT PI
15 CLS
20 FAST
25 PRINT "*****BARRAGE BALLO
ONS*****";AT VAL "19",NOT PI;"
30 FOR B=INT PI TO CODE ">"
35 PRINT AT B,VAL "28";" "
40 NEXT B
45 PRINT AT INT (RND*16)+2,VAL
"28";CHR$ 38
50 FOR B=CODE "L" TO CODE ">="
55 PRINT AT INT (RND*17)+1,INT
(RND*19)+5;CHR$ 21
60 NEXT B
65 FOR R=SGN PI TO CODE "?"
70 PRINT AT VAL "18",INT (RND*
27);CHR$ 128
75 NEXT R
80 SLOW
85 LET X=INT (VAL "16"*RND+SGN
PI)
90 FOR Y=NOT PI TO CODE "1"
95 PRINT AT X,Y;
100 IF PEEK (PEEK 16398+PEEK 16
399+255)=CODE "+" THEN GOTO 135
105 IF PEEK (PEEK 16398+PEEK 16
399+255)=CODE "A" THEN GOTO 150
110 PRINT " "
115 LET Z=X
120 LET X=X+(INKEY$="6" AND X<U
AL "17")-(INKEY$="7" AND X>SGN P
I)
125 PRINT AT Z,Y;" "
130 NEXT Y
135 PRINT " "
140 PRINT AT VAL "10",SGN PI;"Y
OU LANDED IN ";BL;" OF THE BASES
145 STOP
150 LET BL=BL+1
155 IF BL=3 THEN PRINT AT VAL "
12",SGN PI;"WELL DONE...YOU LAND
ED YOUR";AT VAL "14",INT PI;"PLA
NE IN AL 3 BASES"
160 IF BL=3 THEN STOP
170 NEXT F
175 STOP
180 SAVE "BARRAGE BALLOONS"
185 RUN

```



BALLOONS

GUIDE your ship to your enemy's base whilst avoiding the barrage balloons which defend the city. Use keys six and seven to dodge the barrage balloons. When the

game ends you will be told how many times you landed at the base.

Barrage Balloons was written for the 16K ZX-81 by L Davis of Portsmouth, Hants.

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Crazy Painter



PAIN the floor of your employer's mansion. After a certain amount of the floor is painted the door opens enabling you to enter the next room. If you walk over the newly-painted areas you stick to the floor and

are doomed to stay on that spot forever. Do not paint the floor bugs, as they will eat you, and avoid the pillars.

Crazy Painter was written for the 16K Spectrum by Richard Tinner of Kingswood, Bristol.

```

6 LET hs=0
10 PAPER 6: BORDER 6: INK 0: C
LS
90 GO SUB 9000
100 GO SUB 6000
105 LET sheet=1
106 LET sc=0
107 LET sc2=0
108 LET bug=0
110 GO SUB 2000
115 GO SUB 3000
130 LET x=11: LET y=31
140 LET x1=0: LET y1=-1
150 LET xx=x: LET yy=y
160 PRINT AT 0,0;"SCORE=";sc;"
HIGH-SCORE=";hs
200 PRINT AT x,y: INK 0: PAPER
6;"A"
210 IF INKEY$="8" AND ATTR (
x,y+1) <> 0 THEN LET y1=1: LET
x1=0
220 IF INKEY$="5" AND ATTR (
x,y-1) <> 0 THEN LET y1=-1: LET
x1=0
230 IF INKEY$="7" AND ATTR (
x-1,y) <> 0 THEN LET x1=-1: LET
y1=0
240 IF INKEY$="6" AND ATTR (
x+1,y) <> 0 THEN LET x1=1: LET
y1=0
242 LET x=x+x1: LET y=y+y1
246 IF ATTR (x,y)=54 THEN GO
TO 600
247 IF ATTR (x,y)=50 THEN GO
TO 500
248 IF ATTR (x,y) <> 48 THEN
LET x=xx: LET y=yy: GO TO 150
249 IF y=31 THEN GO TO 150
250 PRINT AT xx,yy: INK 2: PAP
ER 6;"(ig8)"
255 LET sc=sc+1
256 BEEP 0.004,-10
260 IF sc>12*100+sc2 THEN PRI
NT AT 10,31: PAPER 6: INK 6;" "
270 GO TO 150
500 PRINT AT xx,yy: INK 2;"(ig
8)"
501 PRINT AT x,y;"C"
505 FOR n=10 TO -5 STEP -5
510 BEEP 0.5,n
515 NEXT n
520 IF sc>hs THEN PRINT AT 1,
4;"YOU HAVE A NEW HIGH-SCORE": L
ET hs=sc
540 PRINT AT 21,2;"PRESS ANY K
EY TO PLAY AGAIN"
550 PAUSE 0: PAUSE 0: CLS : GO
TO 100

```

```

600 CLS
601 IF sheet=5 THEN GO TO 800
602 LET sheet=sheet+1
603 LET sc2=sc
604 PRINT AT 10,3;"SHEET ";she
et-1;" COMPLETED BONUS 50": LET
sc=sc+50
607 FOR n=-10 TO 10: BEEP 0.09,
n: NEXT n
608 CLS
610 GO TO 110
650 STOP
800 CLS
801 LET P=1
802 LET sc=600
805 FOR N=1 TO 32
806 PAPER P: BORDER P: CLS
830 BEEP 0.05,N
835 LET P=P+1: IF P=8 THEN LET
P=1
840 NEXT N
841 LET sc=sc+150
845 PRINT AT 0,0;"*****WELL DO
NE YOU FINISHED*****"
846 PRINT AT 8,8;"YOU SCORED "
;sc
847 IF sc>hs THEN PRINT AT 1,
2;"YOU HAVE GOT A NEW HIGH-SCORE
": LET hs=sc
850 PRINT AT 21,0;" PRESS ANY
KEY TO PLAY AGAIN "
860 PAUSE 0: PAPER 6: BORDER 6:
CLS : GO TO 100
2000 PRINT AT 1,0: INK 0: PAPER
0;"(32*ig8)"
2010 FOR n=1 TO 20: PRINT AT n,
0: INK 0: PAPER 0;"(ig8)": AT n,
31;"(ig8)": NEXT n
2015 PRINT AT 10,31: INK 0: PAP
ER 6;" "
2020 PRINT AT 21,0: INK 0: PAPE
R 0;"(32*ig8)"
2025 IF sheet=1 THEN RETURN
2030 FOR n=11 TO 20: PRINT AT n
,10: INK 0: PAPER 0;"(ig8)": AT
n-10,20;"(ig8)": NEXT n
2040 IF sheet=2 THEN RETURN
2050 PRINT AT 5,1: INK 0: PAPER
0;"(15*ig8)": AT 16,16;"(15*ig8
)"
2060 IF sheet=3 THEN RETURN
2070 PRINT AT 11,20: INK 0: PAP
ER 0;"(4*ig8)"
2080 PRINT AT 10,7: PAPER 0: IN
K 0;"(4*ig8)"
2090 IF sheet=4 THEN RETURN
2100 PRINT AT 10,1: INK 0: PAPE
R 0;"(4*ig8)": AT 12,27: INK 0:

```

```

PAPER 0;"(4*ig8)"
2110 RETURN
3000 LET bug=bug+4
3001 IF bug>16 THEN LET bug=16
3005 FOR n=1 TO bug
3010 LET a=INT ( RND *20)+1: LE
T b=INT ( RND *29)+1
3020 IF ATTR (a,b) <> 48 THEN
GO TO 3010
3025 IF a=11 THEN GO TO 3010
3030 PRINT AT a,b: INK 2: PAPER
6;"B"
3040 NEXT n
3050 RETURN
6000 PAPER 6: BORDER 6: INK 0
6010 PRINT AT 0,9;"CRAZY PAINT
R"
6020 PRINT "Using the cursor key
s(5,6,7,8) you have to paint the f
loors of the rooms in your emplo
yers mansion. After you have pain
ted a certain amount of the floor
the door * will open and you w
ill be able to enter the next room
."
6030 PRINT "Sounds easy but if y
ou run over any of the newly pai
nted floor you stick to the flo
or and never leave that room, so r
emember to leave a clear path t
o the door. Also there are some
floor bugs * which if pain
ted will eat you! The game en
ds when you die or when you pain
t 5 rooms"
6035 PRINT "The higher the level
the more you'll have to paint
before leaving"
6040 INPUT "SELECT LEVEL (1 EASY
to 4 HARD)";sl
6050 IF sl>4 THEN GO TO 6040
6060 IF sl<1 THEN GO TO 6040
6065 LET sl=sl+1
6066 LET sl2=sl
6070 BEEP 0.05,15
6075 CLS
6080 RETURN
9000 FOR n=0 TO 23: READ d: POKE
USR "a"+n,d: NEXT n
9010 DATA 24,24,60,90,90,24,36,3
6
9020 DATA 66,60,90,219,126,60,66
,36
9025 DATA 24,24,255,255,24,24,24
,24
9030 RETURN

```



```

V 11 PAPER 4: INK 7: BORDER 4
12 GO SUB 2000
13 GO SUB 9000
15 DIM b(12)
17 LET t=200: LET s=0: LET r=0

20 FOR a=1 TO 12: LET b(a)=IN
T (RND *7)+10: NEXT a
25 LET y=15: LET z=y
27 CLS
28 PRINT AT 17,15: INK 7;"A"

30 PRINT AT 8,21:"SPECTRUM ";
r: AT 10,24:"HUMAN ";s
50 PLOT 95,143: DRAW 0,9: DRAW
49,0: DRAW 0,-9: PLOT 79,143: D
RAW 81,0: DRAW 0,-120: DRAW -81,
0: DRAW 0,120: PLOT 95,23: DRAW
0,-8: DRAW 49,0: DRAW 0,8
60 FOR a=1 TO 12: PRINT AT a+
3,b(a): INK 1;"D": AT a+3,b(a)+2
;"D": NEXT a
70 PRINT AT 19,23:"PRESS": AT
21,22:"ANY KEY": BEEP .1,10: PA
USE 0: PRINT AT 19,23:" ";
AT 21,22:" "
90 FOR x=17 TO 3 STEP -1
95 PRINT AT 0,0:"TIME ";t;"
"
100 PRINT AT x,y: INK 7;"A"
105 PRINT AT x+1,z:" "
107 LET t=t-1: IF t<0 THEN GO
TO 6000
110 IF INKEY$="q" THEN LET y
=y-1: LET z=y+1
112 IF INKEY$="w" THEN LET y
=y+1: LET z=y-1
115 IF INKEY$="" THEN LET z=
y
121 IF y<10 OR y>19 THEN GO TO
150
122 IF ATTR (x-1,y)=33 THEN G
O TO 3000
130 NEXT x
140 IF y>11 AND y<18 THEN PRIN
T AT 3,23:"GOAL!!!": BEEP .4,20
: LET s=s+1: GO TO 20
150 PRINT AT 3,23:"BALL OUT";

```

```

AT 5,23:"OF PLAY": BEEP .5,5: GO
TO 20
2000 FOR a=0 TO 7: READ c: POKE
USR "A"+a,c: NEXT a
2010 FOR a=0 TO 7: READ c: POKE
USR "D"+a,c: NEXT a
2020 DATA 0,60,126,126,126,126,6
0,0
2030 DATA 56,56,56,16,124,16,40,
68
2040 RETURN
3000 FOR e=x TO 18: PRINT AT e+
1,y: INK 7;"A": AT e,y;" ": PAUS
E 5: NEXT e
3010 IF y<18 AND y>11 THEN PRIN
T AT 3,23:"I SCORED!": BEEP .3,
-5: LET r=r+1
3020 GO TO 20
6000 BEEP 2,40: CLS: PRINT AT
3,11:"GAME OVER": AT 5,10:"Final
Score": AT 8,10:"ZX UNITED ";r
: AT 10,10:"HUMAN ";s: IF s>
r THEN PRINT AT 15,8:"You Win
Earthling!"
6010 IF r>s THEN PRINT AT 15,1
0:"ZX RULES OK!!"
6020 IF r=s THEN PRINT AT 15,4
:"I'll Beat You Next Time"
6030 PRINT AT 18,3:"Press Any K
ey For New Game": PAUSE 0: RUN
9010 CLS: PRINT AT 0,12:"FOOTB
ALL"
9020 FOR o=1 TO 10: READ i$: PRI
NT AT o*2,2;i$: NEXT o: PRINT
AT 21,5:"PRESS ANY KEY TO PLAY":
PAUSE 0: RETURN
9030 DATA "Your team have all be
en sent","off,except you.The oth
er team","have 24 men,but you ha
ve","remote control of the ball!
!!!","However,if you lose possess
ion"
9040 DATA "you lose control.Try
to score","the most goals before
the","whistle goes.(Beware the
ball)","cannot stop!!!".Controls
are:" " q=right w=left
"

```



LONE ATTACKER

YOUR FOOTBALL team have all been sent off the field and you are left facing a team of twenty-four players. To give you a slight advantage the game begins with you in control of the football. If, however, you lose control of the ball your opponents have sole possession and you can only wait and see if they manage to score.

Lone Attacker was written for the 16K Spectrum by Patrick O'Brien, London N12.



LOG JUMP

JUMP FROM one log to another using key 7. When you reach the top of the screen you start again

only this time the logs are shorter. Misjudge a jump and you will fall to your death.

Log Jump was written for the 16K ZX-81 by Hai Ngo of Spencer, Northampton.

```

9 CLS
10 LET A=21
20 LET B=15
30 LET SC=0
40 LET S=1
100 PRINT AT 0,0:" ";AT 21,0:" "
110 FOR F=0 TO 21
120 PRINT AT F,0:" | ";AT F,31:" | "
130 NEXT F
140 PRINT AT 21,1:" "
150 PRINT AT 0,23:"SCREEN:";S
160 LET B$=""
170 LET D$=""
180 IF S=5 THEN LET A$=""
190 IF S=1 THEN LET A$=""
200 IF S=2 THEN LET A$=""
201 IF S=3 THEN LET A$=""
203 IF S=3 THEN LET A$=""
204 IF S=4 THEN LET A$=""
205 FOR F=0 TO 10
210 LET D$=D$+" "+A$
220 IF LEN D$>20 THEN GOTO 231
230 NEXT F
231 IF LEN D$=30 THEN GOTO 240

```

```

232 LET D$=D$+" "
233 GOTO 231
240 LET C$=D$
250 LET C$=C$(30)+C$(TO 29)
270 PRINT AT 1,1;D$:AT 5,1;D$:A
T 9,1;D$:AT 13,1;D$:AT 17,1;D$
280 PRINT AT 3,1;C$:AT 7,1;C$:A
T 11,1;C$:AT 15,1;C$:AT 19,1;C$
290 LET D$=D$(2 TO )+D$(1)
330 PRINT AT A,B
340 LET P=PEEK (PEEK 16398+PEEK
16399*255)
350 IF P=20 THEN GOTO 600
360 PRINT AT A,B;B$
370 IF INKEY$="7" THEN GOSUB 51
0
380 IF A=1 OR A=5 OR A=9 OR A=1
3 OR A=17 THEN LET B=B-1
390 IF A=3 OR A=7 OR A=11 OR A=
15 OR A=19 THEN LET B=B+1
395 IF B>30 THEN LET B=30
396 IF B<1 THEN LET B=1
400 PRINT AT 0,1:"SCORE:";SC
410 IF A=1 THEN GOTO 540
500 GOTO 260
510 LET A=A-2
520 LET SC=SC+10

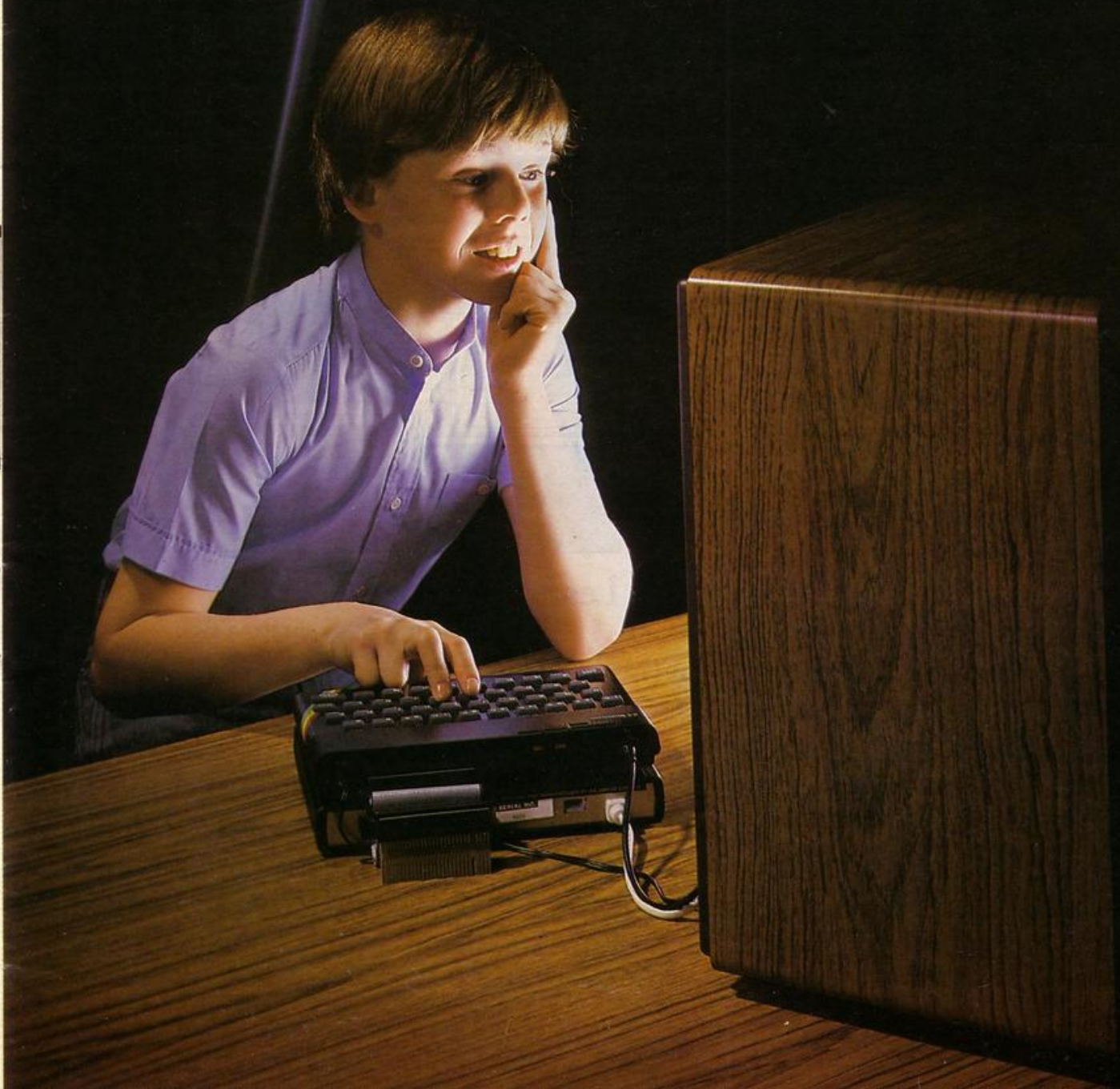
```

```

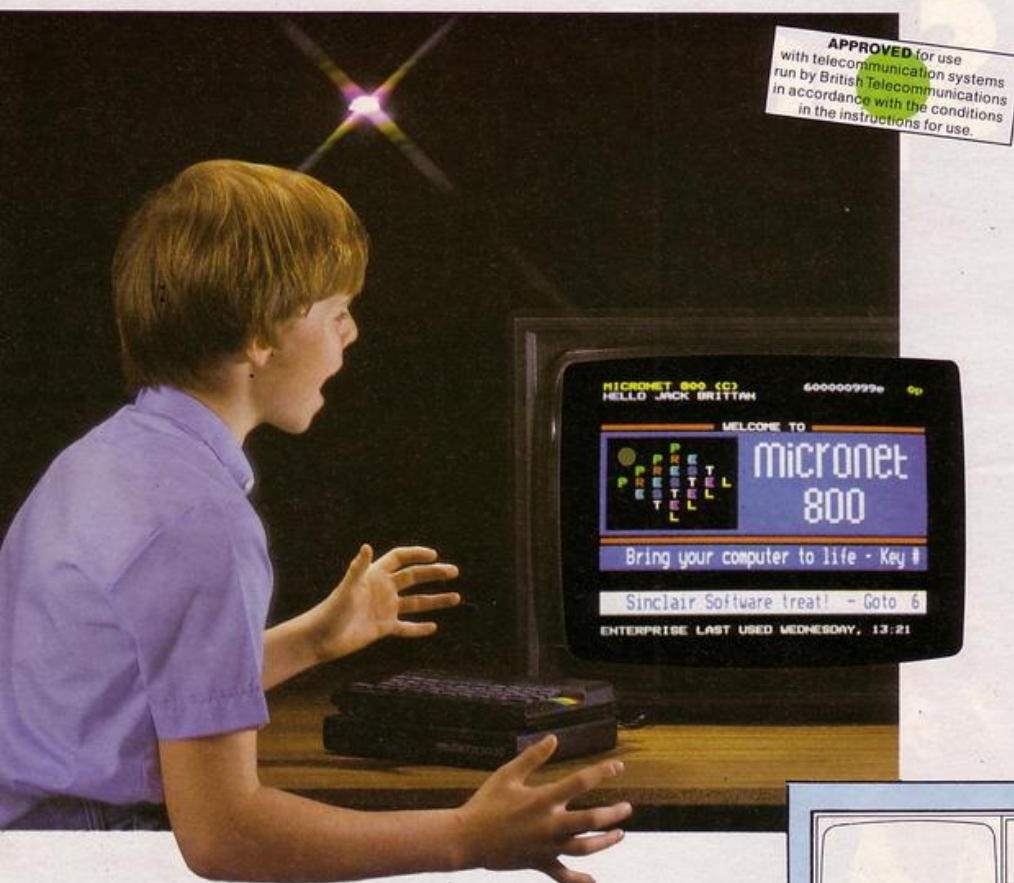
530 RETURN
540 LET S=S+1
550 IF S=6 THEN LET S=5
570 LET A=21
575 LET B=15
580 CLS
590 GOTO 100
600 FOR F=0 TO 10
601 PRINT AT A,B;" ";AT A,B;" "
;AT A,B;" ";AT A,B;" "
602 NEXT F
610 PRINT AT 7,4:"BAD LUCK... Y
OU ARE DROWN "
620 PRINT AT 9,4:"YOUR SCORE IS
";SC
630 IF S<1 THEN PRINT AT 11,4:
"YOU MANAGE TO SCREEN ";S
640 PRINT AT 21,0:"DO YOU WANT
ANOTHER GAME?(Y/N)"
650 INPUT A$
660 IF A$="Y" THEN RUN
670 IF A$="N" THEN STOP
680 GOTO 650
700 SAVE "LOG JUMP"
710 RUN

```


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mainframe with
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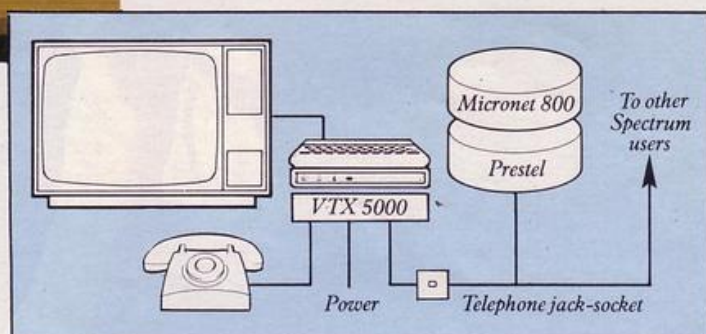
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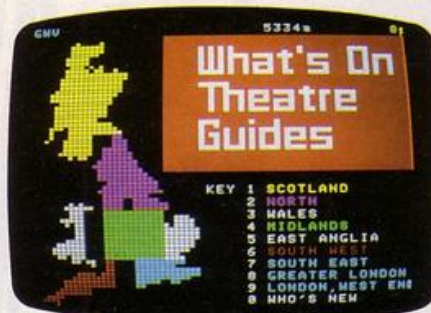
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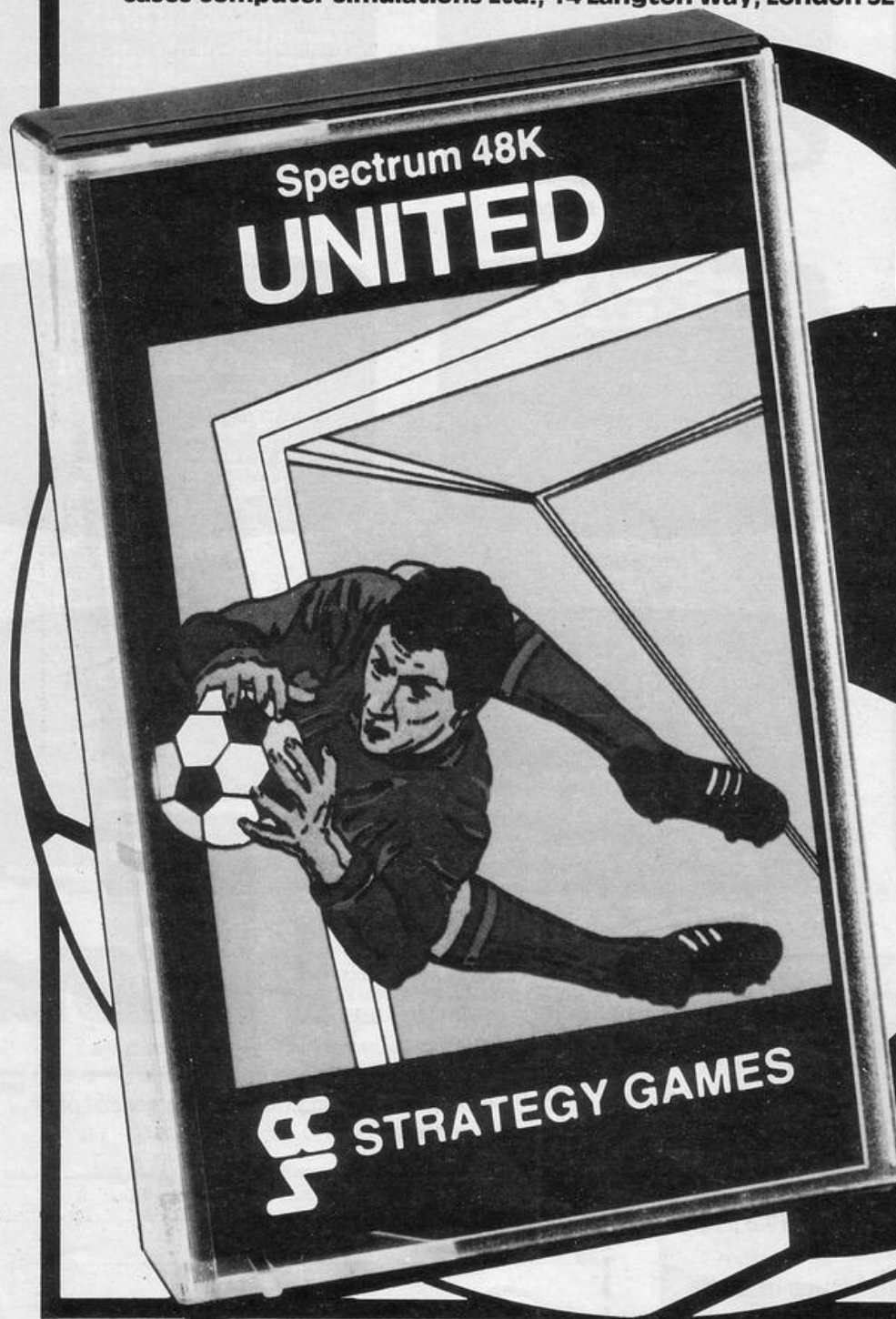
Address: _____

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```

5 GO SUB 9000
6 GO SUB 6000
10 LET sc=0: LET li=3: LET hi=
0: LET m1=4: LET b=0: LET c=1: L
ET m=0: LET z=1
15 DIM f(4): FOR f=1 TO 4: LET
f(f)=1: NEXT f
16 LET r=1
17 GO SUB 9500
25 FOR d=31 TO 0 STEP -1
30 IF m=0 THEN LET b=d
35 IF INKEY$="o" THEN PAUSE
10: PAUSE 0
40 IF INKEY$="p" THEN IF m=
0 THEN LET m=1: BEEP .001,15: B
EEP .001,50
50 IF m=1 THEN PRINT AT c,b;
" ": LET c=c+z: LET b=b+( INKEY$
="w" AND b<31)-( INKEY$="q" AN
D b>0): IF SCREEN$ (c,b) <> " "
THEN GO TO 5000
60 PRINT AT c,b;"H"
61 IF m=1 THEN IF b-1=d THEN
IF c=1 THEN GO TO 1000
65 IF c>20 THEN GO TO 5000
66 IF c=0 THEN GO TO 5010
70 GO SUB 9530: NEXT d: GO TO
25
1000 BEEP .001,10: BEEP .001,13:
BEEP .001,16: PRINT AT c,b;" "
: PRINT AT 1,b;"H": IF sc/300=
INT (sc/300) THEN FOR f=1 TO 4:
LET f(f)=1: NEXT f: RESTORE 970
0: FOR g=1 TO 10: READ a,b: BEEP
a,b: NEXT g: LET r=r+1: PRINT
AT 17,0; PAPER 7; INK 0;"SHEET";
AT 19,0; INK 1; PAPER 7;r
1010 LET z=1: LET m=0: LET d=d+2
: LET c=1: NEXT d
4000 PRINT AT 15,0; PAPER 7; IN
K 1;sc: LET c=c-1: BEEP .01,10:
BEEP .01,20: BEEP .01,30
4010 LET z=-1: NEXT d: GO TO 25

```

```

5000 IF f(1)=1 THEN IF c=14 THE
N IF b>10 THEN IF b<19 THEN L
ET f(1)=0: PRINT AT 13,17;" ":
LET sc=sc+50: GO TO 4000
5001 IF f(2)=1 THEN IF c=16 THE
N IF b>20 THEN LET f(2)=0: LET
sc=sc+80: PRINT AT 15,24;" ":
GO TO 4000
5002 IF f(4)=1 THEN IF c=20 THE
N IF b>14 THEN IF b<23 THEN L
ET f(4)=0: PRINT AT 19,21;" ":
LET sc=sc+90: GO TO 4000
5003 IF f(3)=1 THEN IF c=17 THE
N LET f(3)=0: LET sc=sc+80: IF
b<13 THEN PRINT AT 16,8;" ": G
O TO 4000

```

```

5010 FOR g=32 TO 100: PRINT AT
c,b; INK 2; PAPER 6; OVER 1; BRI
GHT 1; FLASH 1; CHR$(g): BEEP .
001,20: NEXT g
5015 PAUSE 100: CLS
5020 PRINT AT 10,11; INK 2; PAP
ER 6; BRIGHT 1;"GAME OVER"; AT
12,11; PAPER 2; INK 6;"SCORE=";s
c

```

```

5030 PRINT AT 21,0; INK 2; PAPE
R 6; FLASH 1; BRIGHT 1;" PRESS
ANY KEY FOR ANOTHER GO ": FOR f
=1 TO 4000: BORDER 7: BORDER 6:
BORDER 5: BORDER 4: BORDER 3: B0
RDER 2: BORDER 1: BORDER 0: PAUS
E 1: IF INKEY$="" THEN NEXT f

```

```

5031 GO TO 10
6000 PAPER 0: BORDER 0: INK 7: C
LS: PRINT AT 0,0; INK 5; FLASH
1; PAPER 2; BRIGHT 1;" L U N
A R R E S C U E "
6010 PRINT " Your mission is to
rescue as many stranded scient
ists (D) as possible from the moo
ns surface."

```

```

6020 PRINT " You control the sm
all spaceship(H).When you have r
escued one of the scientists,you
then have to dock with the mothe
rship EGI
F J."

```

```

6025 PLOT 206,97: DRAW 0,12,-1.3
: PLOT 232,97: DRAW 0,12,1.3
6030 PRINT " If you crash into
one of the asteroids or the mo
thership or into the moons surf
ace or you miss the mothership
on the way back,then the game
will end."
6040 PRINT "CONTROLS:
'q' Left
'w' Right
'p' Take off from mo
'o' Hold"

```

```

6050 PRINT PAPER 6; INK 2; FLAS
H 1; BRIGHT 1;" PRESS ANY KE
Y TO BEGIN "
6060 PAUSE 1: PAUSE 0: RETURN
9000 FOR f=USR "a" TO USR "r"+
7: READ a: POKE f,a: NEXT f
9005 RETURN
9010 DATA 0,85,170,85,170,255,25
5,255
9020 DATA 56,184,144,124,58,58,4
0,40,56,58,18,124,184,184,40,40,
56,56,16,254,56,56,40,40
9030 DATA 0,0,0,0,0,0,15,19,35,6
7,127,127,63,31,7,0,0,0,0,1,7,
255,195,24,52,52,122,122,122,126
,36,0,56,120,248,248,248,249,255
,255,255,255,249,248,248,240,0
9040 DATA 0,0,1,3,7,15,15,31,31,
31,31,15,15,7,1,0,0,112,248,248,
252,252,252,252,252,248,248,249,
241,240,224,0,0,0,0,48,48,0,130,
192,192,0,8,0,98,96,0,0,24,124,2
54,255,127,127,63,6,0,96,178,240
,97,4,48,50

```

```

9500 BORDER 7: PAPER 0: INK 7: C
LS
9510 PRINT AT 12,0;"(8*ig3:ig7:
13*sp:10*ig3:7*ig8:g2:15*sp:gl:g
3:13*ig8:g2:4*sp:AAAAAAA:6*sp:g
1:11*ig8:ig5:5*sp:gl:2*ig8:15:i0
:2*ig8:g2:7*sp:g5:10*ig8:g2:6*sp
:ig5:4*ig8:ig5:3*sp:AAAAA:g5:10*i
g8:AAAAA:3*sp:4*ig8:4*sp:gl:ig8:
18:10:14*ig8:18:10:ig8:g2:3*sp:g
5:2*ig8:ig5:6*sp:g3:g7:15*ig8:g2
:5*sp:2*ig8:10*sp:g7:12*ig8:g2:6
*sp:2*ig8:sp:AAAAA:4*sp:12*ig8:
ig1:ig7:4*sp:ig2:2*ig8:ig1:gl:ig
8:19:10:ig8:g2:3*sp:g4:5*ig8)"

```

```

9515 PRINT AT 13,0; PAPER 7; IN
K 0;"SCORE"; AT 15,0; PAPER 7; I
NK 1;"0"
9516 PRINT AT 17,0; PAPER 7; IN
K 0;"SHEET"; AT 19,0; PAPER 7; I
NK 1;"1"

```

```

9520 LET a$="BDCD": LET c$=" KM
Q Q R Q QP LN
P R P Q R Q": L
ET b$="GI
E J
F": LET d$="RQ OKM R
Q QQ Q OKM R
P RP Q PLN P

```

```

9530 LET c$=c$(2 TO 32)+c$(1)+c$
(34 TO 64)+c$(33): LET a$=a$(4)+
a$( TO 3): LET b$=b$(2 TO 32)+b$
(1)+b$(34 TO 64)+b$(33): LET d$=
d$(32)+d$(1 TO 31)+d$(64)+d$(33
TO 63)
9540 PRINT AT 13,17;(a$(1) AND
f(1)); AT 15,24;(a$(1) AND f(2))
: AT 16,8;(a$(1) AND f(3)); AT 1
9,21;(a$(1) AND f(4))
9550 PRINT AT 0,0;b$: AT 5,0; I
NK 6;c$
9560 PRINT AT 8,0; INK 2;d$
9570 RETURN
9700 DATA .1,9,.1,4,.1,9,.1,4,.1
,9,.05,2,.08,-2,.1,1,.1,5,.1,9

```



SCIENTIST RESCUE

YOUR mission is to rescue stranded scientists from the moon's surface. You control the

small space vehicle, using q and w for left and right. When you have collected a scientist you must dock with the moving space laboratory so that she can return to safety.

Scientist Rescue was written for the 16K Spectrum by Neil Bates of Coventry.

THIS IS a space invader type game in which you control a laser turret at the bottom of a mountain. Use keys 5 and 8 to rotate the turret and 0 to fire at the intruders. Ten points are awarded for each intruder shot and a bonus can be gained by hitting the spaceship which occasionally strays across the screen.

Laser Turret was written for the 16K Spectrum by Neil Bates, aged 15, of Coventry, W Midlands.

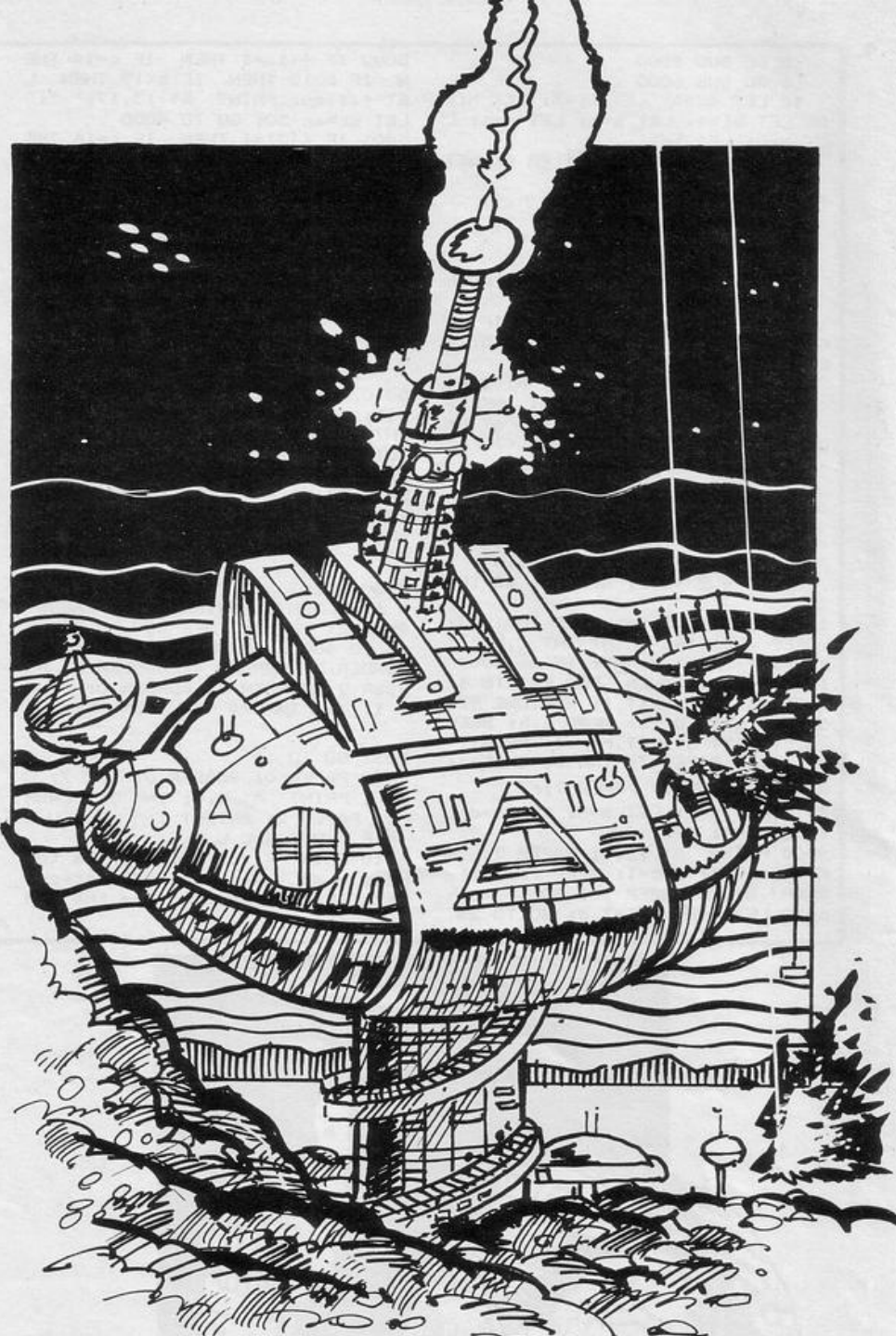
```

10 DATA 80,80,81,79,75,73,73,7
2,70,70,70,71,72,72,71,69,68,67,
66,66,65,64,65,64,62,59,53,53,46
,43,42,41,36,31,29,28,20,19,18,1
6,22,24,26,26,27,28,28,29,29,29,
29,29,29,28,28,27,27,25,24,22
,8,9,10,12,16,18,19,23,27,28,29,
32,34,35,37,39,39,37,36,37,38,39
,44,46,57,59,62,65,67,68,70,72
15 DATA 0,36,66,153,255,153,66
,36,0,0,0,0,3,0,0,0,0,0,14,255,2
55,14,14,126,0,7,255,255,7,0,0,0
,31,255,255,255,255,31,0,0,255,2
55,254,255,255,254,126,0,0,0,0,0
,31,255,63,0,126,6,14,31,254,255
,254,0,0,0,0,32,0,0,8,0,0,0,8,0,
0,32,0,0,0,64,0,0,0,64,0,0,128,0
,0,16,0,0,0,0,0,0,8,0,0,1,0,32,0
,0,4,0,0,0,16,0,8,128,1,16,0,68,
0,33,0,0,0,0,56,60
20 PAPER 5: BORDER 0: INK 0: C
LS : DIM a(93): FOR f=1 TO 93: R
EAD b: LET a(f)=b: NEXT f
21 FOR f=USR "a" TO USR "d"+
7: READ a: POKE f,a: NEXT f
25 GO SUB 200
26 DIM a$(2,100): LET a$(1)="(
95*sp)BC"
27 LET a$(2)="(94*sp)DEF"
30 LET l=0
36 LET b=0: LET c=0
37 LET h=0: LET u=0
38 LET sc=0: LET d=0: LET e=0

40 FOR x=100 TO 1 STEP -1
45 LET l=1+6*(INKEY$="8" AND
1<0)-6*(INKEY$="5" AND 1>-32)

50 LET f=COS l*12: LET g=SIN
l*12
55 IF d=21 OR b=21 THEN GO SU
B 9000
60 PLOT 50+f,20+g: DRAW f,g
61 IF INKEY$="0" THEN GO SU
B 100
62 LET a$(1)=a$(1,2 TO )+a$(1,
1): LET a$(2)=a$(2,2 TO )+a$(2,1
): PRINT AT 0,0;a$(1, TO 32);a$(
2, TO 32)
70 OVER 1: PLOT 50+f,20+g: DRA
W f,g: OVER 0
75 GO SUB 300
80 NEXT x
90 GO TO 40
104 INK 2: PLOT 50+f+f,20+g+g:
DRAW (11*f)+2,(11*g): INK 0
105 BEEP .1,-20
106 GO SUB 1000
110 OVER 1: PLOT 50+f+f,20+g+g:
DRAW (11*f)+2,(11*g): OVER 0
115 IF u=1 THEN PRINT AT b,c;
" ": LET b=0: LET u=0
116 IF h=1 THEN PRINT AT d,e;
" ": LET d=0: LET h=0
120 RETURN
200 FOR f=1 TO 61: PLOT f-1,0:
DRAW 0,a(f): BEEP .001,a(f)/1.2:
NEXT f: PRINT AT 21,7:(3*ig8:
2*sp)GH(2*sp)GH(2*sp)GH(2*sp)GH(
sp:5*ig8)": FOR f=62 TO 93: PLOT
f+162,0: DRAW 0,a(f): BEEP .001
,a(f)/1.2: NEXT f: PRINT AT 21,
0: PAPER 0: INK 7:"Score=0": RETURN
300 IF b=0 THEN LET c=INT ( R
ND *20)+6: LET b=2

```



LASER TURRET

```

305 IF d=0 THEN LET e=INT ( R
ND *20)+6: LET d=2
310 INK 1: PRINT AT b,c;" ": L
ET b=b+1: PRINT AT b,c;"A"
315 PRINT AT d,e;" ": LET d=d+
1: PRINT AT d,e;"A": INK 0: RET
URN
500 LET sc=sc+10: PRINT AT 21,
0: INK 7: PAPER 0:"Score=";sc: L
ET u=1: FOR y=1 TO 7: PRINT INK
y: AT b,c: OVER 1: CHR$ (152+y)
: BEEP .001,30: NEXT y: RETURN
600 LET sc=sc+100: PRINT AT 21
,0: INK 7: PAPER 0:"Score=";sc
610 LET x$="IJKLMND": FOR v=1 T
O 6: BEEP .001,50: PRINT AT 0,x
-6: OVER 1;x$( TO 4): AT 1,x-6;
OVER 1;x$( TO 4): LET x=x$(2 TO
)+x$(1): NEXT v
620 LET a$(1)="(95*sp)BC"

```

```

630 LET a$(2)="(94*sp)DEF"
640 LET x=100: RETURN
1000 IF ATTR (b,c)>41 THEN GO
SUB 500
1005 IF x<35 THEN FOR v=3 TO 6:
IF ATTR (1,x-v)=42 THEN GO SU
B 600
1007 IF x<35 THEN NEXT v
1010 IF ATTR (d,e)>41 THEN GO
SUB 1100
1020 RETURN
1100 LET sc=sc+10: PRINT AT 21,
0: INK 7: PAPER 0:"Score=";sc: L
ET h=1: FOR y=1 TO 7: PRINT INK
y: AT d,e: OVER 1: CHR$ (152+y)
: BEEP .001,30: NEXT y: RETURN
9000 PRINT AT 10,10;" GAME OVE
R ": AT 12,11:"SCORE=";sc
9010 PRINT AT 15,0;" PRESS AN
Y KEY TO PLAY AGAIN ": PAUSE 1:
PAUSE 0: RUN

```

Second in which race?

I AM writing to tell you about a bug in Micromega's new game, **Full Throttle**, which allows you to come second on any track.

First you choose your track and set the number of laps to one. Next you start the game and travel around the track at a slow speed so that all the other bikes overtake you. You then continue at a slow speed until you are just in front of the finish line, and then wait until the other bikes approach to overtake you for the second time. As soon as the first bike passes you, speed up and, if you are travelling sufficiently fast, when the end of game message appears you will be told you came second.

Neil Gorst
Dorridge, Solihull.

High-res ZX-81 success

I WOULD like to say that I think Software Farm have done it again. Not only did they come up with a ZX-81 hit called **Forty Niner**, which had high-resolution graphics and is a great success, but they have now produced their second high-resolution game, **Rocket Man**, which is great. I was addicted to it, and spent the entire day in front of the television playing it without being able to reach a very high score.

The game has six different great screens.

My highest score so far is 48,398, and I reached screen six.

I would like to thank Software Farm for their marvelous games.

Simon Kelly,
Muswell Hill, London.

What is the secret

I RECENTLY bought **Rocket Man** for the 16K ZX-81, and was astounded by the graphics. It was only when I saw an advert for the high-resolution utility that I realised the 192*256 pixel grid was set by a POKE. Does anyone know the program or POKE which can be used to achieve this effect? If they do, please let *Sinclair Programs* know so that we can all use this effect in our programs.

A. Horrocks,
Rochdale, Lancashire

Failed geographers

I WANT you to correct a mistake. In the June 1984 issue of *Sinclair Programs* I read in line 9000 of **Geography Test** that the capital city of Turkey is Istanbul, which is completely wrong. Istanbul is the most famous and crowded city of Turkey but, since 1923, the capital city of

ERRORS AND MISHAPS



Part of line 9040 was omitted from the program **For Love**, which was printed in the September edition of *Sinclair Programs*. After "MAGNIFYING GLASS" the line should continue: "AXE", "SOAP", "SOAP".

the Turkish Republic is Ankara.

I would be thankful if you would correct this big geographical mistake as soon as possible.

Selcuk Aksoy
Istanbul, Turkey

Millions have been won

I AM writing to tell you about my high score on **Cash Accumulator** which was published in the July issue of *Sinclair Programs*. On my first turn I got £1,679,968, and on my fourth go I got £16,717,696. I would like to hear if anyone has beaten my score, or if anyone can do any worse than my mother, who scored £3.

James Williamson,
Macclesfield, Cheshire.

ZX-81: the first sounds

I AM writing with a letter published earlier this year written by Gerald Shield. He wrote that, in FAST mode, RAND USR 823 would make the ZX-81 BEEP.

I have discovered that RAND USR 821-829 all produce different notes.

David Lane, aged 13
Bridgwater, Somerset.

Reader held by police

I RECENTLY bought a game called **Urban Upstart**, produced by Richard Shepherd Software Ltd. I have nearly completed the game but in some places, if you wait too long, you are arrested and placed in a cell.

If you move north from the cell you go to the police sergeant's desk. I have spent hours trying to escape from the police station, but cannot do so.

I am writing to ask whether anybody can help me. I would be grateful for any advice, no matter how small.

C P Ball
Kidderminster,
Worcestershire

● If anybody has any advice to offer Chris please let us know and we will publish it or pass it on.

Please complete this form and enclose it with any program which you send to us for possible publication.

To: Sinclair Programs, 67 Clerkenwell Road, London EC1R 5BH.

I encloseProgram(s) for thecomputer.

I guarantee that each program submitted is my original work.

Signed

Name.....

Address.....



How much would you expect to pay for a dual 128K fast access storage system for your Spectrum that included Centronics and RS232 interfaces and free word processing software as standard?

Chances are it's a lot more than £129.95. But this is what will buy you the incredible Rotronics Wafadrive unit. There are no extras - this price includes VAT and postage.



A fast reliable dual-drive storage system

Integrated System

The Wafadrive is a complete system which contains the micro interface, two 128K drives, RS232 and Centronics ports, all in one attractively-styled, compact unit. There is a minimum of connecting leads and no extra boxes to clutter the desk top. Like the majority of professional systems, the units are dual drive. This offers the optimum balance between system flexibility and cost. Built-in serial and parallel interfaces allow the direct connection of just about any popular printer.

Fast and Reliable

The Wafadrive achieves very fast loading and saving, but not at the expense of reliability. Extensive research and the use of high grade materials ensure that the Wafadrive will give years of dependable operation. Data

integrity is on a par with floppy disk. The fully interchangeable wafers are available in three sizes - 128K, 64K and 16K. Low capacity wafers give faster access. They are therefore most suitable for program development applications. The high capacity wafers are suitable for more general data storage. Loading rate is well over ten

times as fast as cassette!

Software

Armed with the comprehensive user manual, blank wafer and word processor supplied, you can use your Wafadrive straight away. There is also a rapidly growing range of software to enable the programmer and

games player to exploit the Wafadrive system to the full.

Wafadrive for the 16/48K Spectrum is available now. Versions for other popular home computers are under development.

Send a 16p stamp for a full colour brochure and information on software and accessories.

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| — Bear Bovver/Wong's Loopy Laundry/World Cup (48K: Artic) | @ £9.95 each |
| — Starbike (48K: Softek) | @ £7.95 each |
| — The Artist - graphic utility (48K: Softek) | @ £9.95 each |
| — ZAP machine code development package (48K: Hewson) | @ £19.95 each |
| — RS232 lead | @ £9.95 each |
| — Centronics lead | @ £9.95 each |

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SP/11/84

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Please allow 28 days for delivery.



SMT

Police intervene as computer creates life

IN LATE 1982 the situation was clear. **Space Invaders** may have been almost the only Spectrum game on the market, but that did not mean it merited ten out of ten on a sliding scale, merely an honourable mention in Spectrum history. Two years later the situation is slightly different; how should a game be rated which is so radical a departure from other games on the market that it requires new methods of criticism?

Such a game is **Deus ex machina**, from Automata. This program can best be described as the world's first example of concept software. It synchronises a series of thematically linked computer games with a stereo sound-track run on a cassette recorder. As such, it is the first computer program to seriously present the possibility of computer games of the future integrating sound and film to create a more completely interactive form of video and aural entertainment than is now possible.

For the first time, too, it is possible to view the Spectrum game as art and, as art, it is not only the game itself, but its presentation, methods and ideas which require criticism.

For example, in one of the games, you play the part of a soldier running along a smooth surface jumping holes.



The voice of the Defect Police comes from your cassette recorder. "When I say 'jump', jump". While you are smarting over the suggestion that you should follow the commands of a computer game the cassette proceeds "Wait for it, wait for it..." Of course, you decide not to jump. Then, simultaneously, the cassette recorder shouts jump, and a hole appears. Of course,

As the Christmas software goes on sale Spectrum owners are spoiled for choice.

you jump and, although this is the umpteenth game in which you have jumped when a hole appears, for the first time you wonder what you are doing following a machine's commands.

The cassette and games take you through an entire life cycle, from DNA and simple cells, through conception, birth and childhood, to senility. The games are supported by a synchronised sound track and commentary, as well as by a complete lyric sheet which is provided. Familiar voices, from Ian Dury to Frankie Howerd can be heard, backing each section of the game.

The game must be played in sequence, from cells to senility, taking around an hour. At the end of the game you are presented with your score percentages for each section, giving you a score which can be improved, but there is no failure, for your character must die at the end, and everyone, no matter how bad at computer games, sees the entire cycle.

Ten out of ten for a program which surpasses everything on the market at the moment, or one out of ten for the first piece of artistic software? It is difficult to tell but, whatever the score, **Deus ex machina** deserves to be an enormous success.

Deus ex machina is produced for the 48K Spectrum by Automata, 27 Highland Road, Portsmouth, and costs £15.

Frank N Stein

THE STORY of Frankenstein was ideally suited for adaptation to computer game, and PSS have carried this adaptation out admirably.

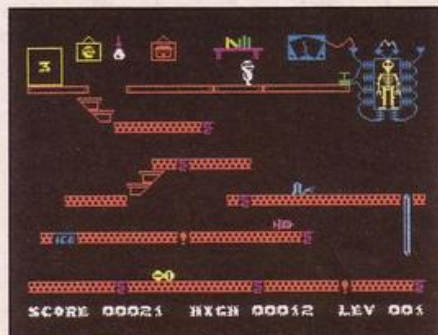
On the first level the player's aim is to assemble **Frank N Stein** from the pieces of body scattered around the lab. Pieces must be collected in the correct order and assembled before the switch can be thrown to bring him to life.

As usual, of course, things are not that simple. The opposition is enor-

mous. On each level you face a different range of problems, involving swamps, ice, electric shocks, spiders, unidentifiable objects... you name it, it is hidden in one of the labs.

Having avoided all these problems and completed your monster your problems do not end. On screen two the monster starts to attack you, and can be added to your list of opponents. On screen three you must assemble another monster, but this time the screen layout is different, and your timing must be much more precise.

There are elements here of **Chuckie Egg**, and elements of **Manic Miner**.



The game becomes progressively more difficult and is therefore one on which high scores will be amassed by dedicated players.

Too challenging to be ignored for long, **Frank N Stein** will set Spectrum owners compulsively building monsters this Christmas. Produced for the 48K Spectrum by PSS, 452 Stoney Stanton Road, Coventry it costs £5.95.

Handles

THE AUTHOR of **Handles**, produced for the ZX-81 by Pooter Software, obviously has considerable programming and artistic capability. It is a pity that he has chosen to demonstrate this in **Handles** which is a particularly uninspiring guessing game.

Six characters are shown on screen. They each have a real name but, for the purposes of Citizen's Band Radio, have given themselves new names or "handles". They have achieved this by swapping their names around. It is up to the player to guess what these new handles are.

As the names appear to be redistributed on an entirely random basis, there

is little skill to be employed in this game. After four rounds the program will tell you which of the characters you particularly like and dislike, and give a brief character analysis.

The author's reasons for writing this game remain a mystery. It is machine-coded and well laid out, but a game along the same lines could be produced quickly in simple Basic by the majority of readers of *Sinclair Programs*.

Handles is produced for the 16K ZX-81 by Pooter Games, 24 Parsloes Avenue, Daggenham and costs £1.85.

Sherlock

MELBOURNE HOUSE have done it again. Their new adventure game, **Sherlock**, is as exciting, as intriguing, and as puzzling as **The Hobbit**.

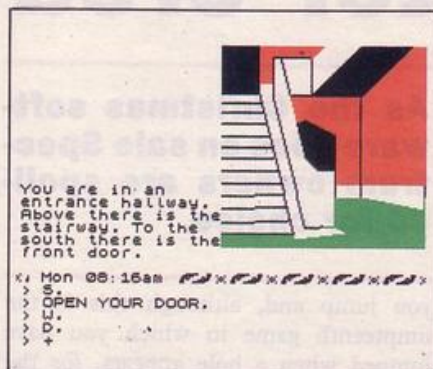
The game begins at Baker Street, with Sherlock Holmes and Watson sitting in armchairs. Somewhere there is a mystery to be solved, but what that mystery is, and where the clues can be found must be discovered by the player.

Like Thorin in *The Hobbit*, Watson can prove to be a help, a hindrance or just plain annoying. You can discuss matters with him, but his response of "Brilliant" to simple statements of Holmes is an uncritical response and of little help. It is also possible to talk to many other characters in the game. Without talking to a cab driver you will never be able to leave Baker Street, and without questioning the witnesses in detail you have little hope of solving the crime.

Timing is of vital importance in this game. It is not possible to just sit down and wait for things to happen. The clock on the screen shows the passing of time, which passes at the same speed whether you are travelling, sleeping or working. While you remain still the other characters are moving quickly. Watson has patients to visit, Lestrade of Scotland Yard has work to do. Even more importantly, the police cannot be expected to leave murdered bodies lying in the garden indefinitely, and may tidy them away before you arrive on the scene of the crime. Also, it must be remembered that Sherlock Holmes is not part of the establishment, and nobody is prepared to wait for him to solve the crimes. As soon as Lestrade feels he has solved the crimes satisfactorily the game will end, no matter how much of the game you have completed.

An infuriating aspect of many adventures is that you occasionally know exactly what you want to do, but cannot

find the correct words with which to convince the computer of your intentions. Melbourne House have overcome this problem. After all, detectives often know what they want to discover, but have to find exactly the right questions



to ask suspects or witnesses. It is possible to feel that your problems are due not to your computer's stupidity but to your inept questioning and the criminal's skill.

Sherlock is produced for the 48K Spectrum by Melbourne House, Church Yard, Tring, Hertfordshire and costs £14.95.

Decathlon

THE SUMMER of the Olympics, and **Daley Thompson's Decathlon** from Ocean zooms up the software charts. A topical arcade game, it has been selling well since its launch.

The game is divided into two parts, each containing a day's decathlon events. On the first day you struggle to meet the qualifying times and distances for the 100 metres, long jump, shot putt, high jump and 400 metres. On the second day you continue with the 110

metres hurdles, the discus, pole vault, javelin and 1500 metres.

Success in the throwing and jumping events depends partly on speed at take off or launch and partly on the angle attained. The races, of course, depend on overall speed.

While the animation involved in your representation on screen is good, the games themselves seem more suited to frantic manipulation in an amusement arcade than to key-pressing in the front room. Speed is attained by alternately pressing two keys as quickly as possible. It exhausts your fingers, and it probably does little for your keyboard. In the first few races this seems acceptable but, while jogging your fingers in the 1500 metres, questions such as "Why am I doing this?" tend to drift through the mind.

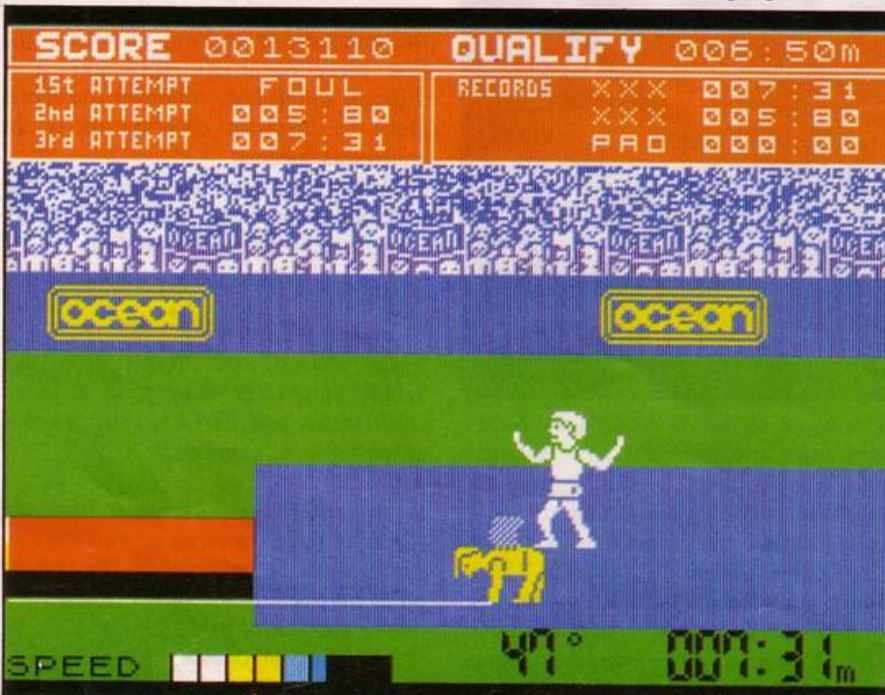
With lots of practice or a lucky fluke you will bring the Olympic crowd cheering to its feet, unless the tips of your fingers wear away first or you think of something better to do.

Decathlon is produced for the 48K Spectrum by Ocean Software Ltd, Ralli Building, Stanley Street, Manchester and costs £6.90.

Strange loop

STRANGE LOOP is a massive arcade game, including over 200 locations, enemies to kill, mazes to solve, things to collect, transport and supplies to find; in fact, everything which we have come to expect from Spectrum arcade games presented in a extremely well thought out game.

The game is set in a robot factory where robots have been programmed to





carry out all the humdrum tasks which once were humans' lot. Now, though, the factory has been invaded by aliens who have reprogrammed the robots to destroy Earth. Your task is, of course, to save the human race. All you have to do is overcome the high temperatures, the lack of oxygen, the sharp industrial waste, the robots, etc. . .

The object is not merely to find the control room, which is a relatively easy task, but to enter it and save the earth. To do this you will probably need a detailed map, good shooting ability and some idea of your route and things to be collected on the way.

It is difficult to find fault with the game, save in its safety. Aliens, mazes robots; surely we have all been here somewhere before? Yes, it is very well written. Yes, it is difficult and challenging. Yes, the graphics are very good. On the other hand: no, it is not an original idea. No, there are no new elements to this game. Yes, Virgin are, very much, playing it safe.

Good it is, innovative it is not. **Strange Loop** is produced by Virgin Games, 2-4 Vernon Yard, 119 Portobello Road, London W11 and costs £5.95.

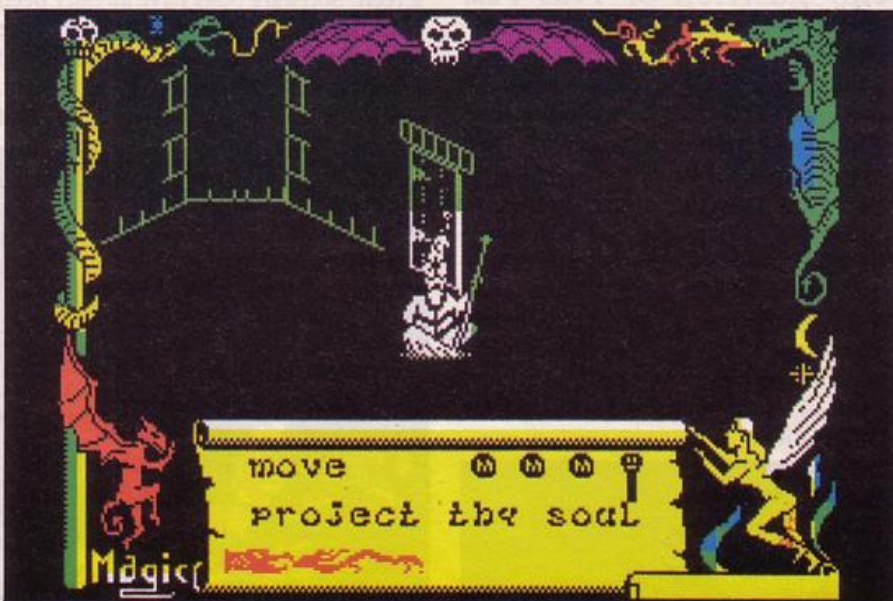
Avalon

AVALON from Hewson Consultants is billed as "the 3D adventure movie," and it makes a very creditable attempt at achieving this goal. Three dimensional pictures of locations around which your character can move are drawn on screen. As in television programs such as **Coronation Street**, this means that each room has a wall which you never see, a wall through which you can watch the action.

The game is mammoth, including 223 rooms on eight levels, and over 100 characters. In many ways it seems similar to **Atic Atac**, rooms to move through seen from the side rather than from above; passages to travel down, rather than trapdoors and, of course, there is the player's ultimate goal to be located and villains to be defeated.

Other aspects of the game, are entirely new. Around the building are

placed various spells which can be used at different times. The Move spells with which you start are important, as they are the ones which allow you to move your astral projection around. Others which appear are essential to your progress. Spells to freeze your enemies, to make yourself invisible, or to control a servant can all be found and your skill in finding these and your judgement in knowing when to use them are essential for success in **Avalon**.



Using a complete three-dimensional technique in an adventure is new. However, it does produce graphics which flicker incessantly. Those people who were expecting graphics of the quality used in **Ant Attack** from Quicksilver will be disappointed. The three-dimensional view also makes movements more complicated, as you try to move a character on a two-dimensional screen through three dimensional space.

For short periods of time the game is excellent, but when played for a long time as it must be, it becomes a strain on the eyes. It will, without doubt, be an extremely successful game, but its success with flicker-free graphics would be even greater.

Avalon is produced by Hewson Consultants, Hewson House, 56B Milton Trading Estate, Milton, Abingdon and costs £7.95.

Hampstead

HAMPSTEAD from Melbourne House. What a disappointment. The game arrives in stylish packaging, complete with a pair of languorous Afghan hounds on the cover. The accompanying booklet is excellent, well-illustrated, and full of hints, tips and jokes. The aim of the game is novel, to social climb until you have reached the pinnacle and

attained Hampstead.

A brilliant start. However, when the game is loaded the screen clears and a limited, text-only adventure appears on the screen. The screen display is unexciting, the game was obviously developed using **The Quill** without using it to its full advantage.

Granted, the problems you encounter are unusual. How many other games require you to cash a giro, cope with unemployment and watch "3,2,1" on

television? However, once you have encountered an amusing scenario once, you know the joke. It is unamusing the first time you return, and stale subsequently.

The aim of the game is also a little dubious. The morality of many fantasy adventures may be appalling, but it is obscured by distance. You can kill your seventeenth peasant and twentieth dragon without any pangs of conscience, without feeling that this is what you would do if that peasant were set down before you in the middle of the High Street. Action in the inner city is closer to home, and inspires you to act in a normal fashion. If you do not usually use lies and deceit to survive, it is irritating to be forced to do so. If you usually enjoy "3,2,1" it is annoying to be placed at the bottom of the social ladder for doing so.

Using "real" situations in an adventure is dangerous, for it encourages the player to act normally and to employ realistic rather than fantastic values. There is a possibility that women will not question playing the hero or a knight, but they will certainly wonder what is happening if they are presented with a real-life situation, shown a woman and expected to treat her as merely a stepping stone to success.

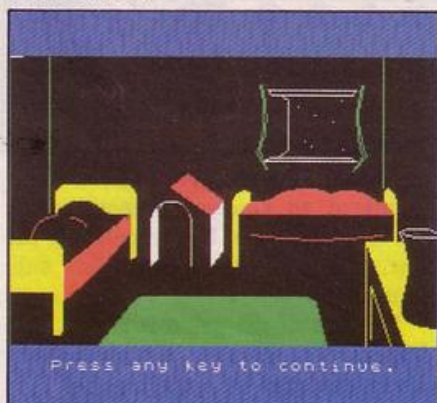
It would be easier to be pleasant about this program if Melbourne House had treated it as a mediocre game. Instead, they have built it up to be something it is not, and priced it at £9.95.

Original in concept, but way overpriced, Hampstead is produced by Melbourne House, Church Yard, Tring, Herts.

Peter Pan

THE CREATION OF **Peter Pan: The Adventure Game** was an excellent idea. The transfer of the magical world of Peter Pan, of flying, crocodiles and pirates to the computer where flying seems possible and the player can take the part of Peter Pan. What a pity it all went wrong.

The package comes complete with the Puffin book, **Peter Pan**, which is enjoyable and fun to read. Then you load the computer game. You are immediately transported from the flowing prose of Barrie to a one-dimensional world of short descriptions and limited conversation.



Having read the book you know exactly what to do. Open the drawer, find your shadow, try to stick it on with soap. Look in the jug and find Tinkerbelle. Now wake Wendy, so that she can sew your shadow to your feet. A little fairy dust, a little flying practice, and then off to Never Never Land for wonderful adventures.

Of course, life in adventures is not that simple. The computer does not understand half the things that you want to do, Tinkerbelle is more irritating than you could have imagined, Wendy stubbornly refuses to have anything to do with you, and you are trapped in one room wondering why you ever enjoyed the book.

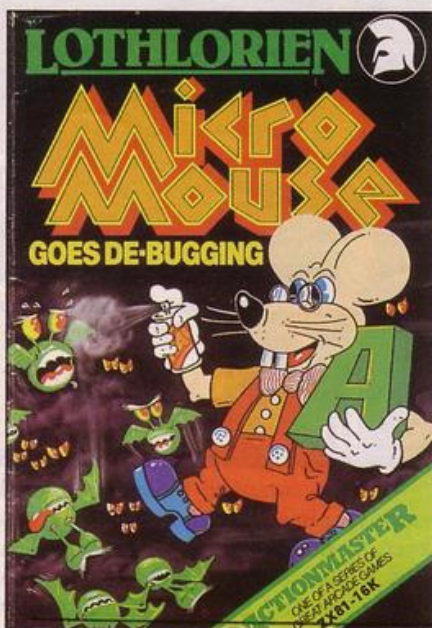
Some conversions from book to computer work brilliantly, while some lose all their sparkle. Peter Pan unfortunately falls into the latter category. If you want to become involved in the story of Peter Pan, go and see the

pantomime, for that will bring it to life far more than your Spectrum.

Peter Pan is produced for the 48K Spectrum by Hodder and Stoughton, 47 Bedford Square, London and costs £9.95.

Micro Mouse

A FAST-PACED new ZX-81 game produced by Lothlorien is **Micro Mouse goes Debugging**. The game begins with a short program displayed on screen. Software bugs have already been at work at this program, and some of the characters have been stolen and placed in cages at the corners of the screen. Micro mouse must return these, and



any other stolen characters to their rightful places, killing the software bugs with Datakill if necessary.

The game moves very fast, for the bugs are always on the move and, at first, it is difficult to spot where in the program a character should go. Micro mouse rushes around, and there is scarcely time to grab the Datakill and kill the bugs.

This is an excellent game, with clear graphics, calling for skill and tactics as well as speed and quick reactions. It is produced by Lothlorien, 56a Park Lane, Poynton, Cheshire and costs £5.95.

Hyperaction

THERE WAS a time when the Spectrum software market was full of games involving ice blocks and penguins, the idea of which was to protect the player by sliding ice cubes around the screen. **Hyperaction** from Silversoft takes this theme one step further.

Each level of the game involves a maze in which blocks must be shuffled

around for protection. The aim of the game is sometimes to cover four points, sometimes to reach five, and sometimes to eliminate one colour from the board. The common denominator is the maze.

On each level you begin with several lives and, if you fail at a maze, it will be redrawn in a different pattern. The chances are that you will see a very large amount of versions of the first few mazes, without seeing the later ones more than once or twice.

If your ambition has always been to be reincarnated as a penguin, then this game is for you. If mazes and monsters drive you screaming up the wall, as is more probably the case these days, then avoid it like the plague.

Hyperaction was written and produced for the 48K Spectrum by Silversoft, 271-273 King Street, London W6 and costs £5.95.

Master mariner

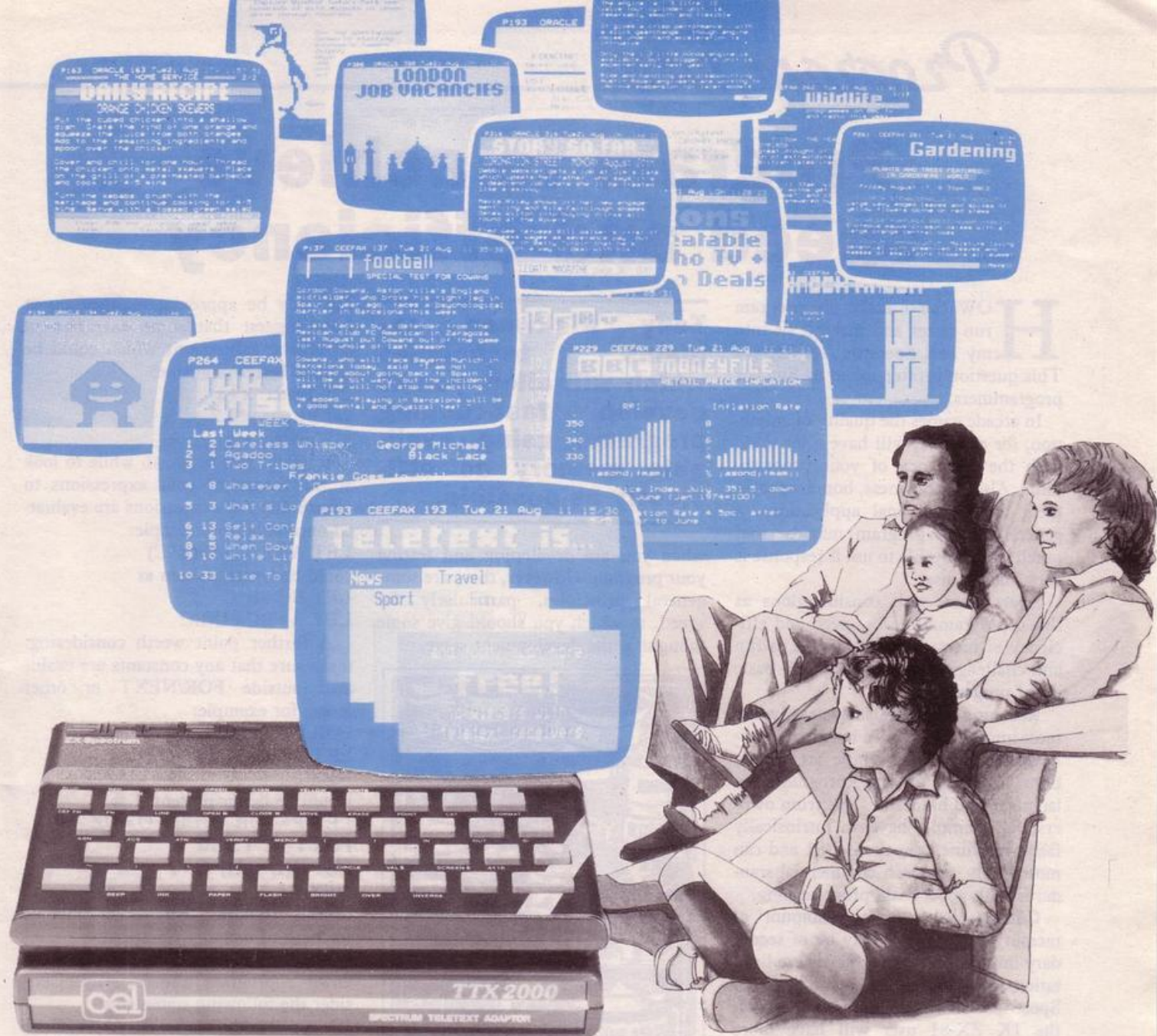
TWO YEARS ago it was possible to produce a simple game for the Spectrum, market it, and expect it to sell in large numbers. Since then the market has changed considerably. A game costing around six pounds is expected to be original and of high quality, and the more straightforward games will not sell.

However, there is still a market for these games, although it is located in a much lower price bracket. Atlantis are supplying games for this market, and are selling games for the 48K Spectrum, priced at £1.99 each.

Master Mariner is a revival of that hardy perennial **Ocean Trader**. The player owns a boat which must be taken from harbour to harbour, buying and selling goods. Hazards are many: storms, sea mists, pirates, high taxes or simply a run of bad luck. A slow-moving game, delayed frequently by animated representations of the boat setting of to sea, or goods being unloaded.

Vagan Attack sets the player moving around the galaxy, trying to find and destroy enemy ships and bases. Although the title and cover suggest that this is a fast-moving, shoot-'em-up game it more closely resembles a simulation, for moves are made slowly and with thought. The instructions are confusing and the screen display and diagrams not entirely clear, so the first few games played are more a stab in the dark than complex space war simulation.

Master Mariner, Eights and Vagan Attack are all produced for the 48K Spectrum by Atlantis Software, 19 Prebend Street, London N1.



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Program to achieve speed and efficiency

HOW can I make my program run faster and make it fit into my 16K Spectrum/1K ZX-81? This question is often asked by Sinclair programmers.

In arcade games the quality of animation, for example, will have a lot to do with the efficiency of your programming. Also, for business, home management and educational applications, a generally good program may be that much less enjoyable to use if response is slow and clumsy.

Apart from such considerations as these, programming for speed and efficiency of memory usage can be as fun and challenging to learn as is the basic art of programming.

Reducing run-time is generally the most important factor in improving performance. Obviously there are limitations inherent in the programming language and hardware. Spectrum owners, for example, have an intrinsically faster machine than the ZX-81 and can more easily approach commercial standards with good Basic programming.

Cutting down on the amount of memory used will usually be of secondary importance. Again, hardware limitations must be respected, and the 16K Spectrum/ZX-81 and, more especially, the 1K ZX-81 user will have more problems than the 48K Spectrum user.

Elegant programming

That is not to suggest that the 48K Spectrum owner will not occasionally be confronted with the problem of memory conservation. For example, a Basic interface program which is also a utility in the sense that it will be calling other programs of indeterminate size, should be "squeezed" into the smallest amount of RAM possible in order to leave the maximum amount of room for called programs.

Efficient and elegant programming intended for speed of execution can often produce a "spin off" benefit by simultaneously saving memory. Unfortunately, the reverse effect is less likely. Saving memory will often mean a loss of speed, so it may be necessary to try to optimise these opposing effects.

It should be stressed that many of the ideas suggested in this article are really refined in the sense that you need not worry too much about such matters

Tony Rickwood explains techniques which will allow you to develop fast-running programs using available memory as efficiently as possible.

when you are developing and testing your program. However, there are some general principles, particularly for speed, to which you should give some thought at the development stage.



In longer Basic programs, try to keep the more frequently used subroutines and defined functions to the beginning. A direct jump means that the interpreter has to scan from the beginning to look for the start and end of a subroutine, or until the appropriate DEF FN (Spectrum only) is found. The few milliseconds saved on each call will mount up with frequency of use.

Check your format

For programs of the number-crunching variety, involving a lot of calculation, it is well worth your while to examine your use of operators. Relative time factors can be assigned to all arithmetic operators, though the more important of these apply to multiplication, division, and exponentiation. Multiplication takes twice as long as addition, division takes three times as long as addition and exponentiation takes ten times as long. Although these figures

can only be approximate, they do at least suggest that some examples of arithmetic expressions which could be written better might be:

$2 * x$ Better: $x + x$

$y / 5$ Better: $y * 0.2$

$z \uparrow 2$ Better: $z * z$

It would also be worth while to look at the format of your expressions to ensure that sub-expressions are evaluated once only, for example:

LET $A = B * C + D / (B * C)$

could be better written as

LET $BC = B * C$

LET $A = BC + D / BC$

A further point worth considering: make sure that any constants are evaluated outside FOR/NEXT or other loops, for example:

FOR $I = 1$ TO 10

LET $A(I) = X(I) / Z + SQR Y$

NEXT I

would be better presented as

LET $P = SQR Y$: LET $Q = 1 / Z$

FOR $I = 1$ TO 10

LET $A(I) = X(I) * Q + P$

NEXT I

In this example, there is an obvious trade-off of memory for speed.

Multiple logical tests can also slow down a program unnecessarily. Consider the following statement:

IF $A > B$ AND $C < D$ AND $E = F$ THEN

There are three tests here, only one of which needs to fail to make the whole expression fail, although all three must be tested.

Better would be:

IF $A > B$ THEN IF $C < D$ THEN IF $E = F$ THEN . . .

This allows the statement to be aborted so that control can pass directly to the next immediately a test is failed. Speed improvements will be better if you can arrange the conditions in ascending order of probability (least likely first).

The absence of the

IF . . . THEN . . . ELSE

statement in Sinclair Basic can sometimes cause clumsy and inefficient programming.

The principle is:

IF Condition THEN do something

IF NOT Condition THEN do something ELSE

The Spectrum does, at least, have advantages over the ZX-81 in this respect, by allowing multiple statements. Com-

pare the following:

ZX-81

```
IF X=20 THEN LET Y=11
IF X<>20 THEN LET Y=0
```

SPECTRUM

```
IF X=20 THEN LET Y=11: GOTO 30
30: LET Y=0
30 .....
```

It will be clear that the ZX-81 version requires both TRUE and FALSE conditions to be tested, while the Spectrum version requires only one test (although two statements are still required. We will see later how this can be further reduced for certain applications).

The multiple statement facility available on the Spectrum is also useful for efficiency on a long list of expressions which would otherwise require separate statements. This is especially useful in IF... THEN statements where the value of one variable dictates the value of a host of other variables. A note of caution though: beware of making your program unreadable with excessively long multiple statements.

Array selection

ZX-81 users may also argue that the IF... THEN... ELSE statement can be mimicked in a specialised context of printing array elements. As the same is true of the Spectrum, this particular trick is worth studying. Suppose, for example, that you want to print the first six characters of a 12 character string, given a TRUE condition, and the last six characters given a FALSE condition. As one cannot have, for example:

```
IF P=0 THEN PRINT X$(1 TO 6)
ELSE PRINT X$(7 TO 12)
```

the equivalent two statements for the ZX-81 would be:

```
IF P=0 THEN PRINT X$(1 TO 6)
IF P<>0 THEN PRINT X$(7 TO 12)
```

This double test could be turned into one by:

```
LET A=(P<>0)*6 (i.e. 6 or 0)
PRINT X$(1+A TO 6+A)
```

The last example of condition testing might also have come under the heading of Boolean Logic. This is one of the most powerful features for efficient programming on both the Spectrum and ZX-81.

For example, other Basics might contain the following:

```
IF A>B THEN LET A=A-1
IF A<B THEN LET A=A+1
```

You can condense this into a single statement:

```
LET A=A+(A<B)-(A>B)
```

Many games applications require this kind of programming, chase routines

for example. In the above example, we can imagine this algorithm as representing A chasing B across the screen, with A and B as their X coordinates.

The underlying principle of Boolean Logic is that anything which can be treated as the condition in the IF condition THEN....

statement, can also be a logical expression. It can also be any numerical expression, as the computer is really only interested in whether the value of the expression is zero (FALSE) or non-zero (TRUE). For logical expressions which use the comparison operands <=, <>, >=, <, > and =, we are only concerned with values of 0 and 1. Thus, in the example:

```
IF A<B THEN A=A+1-0=A+1
```

```
IF A>B THEN A=A+0-1=A-1
```

Value comparison

Where ANDs and ORs are used, it helps to extend the 1,0 (for TRUE, FALSE) idea to represent AND by "*" and OR by "+". This notation helps when grappling with such expressions as:

```
IF ((A>B OR C<D) AND E=F) THEN...
```

Though the inner brackets are unnecessary when entering on your machine, they help in working out a truth table. There are possibilities:

((0+0)*0)=0	((0+0)*1)=0
((0+1)*0)=0	((0+1)*1)=1
((1+0)*0)=0	((1+0)*1)=1
((1+1)*0)=0	((1+1)*1)=1

Such a table clearly indicates only three possible true results.

Probably the best example for games programming would be found in the player or computer control routines. Consider, for example, up/down movement using keys "6" and "7". The novice might use two statements, such as:

```
IF INKEY$="6" AND Y<20 THEN
LET Y=Y+1
IF INKEY$="7" AND Y>0 THEN
LET Y=Y-1
```

A much faster way would be:

```
LET Y=Y+(INKEY$="6" AND
Y<20)-(INKEY$="7" AND Y>0)
```

One other point about logic and condition testing. As previously stated, your machine is only interested in whether a condition is zero or non-zero. It follows then, that a statement such as:

```
IF Z<>0 THEN...
```

can be replaced by IF Z THEN...

Similarly:

```
IF Z=0 THEN...
```

can become IF NOT Z THEN... These substitutes are not only faster: they also save a few bytes of memory.

Literals are numbers which appear "literally" in your program. Literals were fully explained in my last article which showed how extravagant they are of memory (at six bytes each). They can be reduced in several ways.

Save memory

The most popular method for cutting down on memory assigned to literals is to use the VAL function. To illustrate the saving, compare the following:

NO. OF BYTES FOR:	LET A=10	LET A= VAL "10"
LINE NO.	2	2
LINE LENGTH	2	2
KEY STROKES	5	8
NUMBER	6	-
ENTER	1	1
TOTAL	16	13

This saving of three bytes each time VAL is used applies to both machines.

Another popular method is to use a number which is already stored, such as PI. Thus:

```
LET Z=PI-PI and LET Z=SIN PI
use even fewer bytes than
LET Z=VAL "0".
```

Similarly:

```
LET Z=PI/PI and LET Z=SGN PI
might be preferred to LET
Z=VAL "1".
```

Numbers which are used repetitively should be assigned as a variable at the program start if memory is a problem. For example, LET U=PI/PI at the outset will save five bytes every time a "1" is required.

Many numbers used to initialise variables can be removed from the program altogether, as, when a program is saved, the variables are saved with it. The procedure here would be:

- RUN the program and interrupt (with a STOP) after initialisation (i.e. after SETUP)
- Delete all the LET, READ and DATA statements in SETUP
- SAVE the program AND variables with a line start (or use GOTO to execute, as RUN clears the variables).

You will still need sufficient memory in the first place, so this technique is really for cutting down programs to run on a smaller machine or to reduce loading time. When space is a problem at the development stage, you might still be able to fit all your variables in by using direct LET or INPUT commands, outside the program.

It is always best to try to incorporate instructions into a program although they can sometimes cause size problems. The answer here is to make a separate program for instructions and other information, with the last line used to call the main program.

MOVE your spider around the web, catching the flies before they escape. You have twenty seconds in which to catch each fly. If five manage to escape the game ends.

Web Runner was written for the 16K Spectrum by Hugh Creed, aged 13, of Lancaster, Lancashire.

```
1 PAPER 0: INK 7: BORDER 0: C
LS : GO SUB 1000
2 LET hi=0
3 LET sc=0
4 LET ti=0
5 LET mis=0
100 LET b=0
105 REM draw web
110 FOR a=175 TO -175 STEP -75
```

```
120 PLOT 0,b
130 LET b=b+40
140 DRAW 255,a
150 NEXT a
160 LET b=0
170 FOR a=255 TO -255 STEP -75
```

```
180 PLOT b,0
190 LET b=b+40
200 DRAW a,175
210 NEXT a
220 FOR a=10 TO 82 STEP 24
230 CIRCLE 137,92,a
240 NEXT a
```

```
250 LET a=10: LET b=15
254 REM main loop
255 PRINT AT a,b; OVER 1;"QE"
260 LET c=INT(RND*20): LET
d=INT(RND*10+10)
261 PRINT AT a,b; OVER 1;"QE"
```

```
265 PRINT AT c,d; INK 5; OVER
1;"R"
```

```
270 PRINT AT a,b; INK 6; OVER
1;"QE"
```

```
280 IF INKEY$="q" THEN LET a
=a-1
```

```
285 IF INKEY$="a" THEN LET a
=a+1
```

```
290 IF INKEY$="o" THEN LET b
=b-1
```

```
295 IF INKEY$="p" THEN LET b
=b+1
```

```
296 PRINT AT a,b; OVER 1;"QE"
```

```
297 BEEP .005,0
```

```
298 LET ti=ti+1
```

```
299 IF ti=18 THEN PRINT AT c,
d; INK 5; OVER 1;"R": PRINT AT
a,b; OVER 1;"QE": LET mis=mis+1:
LET ti=0: GO TO 260
```

```
300 IF a<0 THEN LET a=0
```

```
301 IF a>21 THEN LET a=21
```

```
302 IF b>30 THEN LET b=30
```

```
303 IF b<0 THEN LET b=0
```

```
305 IF mis=5 THEN PRINT AT 10
,0;"QEQEQEQEQEEScore=";sc;"QEQE"
```



WEB RUNNER

```
1030 DATA "r",146,84,56,254,56,8
4,56,84
1032 REM instructions
1035 LET g=30
1040 LET a$="QEQEEMR WEBQ
EQEQE"
```

MOVE YOUR SPIDER AROUND THE WEB AND CATCH THE FLIES BEFORE THEY ESCAPE

RRRKEYSRRR

'Q' TO MOVE UP
'A' TO MOVE DOWN
'O' TO MOVE LEFT
'P' TO MOVE RIGHT

```
T"
1050 FOR i=1 TO LEN a$
1060 PRINT a$(i);
1065 IF a$(i) <> " " THEN BEEP
.0006,g
1070 IF g=70 THEN LET g=10
1075 LET g=g+1
1080 NEXT i
1085 PAUSE 0: CLS
1090 RETURN
2000 CLS : PRINT AT 10,0;"WANT
TO PLAY AGAIN(Y/N)"
2010 IF INKEY$="y" THEN CLS :
GO TO 3
2020 IF INKEY$="n" THEN STOP
2030 GO TO 2010
```

```
"QEQE": PAUSE 0: PAUSE 0: PAUSE
0: GO TO 2000
```

```
307 PRINT AT 0,20;"time=";ti:
IF ti<10 THEN PRINT AT 0,26;"
"
```

```
310 IF a=c THEN GO SUB 500
410 GO TO 270
```

```
500 IF b=d THEN LET sc=sc+10:
PRINT AT a,b; OVER 1;"QE": PRIN
T AT c,d; INK 5; OVER 1;"R": LE
T ti=0: GO TO 260
```

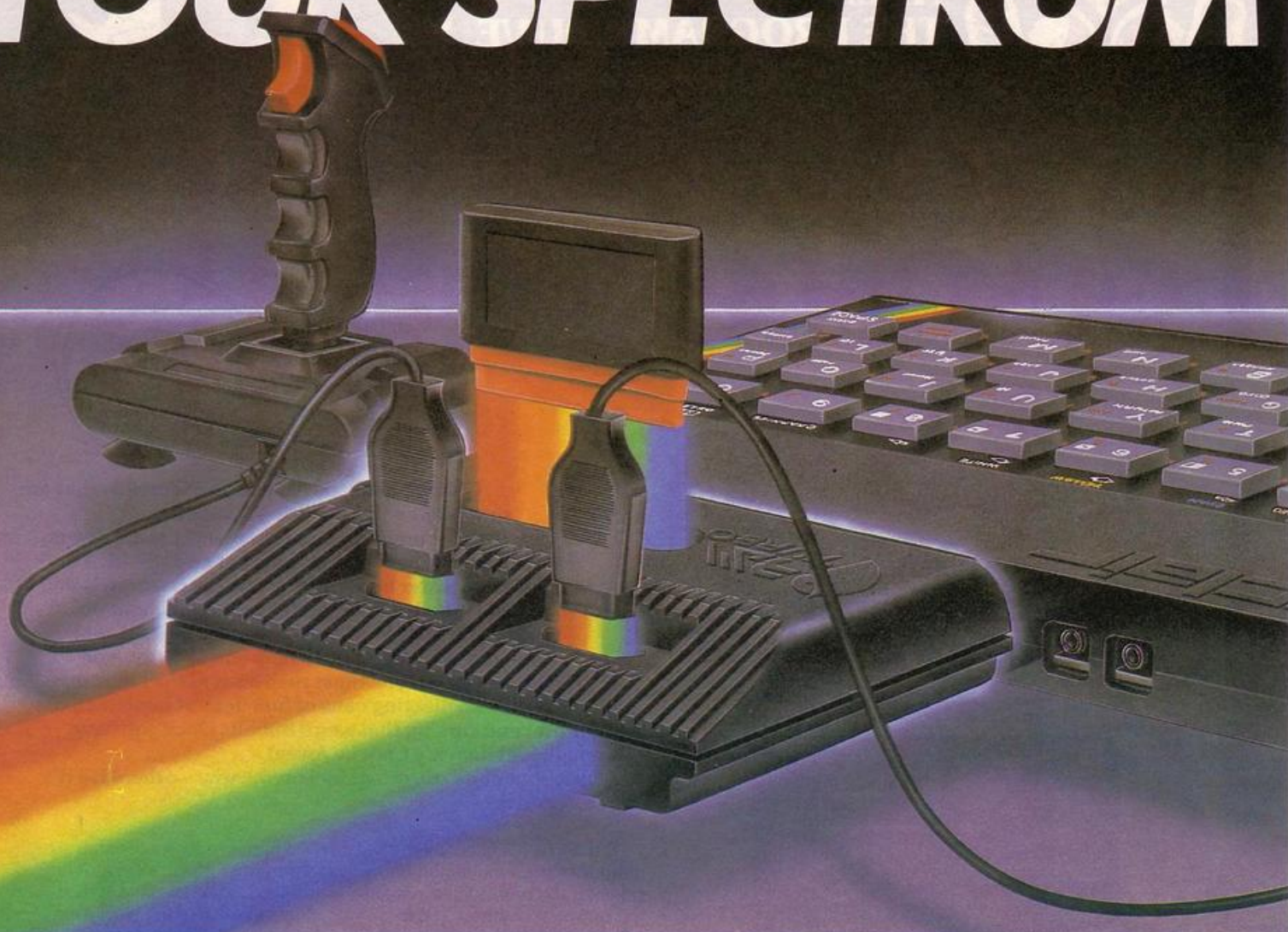
```
510 IF b+1=d THEN LET sc=sc+10
: PRINT AT a,b; OVER 1;"QE": PR
INT AT c,d; INK 5; OVER 1;"R":
LET ti=0: GO TO 260
```

```
520 RETURN
```

```
1000 FOR b=0 TO 2: READ a$: FOR
n=0 TO 7: READ a: POKE USR a$+n
,a: NEXT n: NEXT b
```

```
1010 DATA "q",0,32,93,175,93,163
,16,32
1020 DATA "e",0,4,250,245,250,24
3,8,4
```


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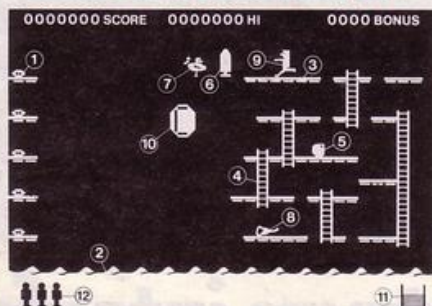
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| 2. Sea | 6. Rocket | 10. Bubloid |
| 3. Platforms | 7. Vulture | 11. Fuel Gauge |
| 4. Ladders | 8. Leg of Lamb | 12. Men Remaining |

Get rich quick by collecting Diamonds that are simply lying there waiting for you!

Oh... I forgot to mention that there are one or two problems! There is an expanse of Shark infested water between you and the Diamonds and a strange breed of Bubble that seems hell bent on getting you in it! Somehow you must cross it...

You have a Rocket Pac to help you (a Vulture on higher levels) but you must rush around the platforms and ladders collecting cans of fuel (legs of lamb with the Vulture) and cursing that weird Bubble. Once you have enough fuel then it's Chocks Away!

Oh... but don't run out of fuel on the way - otherwise it's SPLASH!

The aim is to collect all the diamonds from the far left hand side of the screen, whilst avoiding the rampant Bubloid. These emerge from the sea and are hell-bent on returning to their watery habitat with you in tow. Sooner or later you are going to end up in the drink - The idea is to make it later!

By belting round the system of platforms and ladders, cleverly avoiding the Bubloid, you collect the fuel cans which appear in random positions, until you consider that your fuel gauge indicates sufficient in the tank.

Now you can go and collect your rocket. With the rocket-pack strapped to your back you can fly across the expanse of sea to collect the diamonds... but don't run out of fuel or your rocket-pack will simply disappear and you will wind up in the drink!

There are six stages with six different platform layouts. On stages 1-3 the Bubloid, which floats in front of the platforms with uncanny ease, gets an ever increasing ability to home in on your position, making the task of staying alive more demanding with each stage. On stages 4-6 you once again start with the easiest Bubloid (which is a blessed relief!) but the fuel cans are replaced by legs of lamb which you must collect to feed your vulture, and once it has enough energy (or you think it has!) you must flap across the water on its back to collect the diamonds.

Extra men are awarded for every 10,000 points - but ONLY once you have collected all the diamonds and so completed each particular stage.

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YOU ARE the penguin who must climb the ladders to reach the fish on the top ice level. As there is only one fish you have to reach the top level before the polar bear who is also in pursuit of a meal.

Penguins and Polars was written for the 16K Spectrum by David Reid, of Angus, Scotland.

```

1 GO SUB 3000
5 LET hi=0
10 GO SUB 9000
20 LET f=.2: LET lev=1
832 LET r=18: LET c=14
1001 LET e=2: LET d=0
1002 LET f=f+.05
1005 BORDER 1: PAPER 1: CLS : PA
PER 1: INK 7
1010 FOR n=4 TO 20 STEP 4
1020 PRINT AT n,0: INK 4: BRIGH
T 1: "CCCCCCCCCCCCCCCCCCCCCCCC
CCCCC"
1025 NEXT n
1027 PRINT AT 0,0: INK 6: PAPER
0: BRIGHT 1: " LEVEL:
HI:
1028 PRINT AT 0,14: PAPER 0: IN
K 6: BRIGHT 1: lev: PRINT AT 0,2
1: PAPER 0: INK 6: BRIGHT 1: hi

1029 GO SUB 6000
1035 PRINT AT r+2,0: INK 4: BRI
GHT 1: "CCCCCCCCCCCCCCCCCCCC
CCCCC"
1040 PRINT AT r,c: INK 6: " A ";
AT r+1,c: INK 6: " B "
1050 IF r <= 5 THEN GO TO 7000

1055 PRINT AT e,d: INK 7: BRIGH
T 1: " DE": AT e+1,d: INK 7: BRIG
HT 1: " FG"
1057 LET d=d+f
1060 PRINT AT 3,29: INK 5: BRIG
HT 1: "HI"
2000 IF d >= 27 THEN GO TO 5000

2100 IF INKEY#="q" THEN LET c
=c-1: BEEP .0005,30
2110 IF INKEY#="w" THEN LET c
=c+1: BEEP .0005,30
2120 IF INKEY#="i" AND c+1=p T
HEN LET r=r-4: GO SUB 6000
2140 IF c <= 0 THEN LET c=0
2150 IF c >= 29 THEN LET c=29

2160 GO TO 1031
2999 REM title screen
3000 CLS : BORDER 6: PAPER 6: CL
S : PAPER 6: INK 0
3010 INK 4: BRIGHT 1: FOR f=1 TO
40: LET a=INT ( RND *120)+1: L
ET b=INT ( RND *40)+1
3020 PLOT 127,105: DRAW a,b
3030 PLOT 127,105: DRAW -a,b
3040 PLOT 127,105: DRAW -a,-b
3050 PLOT 127,105: DRAW a,-b
3060 NEXT f
3065 BRIGHT 0
3070 PRINT AT 1,0: INK 2: "
P E N G U I N"
3080 PRINT AT 16,0: INK 2: BRIG
HT 1: " Backwards-Q Forward-W
Up-I ": BRIGHT 0
3090 PRINT AT 19,0: INK 1: "....
...press any to start....."
3499 PAUSE 0
3500 RETURN
4999 REM end of game routine
5000 BEEP .6,-10: BEEP .7,-20
5005 PRINT AT 12,0: "
"
5010 PRINT AT 11,0: INK 7: " TH
E POLAR BEAR GOT THE FISH "
5015 FOR v=0 TO 150: NEXT v
5020 PRINT AT 13,0: INK 7: " pre
ss any key for another game": PA
USE 0: PAUSE 0
5100 IF lev-1>hi THEN LET hi=le
v-1
5110 GO TO 20

```



PENGUINS AND POLARS

```

5999 REM ladder routine
6000 LET p=INT ( RND *29+1)
6001 IF r=6 THEN LET p=29
6003 PRINT AT 6,0: "
"
6005 PRINT AT 10,0: "
"
6006 PRINT AT 14,0: "
"
6007 PRINT AT 18,0: "
"
6008 IF r <= 2 THEN RETURN
6010 BEEP .005,10: BEEP .005,15:
BEEP .005,20: PRINT AT r+1,p: "
J": AT r,p: "J": AT r-1,p: "J": AT
r-2,p: "J"
6030 RETURN
6999 REM next level routine
7000 BEEP .1,10: BEEP .1,7: BEEP
.5,20: PRINT AT 12,0: "
YOU GOT THE FISH " : FOR l
=0 TO 200: NEXT l: LET lev=lev+1
: GO TO 100
8999 REM user-defined-graphics
9000 FOR n=0 TO 7: READ a: POKE
USR "a"+n,a: NEXT n
9010 FOR n=0 TO 7: READ a: POKE
USR "b"+n,a: NEXT n
9020 FOR n=0 TO 7: READ a: POKE
USR "c"+n,a: NEXT n

```

```

9030 FOR n=0 TO 7: READ a: POKE
USR "d"+n,a: NEXT n
9040 FOR n=0 TO 7: READ a: POKE
USR "e"+n,a: NEXT n
9050 FOR n=0 TO 7: READ a: POKE
USR "f"+n,a: NEXT n
9060 FOR n=0 TO 7: READ a: POKE
USR "g"+n,a: NEXT n
9070 FOR n=0 TO 7: READ a: POKE
USR "h"+n,a: NEXT n
9080 FOR n=0 TO 7: READ a: POKE
USR "i"+n,a: NEXT n
9090 FOR n=0 TO 7: READ a: POKE
USR "j"+n,a: NEXT n
9200 DATA 0,56,68,130,154,154,13
1,210
9210 DATA 166,206,158,188,248,32
,124,0
9220 DATA 0,255,251,123,114,50,4
8,16
9230 DATA 3,7,7,7,3,15,31,63
9240 DATA 192,224,224,224,192,24
0,248,252
9250 DATA 55,55,23,7,14,14,14,14
9260 DATA 236,236,232,224,112,11
2,112,112
9270 DATA 31,63,127,13,127,63,31
,0
9280 DATA 131,199,239,255,239,19
9,131,0
9290 DATA 129,255,129,129,129,25
5,129,129
9999 RETURN

```


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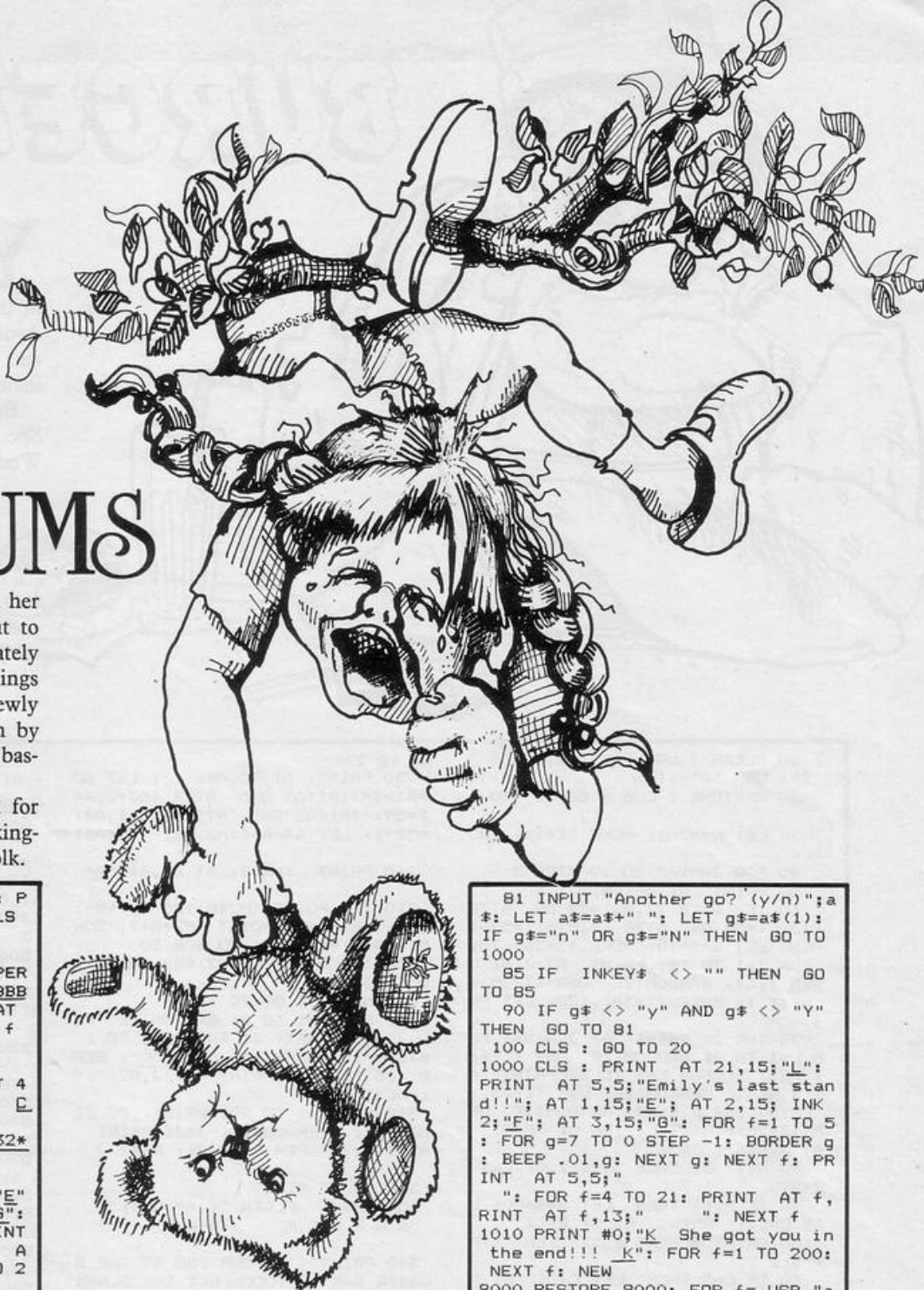
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EMILY'S TANTRUMS

EMILY is playing happily in her tree house when you go out to call her for tea. Unfortunately she objects and begins to throw things from the tree house onto your newly mown lawn. Try to save the lawn by catching the toys in your laundry basket.

Emily's Tantrum was written for the 16K Spectrum by William Buckingham, aged 12, of Fakenham, Norfolk.



```
10 LET x=2: LET f1=1: INK 7: P
APER 0: BORDER 0: BRIGHT 1: CLS
: GO SUB 9000
15 RESTORE 35
20 PRINT AT 5,0: INK 4: PAPER
2: "BBBBBBBBBBBBBBBBBBBBBBBBBBB
BBBB": FOR f=0 TO 21: PRINT AT
f,0: INK 4: PAPER 2: "B": NEXT f
```

```
25 PRINT AT 6,1: INK 4: "C
C C CC C C C C": AT 4
,1: INK 4: "C CCC C C C C
C CC C"
```

```
26 PRINT AT 21,0: INK 4: "(32*
ig8)"
27 IF f1=0 THEN GO TO 45
30 LET f1=0: PRINT AT 1,5: "E"
: AT 2,5: INK 3: "F": AT 3,5: "G":
FOR f=1 TO 5: READ a$,b$: PRINT
AT 20,6;a$: PAUSE 25: PRINT A
T 2,7;b$: PAUSE 25: FOR g=1 TO 2
00: NEXT g: PRINT AT 20,6:"
```

```
" : AT 2,6:
": NEXT
```

```
35 DATA "Come down,Emily!","No
,I'm not going to!","You won't g
et any supper..","I don't care!"
,"COME DOWN","NO!","Come on,Emil
y!","I will not!","I'll get cros
s....","I shall scream...."
```

```
40 FOR p=1 TO 2: RESTORE 40: F
OR f=1 TO 10: READ a,b: BEEP a,b
: NEXT f: NEXT p: DATA .2,0,.2,0
,.2,0,.2,0,.2,1,.2,0,.2,0,.2,1,.
2,1,.4,0
```

```
45 BEEP .8,12: PRINT AT 20,1:
"Press any key to play ~TANTRUM~
"
```

```
50 IF INKEY$="" THEN GO TO
50
```

```
55 PRINT AT 20,1:"
"
```

```
56 PRINT AT 1,5:" ": AT 2,5:"
": AT 3,5:" ": LET s=0
```

```
59 LET x=2: PRINT #0: "K Willi
am Buckingham 1984 "K"
```

```
60 PRINT AT 19,x:" ": LET p
= INT ( RND *25)+3: PRINT AT 1,
p:"E": AT 2,p: INK 2:"F": AT 3,p
:"G": LET gp= INT ( RND *5)+1: L
ET a$="ADHIJ"(gp): LET i= INT (
```

```
RND *6)+2: LET x=15: FOR f=7 TO
19: PRINT AT f,p: INK i;a$: FOR
")-( INKEY$="1")+ (x=2)-(x=28):
g=1 TO gp: LET x=x+( INKEY$="0
PRINT AT 19,x-1: INK 7:" L ": N
EXT g
```

```
64 IF INKEY$="2" THEN PAUSE
0
```

```
65 BEEP .01,30-f: PRINT AT f,
13: INK
```

```
p:" ": NEXT f
```

```
70 PRINT AT 19,x:"L": IF x=p
THEN FOR b=1 TO 2: BEEP .1,10:
BEEP .1,5: BEEP .1,15: NEXT b: P
RINT AT 1,p:" ": AT 2,p:" ": AT
3,p:" ": LET s=s+100*(6-gp): GO
TO 60
```

```
80 FOR f=1 TO 10: BEEP .1,0: B
EEP .1,-10: NEXT f: BEEP 1,-30:
PRINT AT 8,1:"Little Emily is c
ross": AT 10,1:"with you.You dro
pped one of her": AT 12,1:"toys
AND you ruined your lawn": AT 14
,1:"as well!!!": AT 18,1:"Score:
":s
```

```
81 INPUT "Another go? (y/n)";a
$: LET a$=a$+" ": LET g$=a$(1):
IF g$="n" OR g$="N" THEN GO TO
1000
```

```
85 IF INKEY$ "<" "" THEN GO
TO 85
```

```
90 IF g$ "<" "y" AND g$ "<" "Y"
THEN GO TO 81
```

```
100 CLS : GO TO 20
```

```
1000 CLS : PRINT AT 21,15:"L":
PRINT AT 5,5:"Emily's last stan
d!!": AT 1,15:"E": AT 2,15: INK
2:"F": AT 3,15:"G": FOR f=1 TO 5
: FOR g=7 TO 0 STEP -1: BORDER g
: BEEP .01,g: NEXT g: NEXT f: PR
INT AT 5,5:"
```

```
" : FOR f=4 TO 21: PRINT AT f,
RINT AT f,13:" ": NEXT f
```

```
1010 PRINT #0:"K She got you in
the end!!! "K": FOR f=1 TO 200:
NEXT f: NEW
```

```
9000 RESTORE 9000: FOR f= USR "a
" TO USR "1"+7: READ a: POKE f,
a: NEXT f
```

```
9010 DATA 0,8,20,34,65,34,20,8,8
5,170,85,170,85,170,85,170,16,40
,36,72,36,72,40,16
9020 DATA 32,16,124,222,190,254,
124,0,60,66,165,129,189,165,66,6
0,24,231,36,36,66,66,129,255,36,
36,36,102,0,0,0,0
```

```
9025 DATA 124,16,16,16,16,124,56
,16,0,12,15,140,252,252,120,0,60
,126,255,255,24,24,24,136,136
,168,94,10,15,9,15,129,129,129,2
55,255,255,0,0,0
```

```
9030 PRINT " TAB 10:"TANTRUM!"
```

```
" " Darling Emily is playing in
her"" "tree-house!It is tea time
and"" "you have come to get her
in.But,"""Emily objects and sh
e gets"" "angry! She throws her
toys down"" "from the tree,onto
your garden!"" "can you save your
lovely
```

```
9031 PRINT AT 21,0:"~1~ LEFT,~0
~ RIGHT & ~2~ PAUSE"
```

```
9032 IF INKEY$="" THEN GO TO
9031
```

```
9035 CLS : RETURN
```




BURGER BAR

YOU WORK in a burger bar and have to collect the glasses and send the burgers to the bottom of the screen by running across them. Avoid the bad apples which chase you and try to squash them by trapping them underneath the burgers.

Burger Bar was written for the 48K Spectrum by Anthony Sherwood of West Bromwich, West Midlands.

```
10 CLEAR (USR "A"-110): LET
Z=(USR "A"-110)
20 RESTORE : CLS : GO TO 330
```

```
30 LET N=M2-1: POKE (Z+11),180
```

```
40 FOR J=M1+3 TO 19 STEP 3
50 PRINT AT J-1,N;" "
60 IF ATTR (J,M2)=59 OR ATTR
(J,N)=59 OR ATTR (J,M2+1)=59 T
HEN LET S=S+10: POKE (Z+36),70:
FOR I=1 TO 12: PRINT AT J,N; 0
VER 1;A$: RANDOMIZE USR (Z+25):
NEXT I: POKE (Z+36),128: LET F=
1
```

```
70 INK 2: PRINT AT J,N;B$: FO
R L=1 TO 2: RANDOMIZE USR (Z+4)
: NEXT L: FOR L=1 TO 2: PRINT A
T J,N;A$: RANDOMIZE USR (Z+25):
PRINT AT J,N;B$: RANDOMIZE US
R (Z+25): NEXT L: INK 0: PRINT
AT J,N;" "
80 NEXT J: POKE (Z+11),0: LET
S=S+5
```

```
90 IF M1=1 THEN LET S=S+50: L
ET C=C+1: PRINT AT 21,N;A$
100 PRINT #0; AT 1,12- LEN STR
$ S;S
```

```
110 IF C=3 THEN LET C=0: LET F
=0: RANDOMIZE USR (Z+73): POKE
(Z+11),100: FOR L=1 TO 30: RANDO
MIZE USR (Z+4): NEXT L: POKE (Z
+11),0: GO TO 430
120 IF F=1 THEN LET F=0: PRINT
AT A1,A2;" " : AT A3,A4;" " : GO
TO 600
130 RETURN
140 FOR I=1 TO 2
150 PRINT AT M1,M2;" "
160 LET M2=M2+(INKEY$="0" AND
M2<31)-(INKEY$="9" AND M2>0)
```

```
170 LET M1=M1+3*((INKEY$="w"
AND ATTR (M1+2,M2)=59)-(INKEY$
="2" AND ATTR (M1-1,M2)=59))
```

```
180 IF ATTR (M1,M2)=58 THEN L
ET S=S+5: PRINT AT M1,M2;"*": R
ANDOMIZE USR (Z+4): PRINT #0; A
T 1,12- LEN STR$ S;S
190 PRINT AT M1,M2;M$(I)
200 IF I=2 THEN GO TO 250
210 PRINT AT A1,A2;" "
220 LET A1=A1+3*((M1>A1 AND AT
TR (A1+2,A2)=59)-(M1<A1 AND AT
TR (A1-1,A2)=59))
230 LET A2=A2+(M2>A2)-(M2<A2)
```

```
240 PRINT INK 3; AT A1,A2;"A":
```

```
GO TO 270
250 PRINT AT A3,A4;" " : LET A3
=A3+3*((M1>A3 AND ATTR (A3+2,A4
)=59)-(M1<A3 AND ATTR (A3-1,A4
)=59)): LET A4=A4+(M2>A4)-(M2<A4)
```

```
260 PRINT INK 3; AT A3,A4;"A"
```

```
270 IF POINT (M2*8,(20-M1)*8-1
)=1 THEN IF POINT (M2*8+7,(20-
M1)*8-7)=1 THEN GO SUB 30
280 IF ATTR (M1,M2)=59 THEN G
O TO 300
290 NEXT I: GO TO 140
300 FOR J=1 TO 2: RANDOMIZE US
R (Z+73): NEXT J: FOR J=M1 TO 1
STEP -1: PRINT AT J,M2;"C": BEE
P .05,30-3*J: PRINT AT J,M2;" "
: NEXT J
```

```
310 FOR J=1 TO 20: PRINT AT J,
M2;"C": BEEP .07,30-3*J: PRINT
AT J,M2: PAPER 5;C$(J): NEXT J
```

```
320 GO TO 410
330 PRINT FLASH 1; AT 0,0;"
BURGER BAR
```

```
340 PRINT "YOUR JOB AT THE B
URGER BAR IS TO COLLECT THE GLASS
ES AND SEND THE BURGERS TO THE BO
TTOM BY RUNNING ACROSS THEM."
```

```
350 PRINT "AVOID THE BAD APP
LES - THEY CAN BE DESTROYED BY D
ROPPING BURGERS ON TO THEM."
```

```
360 PRINT "LEFT 9
RIGHT 0 UP 2
DOWN W": GO TO 610
370 FOR I= USR "A" TO USR "M"+
7
```

```
380 READ J: POKE I,J: NEXT I
390 PRINT AT 21,10;"PRESS A KE
Y": RANDOMIZE USR (Z+4): PAUSE
0
```

```
400 LET A$="EFG": LET B$="JKL":
LET G$="IM": LET F=0: LET M$="C
D": LET S=0: LET H=0: LET C$="..
GAME OVER....."
410 IF S>H THEN LET H=S
420 LET C=0: LET S=0
430 FOR K=0 TO 255 STEP 5: POKE
(Z+11),K: RANDOMIZE USR (Z+4):
NEXT K
```

```
440 POKE 23692,255: FOR I=1 TO
24: PRINT AT 21,31: PRINT : NEX
T I: RANDOMIZE : CLS
450 PRINT AT 0,0;"(32*ig3)"
460 PRINT FLASH 1: OVER 1: INK
3; AT 0,0;"BURGER
BAR
```

```
470 FOR I=2 TO 20 STEP 3: PRINT
AT I,0; INK 1; PAPER 6;"BBBBBB
BBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
": FOR
J=1 TO 4: PRINT INK 2; AT I-1,
INT (RND *32);G$(1+(INT (RND
*2))) : NEXT J
480 PRINT INK 5; PAPER 6; AT I
+1,0;"(32*g3)": NEXT I
490 LET E=0: FOR I=3 TO 18 STEP
3
500 FOR K=6 TO 24 STEP 9: PRINT
INK 2; AT I,K;B$: NEXT K
510 LET J= INT (RND *32): IF
ATTR (I,J) <> 53 THEN GO TO 510
```

```
520 PRINT INK 3; AT I,J;"H": A
T I-1,J;"H": LET E=E+1: IF E <>
4 THEN GO TO 510
530 LET E=0: NEXT I
540 PRINT #0; AT 0,0; INK 3;"(3
2*g3)"
```

```
550 PRINT AT 21,0; INK 5; PAPE
R 4;"(32*g3)"
560 LET M1=19: LET M2=0
570 PRINT #0; AT 1,1;"SCORE 000
00": AT 1,17;"HI SCORE 00000"
```

```
580 PRINT #0; AT 1,12- LEN STR
$ S;S; AT 1,31- LEN STR$ H;H
590 FOR K=240 TO 0 STEP -15: PO
KE (Z+11),K: RANDOMIZE USR (Z+4
): NEXT K
```

```
600 LET A1=3*(INT (RND *7))+1
: LET A2=31: LET A3=3*(INT (RN
D *5))+1: LET A4=0: GO TO 140
610 FOR J=Z TO Z+102: READ K: P
OKE J,K: NEXT J: GO TO 370
620 DATA 16,61,10,25,58,72,92,1
5,15,15,30,247,243,211,254,238,1
6,67,16,254,29,32,246,251,201,24
3,58,72,92,15,15,15,8,38,0,1,128
,0,8,211,254,238,16,8,46,0,85,92
,167,237,82,237,82,17,254,0,25,1
25,148,56,1,61,103,61,32,253,11,
120,177,32,223,251,201,243,17,16
,208,38,10,58,72,92,31,31,31,14,
254,238,16,237,121,67,16,254,37,
32,244,28,21,32,232,251,201
630 DATA 60,126,255,153,255,255
,126,60,255,126,231,24,231,0,0,0
,56,56,16,56,124,186,40,68,56,56
,16,56,40,40,16,16,0,127,255,0,2
55,0,255,127,0,255,255,0,255,0,2
55,255,0,254,255,0,255,0,255,254
,126,66,126,66,126,66,126,66,0,6
2,28,8,8,28,0,127,255,0,255,0,
255,127,0,255,255,0,255,0,255,25
5,0,254,255,0,255,0,255,254,0
640 DATA 0,34,34,20,20,20,28,0
```


CATCH the falling jam on your teaspoon and carry it to the slice of bread at the right of the screen. When you have covered the bread with jam the top slice comes down to make a sandwich and you move on to a higher skill level.

Jam Sandwich was written for the 16K Spectrum by Alan Thomson, London SE4.



```

1 PAPER 5: CLS : INK 7: GO SU
B 3003: REM instructions
2 GO SUB 4000: REM UDG
5 INPUT "SKILL LEVEL 1-5 (5-H
ARDEST)";sk1: BORDER 3: CLS
6 IF sk1<1 OR sk1>5 THEN BEE
P .1,1: GO TO 5
10 GO SUB 1000: REM initialise

20 GO SUB 2000: REM screen
40 REM mainloop
50 LET x= INT ( RND *8)+7
60 FOR n=6 TO x
70 PRINT AT sc,s1;" ABB "
80 GO SUB 900
90 PRINT AT 5,5; INK 2;"E": P
RINT AT 5,5;" "
100 PRINT AT 4,n; INK 2;"E": P
RINT AT 4,n-1;" "
110 NEXT n
120 FOR n=4 TO 18
125 PRINT AT sc,s1+5;" "
130 PRINT AT n,x; INK 2;"E": P
RINT AT n-1,x;" "
150 GO SUB 900
155 PRINT AT sc,s1;" ABB "
160 IF x=s1+1 AND n=sc-1 THEN

```

```

460 PRINT AT 13,21; INK 2;"E":
PRINT AT 13,21;" "
470 FOR x=22 TO sa
480 PRINT AT 12,x; INK 2;"E":
PRINT AT 12,x-1;" "
490 NEXT x
491 LET sa=sa-1
495 LET jam=jam+1
500 PRINT AT 12,x-1;" ": PRINT
AT 13,x; INK 2;"E"
505 FOR b=15 TO 17
506 PRINT AT b,20;" "
507 NEXT b
510 IF jam=10 THEN GO TO 700

520 GO TO 40
600 PRINT AT 4,6;"HARD LUCK TR
Y AGAIN!": FOR y=1 TO 200: NEXT
y: GO TO 7
700 PRINT AT 8,22; INK 5;"
"
710 PRINT AT 9,22; INK 5;"
"
720 PRINT AT 11,22; PAPER 7;"
"
730 PRINT AT 12,22; PAPER 7;"
"

```

```

8)"
2040 NEXT n
2045 PRINT AT 18,25; INK 2; PAP
ER 4;"Skill-";sk1; AT 18,0;"H-Ho
ld"
2046 LET f$="(10*ig8)"
2050 PRINT AT 8,22; INK 7;f$
2060 PRINT AT 9,22; INK 7;f$
2070 PRINT AT 14,22; INK 7;f$

2080 PRINT AT 15,22; INK 7;f$

2090 PRINT AT 10,1; INK 7; PAPE
R 0;"JAM"
3000 PRINT AT 0,0; INK 7;j$: PR
INT AT 1,0; INK 2; INVERSE 1;"
JAM SANDWICH
": PRINT AT 2,0; INK 7;j$
3001 PRINT AT 19,0; INK 7;j$: P
RINT AT 20,0; INK 2; INVERSE 1;
"
JAM SANDWICH
": PRINT AT 21,0; INK 7;j$
3002 RETURN
3003 LET j$="(32*ig8)"
3004 PRINT INK 2;j$: PRINT INV
ERSE 1; INK 7;" JAM SAN

```

JAM SANDWICH

```

GO TO 300
180 NEXT n
190 GO TO 600
300 LET a= INT ( RND *10)+8
305 FOR x=sk1+8 TO 18
310 GO SUB 900
320 PRINT AT sc,s1;" ABB "
325 PRINT AT sc-1,s1; INK 2;"
E "
330 PRINT AT x,a; INK 1;"F": P
RINT AT x-1,a;" "
335 PRINT AT 18,a;" "
340 IF s1=17 THEN PRINT AT x,
a;" ": GO TO 400
345 IF s1+1=a AND sc=x OR s1+2=
a AND sc=x OR s1+3=a AND sc=x TH
EN GO TO 600
350 NEXT x
360 GO TO 300
400 PRINT AT 17,17;" " AT
16,18;" "
410 PRINT AT 15,20; INK 2;"E"

420 PRINT AT 15,20;"C"
430 PRINT AT 16,20;"D"
440 PRINT AT 17,20;"D"
445 BEEP .01,20
450 PRINT AT 14,20; INK 2;"E":
PRINT AT 14,20;" "

```

```

740 PRINT AT 13,22; PAPER 2;"
"
750 LET sk1=sk1+1: IF sk1=6 THE
N PRINT AT 11,6;"YOU'RE TOO GO
OD": AT 12,6;" AT THIS GAME": GO
TO 760
751 PRINT AT 4,6;"HAPPY EATING
""THE SKILL LEVEL NOW GETS HIGH
ER": FOR z=-15 TO 39: BEEP .02,z
: NEXT z: PAUSE 0
755 PRINT "PRESS ANY KEY": PAUS
E 0: GO TO 7
760 STOP
900 LET s1=s1+( INKEY$ ="8")-(
INKEY$ ="5")+ (s1<7)-(s1>17): PRI
NT AT 17,7;" " AT 17,21;" " A
T 16,7;" "
910 IF INKEY$ ="h" THEN PAUSE
0
950 RETURN
1010 LET jam=0
1020 LET s1=17: LET sc=17
1030 LET sa=30
1040 CLS : PAPER 5: CLS : BORDER
3
1050 RETURN
2000 REM screen set up
2020 FOR n=6 TO 16
2030 PRINT INK 2; AT n,0;"(6*ig

```

```

DWICH
": PRINT INK 2;j
$: PRINT AT 19,0; INK 2;j$: PRI
NT INVERSE 1; INK 7;"
JAM SANDWICH
": PRINT
INK 2;j$
3005 PRINT AT 6,0; INK 7;j$;
3010 PRINT AT 8,0; INK 2;" U
SING THE KEY'S (5)&(8) YOU M
UST CATCH THE JAM SO AS TO
FILL YOUR SANDWICH.
BUT BEWARE"" THE JAM SNATC
HERS ARE ABOUT."
3015 PRINT AT 15,0; INK 7;j$
3016 PAUSE 600: CLS
3020 RETURN
3030 GO TO 5080
4000 FOR f= USR "a" TO USR "f"+
7: READ a: POKE f,a: NEXT f
5000 DATA 255,127,63,30,0,0,0,0

5010 DATA 255,255,0,0,0,0,0,0
5030 DATA 1,3,7,15,15,15,15,7
5040 DATA 3,3,3,3,3,3,3,3
5050 REM jam
5060 DATA 24,24,60,60,126,126,25
5,255
5070 DATA 24,60,252,60,82,82,129
,129
5080 RETURN

```


Ten Pin Bowling was written for the 16K ZX-81 by Stephen Tait, aged 12, of Washington, Tyne and Wear.

Ten Pin Bowling was written for the 16K ZX-81 by Stephen Tait, aged 12, of Washington, Tyne and Wear.

TEN PIN BOWLING

TENPIN
SCORE ■ " : AT
BALLS ■ " : B

```

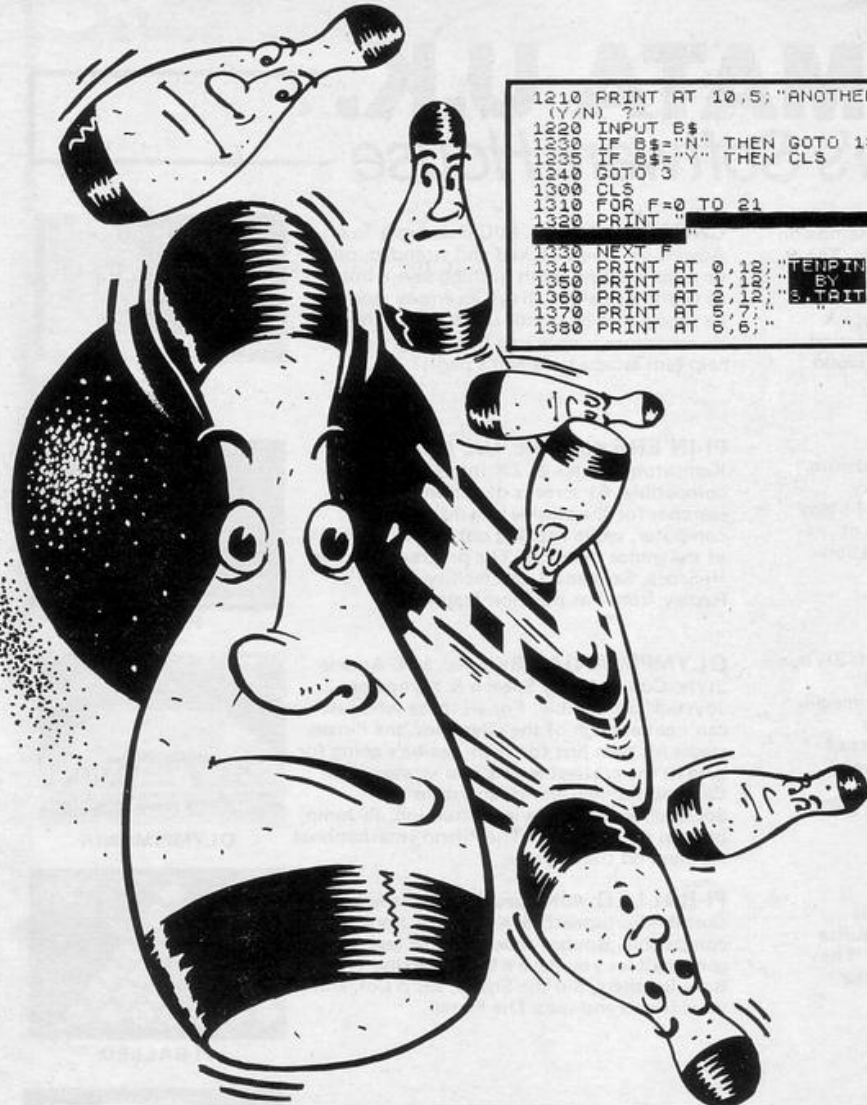
005 LET Y=Y-1
010 IF Y<3 THEN LET Y=28
011 IF INKEY$="7" THEN GOTO 300
012 IF INKEY$="1" THEN GOTO 500
013 IF INKEY$="2" THEN GOTO 700
014 GOTO 200
015 FOR F=20 TO 8 STEP -1
016 PRINT AT F,Y;"0";AT F,Y;" "
017 NEXT F
018 IF Y=15 THEN LET S=S+16
019 IF Y=14 THEN LET S=S+10
020 IF Y=13 THEN LET S=S+5
021 IF Y=11 THEN LET S=S+1
022 IF Y=16 THEN LET S=S+12
023 IF Y=17 THEN LET S=S+7
024 IF Y=18 THEN LET S=S+4
025 LET B=B-1
026 IF B<1 THEN GOTO 1000
027 GOTO 6
028 FOR F=20 TO 8 STEP -1
029 PRINT AT F,Y;"0";AT F,Y;" "
030 LET Y=Y-1
031 IF Y<2 THEN LET Y=Y+2
032 NEXT F
033 IF Y=11 THEN LET S=S+24
034 IF Y=13 THEN LET S=S+17
035 IF Y=15 THEN LET S=S+10
036 IF Y=17 THEN LET S=S+4
037 LET B=B-1
038 IF B<1 THEN GOTO 1000
039 GOTO 6
040 FOR F=20 TO 8 STEP -1
041 PRINT AT F,Y;"0";AT F,Y;" "

```

```

711 IF Y>28 THEN LET Y=Y-2
720 LET Y=Y+1
730 NEXT F
740 IF Y=19 THEN LET S=S+30
750 IF Y=17 THEN LET S=S+17
760 IF Y=15 THEN LET S=S+7
770 IF Y=13 THEN LET S=S+1
780 LET B=B-1
790 IF B=0 THEN GOTO 1000
800 GOTO 8
1000 CLS
1005 PRINT AT 0,10;"GAME OVER"
1010 IF S<HI THEN GOTO 1200
1015 LET HI=S
1020 PRINT AT 4,10;"WELL DONE"
1030 PRINT AT 5,12;"A NEW"
1040 PRINT AT 6,10;"HI-SCORE"
1050 PRINT AT 8,0;"PLEASE ENTER"
YOUR NAME AND PRESSNEWLINE. (8 L
EFTS MAX.)"
1060 INPUT A$
1070 IF LEN A$>5 THEN GOTO 1060
1080 PRINT AT 10,0;"THE NEW CHAM"
PION IS "A$
1090 PRINT "WITH A SCORE OF "S
1100 PRINT AT 21,0;"PRESS ANY KE
Y"
1110 IF INKEY$="" THEN GOTO 1100
1120 CLS
1200 PRINT AT 0,10;"GAME OVER"
1205 PRINT AT 5,5;"YOU SCORED "S

```

```

1210 PRINT AT 10,5;"ANOTHER GAME
(Y/N)?"
1220 INPUT B$
1230 IF B$="N" THEN GOTO 1300
1235 IF B$="Y" THEN CLS
1240 GOTO 3
1300 CLS
1310 FOR F=0 TO 21
1320 PRINT "
1330 NEXT F
1340 PRINT AT 0,12;"TENPIN"
1350 PRINT AT 1,12;"BY"
1360 PRINT AT 2,12;"S.TAIT"
1370 PRINT AT 3,7;"
1380 PRINT AT 6,6;"

```

```

1390 PRINT AT 7,5;"
1391 PRINT AT 8,5;"
1392 PRINT AT 9,6;"
1393 PRINT AT 10,7;"
1394 PRINT AT 11,8;"
1395 PRINT AT 12,9;"
1400 PRINT AT 13,10;"
1410 PRINT AT 14,11;"
1420 PRINT AT 15,12;"
1430 PRINT AT 16,13;"
1440 PRINT AT 17,14;"
1450 PRINT AT 18,15;"
1460 PRINT AT 19,16;"
1470 PRINT AT 20,17;"
1480 PRINT AT 21,18;"
1490 GOTO 1430
1500 SAVE "BOUL"
1501 FOR F=0 TO 21
1502 PRINT "
1503 NEXT F
1510 PRINT AT 0,12;"TENPIN"
1515 PRINT AT 1,12;"BY"
1520 PRINT AT 2,12;"S.TAIT"
1530 PRINT AT 3,7;"
1540 PRINT AT 6,6;"
1550 PRINT AT 7,5;"
1560 PRINT AT 8,5;"
1570 PRINT AT 9,6;"
1580 PRINT AT 10,7;"
1590 PRINT AT 11,8;"
1600 PRINT AT 12,9;"
1610 PRINT AT 13,10;"
1620 PRINT AT 14,11;"
1630 PRINT AT 15,12;"
1640 PRINT AT 16,13;"
1650 PRINT AT 17,14;"
1660 PRINT AT 18,15;"
1670 PRINT AT 19,16;"
1680 PRINT AT 20,17;"
1690 PRINT AT 21,18;"
1700 PRINT AT 21,0;"PRESS A

```

```

NY KEY TO PLAY
1710 IF INKEY$="" THEN GOTO 1710
1720 CLS
1730 PRINT AT 0,12;"TENPIN"
1740 PRINT
1750 PRINT "AT THE BOTTOM OF THE
SCREEN IS A BALL WHICH IS MOVI
NG FROM THE RIGHT TO THE LEFT.WH
EN IT IS IN THE POSITION YOU WAN
T, YOU MUST BOUL IT.THESE ARE TH
E KEYS AND DIRECTIONS.

```

```

1760 PRINT "THE NUMBERS ON THE
PINS INDICATE HOW MANY POINTS YO
U GET IF YOU KNOCK DOWN THAT PI
N. YOU HAVE 3 BALLS TO DO THIS."
1770 PRINT AT 21,0;"PRESS A
NY KEY TO PLAY
1775 IF INKEY$="" THEN GOTO 1775
1780 CLS
1790 RUN

```

```

1 GOTO 10
5 SAVE "H-MAN"
10 LET HI=0
20 CLS
30 PRINT AT 0,11;"HONEY MAN"
40 PRINT AT 4,0;"HONEY MAN"
50 LEADING TO THE HONEY MAN
60 AND TRY TO CATCH THE DOPE
70 DRONE "A" FOR EXTRA POINTS
80 COLLECT THE HONEY AS YOU GO ALONG
90 PRINT AT 10,0;"CONTROLS-"
100 "SEE SCORE"
110 PRINT AT 15,10;"S+8" AT 14,
120 "7" AT 16,11;"6" AT 21,0;"P
130 A KEY TO PLAY THE GAME"
140 PRINT AT 6,22;"A" AT 6,22;"
150 IF INKEY$="" THEN GOTO 70
160 FAST
170 POKE 16418,0
180 LET A$=""
190 FOR A=1 TO 20
200 LET A$=A$+" "
210 NEXT A
220 LET A$=A$+" "
230 LET A$=A$+" "
240 LET A$=A$+" "
250 LET A$=A$+" "
260 LET A$=A$+" "
270 LET A$=A$+" "
280 LET A$=A$+" "
290 LET A$=A$+" "
300 LET A$=A$+" "
310 LET A$=A$+" "
320 LET A$=A$+" "
330 LET A$=A$+" "
340 LET A$=A$+" "
350 LET A$=A$+" "
360 LET A$=A$+" "
370 LET A$=A$+" "
380 LET A$=A$+" "
390 LET A$=A$+" "
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410 LET A$=A$+" "
420 LET A$=A$+" "
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670 LET A$=A$+" "
680 LET A$=A$+" "
690 LET A$=A$+" "
700 LET A$=A$+" "
710 LET A$=A$+" "
720 LET A$=A$+" "
730 LET A$=A$+" "
740 LET A$=A$+" "
750 LET A$=A$+" "
760 LET A$=A$+" "
770 LET A$=A$+" "
780 LET A$=A$+" "
790 LET A$=A$+" "
800 LET A$=A$+" "
810 LET A$=A$+" "
820 LET A$=A$+" "
830 LET A$=A$+" "
840 LET A$=A$+" "
850 LET A$=A$+" "
860 LET A$=A$+" "
870 LET A$=A$+" "
880 LET A$=A$+" "
890 LET A$=A$+" "
900 LET A$=A$+" "
910 LET A$=A$+" "
920 LET A$=A$+" "
930 LET A$=A$+" "
940 LET A$=A$+" "
950 LET A$=A$+" "
960 LET A$=A$+" "
970 LET A$=A$+" "
980 LET A$=A$+" "
990 LET A$=A$+" "
1000 LET A$=A$+" "

```

HONEY MAN

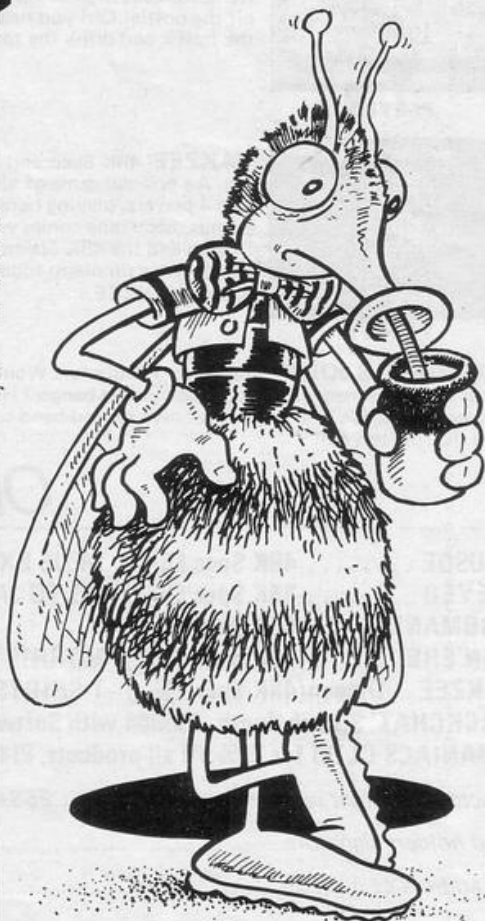
DODGE the holes leading to the worker bees and try to catch the dopey drone. Collect honey as you pursue the drone as this will give you extra points.

Honey Man was written for the 16K ZX-81 by Simon Huggins, aged 12, of Southfields, Northants.

```

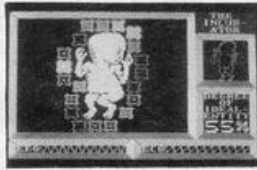
420 PRINT AT 0,0;"BONUS:";INT (
5/2)
430 IF INKEY$="" THEN GOTO 430
440 LET S=5+INT (3/2)
450 GOTO 300
460 PRINT AT 12,6;"ANOTHER GAME
(Y/N)?"
470 IF HI<5 THEN LET HI=5
480 IF INKEY$="N" THEN GOTO 500
490 IF INKEY$="Y" THEN GOTO 150
500 LET A$=""
510 FOR A=1 TO 11
520 PRINT AT A,0;"A"
530 PRINT AT A,0;"A"
540 LET A$=A$+" "
550 NEXT A
560 FOR A=0 TO 23
570 PRINT AT A,0;"
580 NEXT A
590 STOP
600 FOR P=1 TO 10
610 PRINT AT X,Y;" " AT X,Y;" "
620 NEXT P
630 PRINT AT X,Y;" "
640 LET A$=""
650 LET A$=""
660 LET A$=""
670 LET A$=""
680 LET A$=""
690 LET A$=""
700 LET A$=""
710 LET A$=""
720 LET A$=""
730 LET A$=""
740 LET A$=""
750 LET A$=""
760 LET A$=""
770 LET A$=""
780 LET A$=""
790 LET A$=""
800 LET A$=""
810 LET A$=""
820 LET A$=""
830 LET A$=""
840 LET A$=""
850 LET A$=""
860 LET A$=""
870 LET A$=""
880 LET A$=""
890 LET A$=""
900 LET A$=""
910 LET A$=""
920 LET A$=""
930 LET A$=""
940 LET A$=""
950 LET A$=""
960 LET A$=""
970 LET A$=""
980 LET A$=""
990 LET A$=""
1000 LET A$=""

```



AUTOMATA U.K.

The Piman's Software House



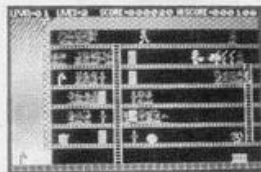
DEUS EX MACHINA

DEUS EX MACHINA 48K Spec. Kempston Joystick & ZX Interface 2 compatible. The unique new era of entertainment, starring Ian Dury, Jon Pertwee, Frankie Howerd and you, in an animated televised fantasy, synchronised to an incredible stereo sound-track. There is nothing like it in this world.



PIMANIA

PIMANIA 48K Spec. The Cult Adventure that's for real! Could you be the lucky winner of 'The Golden Sundial of Pi'? Many have tried and failed. Voted program of 1983 by the Computer Trade Association (Joint winner).



PIROMANIA

PIROMANIA 48K Spec. M/C Arcade Style, Kempston Joystick & ZX Interface 2 compatible. Strike a light! Fire your imagination. That bright spark of a Piman is flaming well out to make the residents of Automata Towers the toast of the town! Can you help Walter Hose dampen the Piman's extinguished career and help the inmates give up smoking?



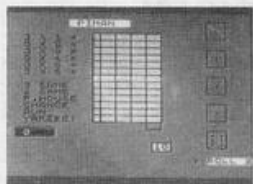
DARTZ

DARTZ 48K Spec. Family fun. This 'arrowing' version of your local's favourite game! Includes true life scoring with 'The more you play the more you drink, the worse your game becomes' rule!



PI-EYED

PI-EYED 48K Spec. M/C Arcade Style. Kempston Joystick compatible. The Piman's hit the bottle! Can you help him negotiate the traffic and drink the town dry?



YAKZEE

YAKZEE 48K Spec. and Dragon. Family fun. An oriental game of luck and skill for 1 to 4 players, playing between 1 to 4 rounds. Each tape comes with both the Dragon and the 48K Spectrum versions along with a simple to follow guide on how to play YAKZEE.

NEW WHEELS JOHN? 48K Spec. Family fun. Would you buy a used motor from this man? Dare you clock an old banger? Have you ever wondered what it's like to run your own second-hand car lot? Wheel leave the rust to you!

CRUSOE 48K Spec. M/C Graphic & Text Adventure. Shipwrecked and stranded, on ye remote island, with nothing save a bottle of Granny's patent elixyr, an empty stomach, ye shorts that he stands up in... and thou. Ye adventure is only just beginning. Can you help him escape ye island's perils?



CRUSOE

PI-IN'ERE 48K Spec. M/C Arcade Style. Kempston Joystick & ZX Interface 2 compatible. 61 screens of action as Burt searches for the elusive bug inside a computer, while keeping out of the reaches of the minor menaces. The program includes Hi-Score, Save and Load facility as well as Replay from last position feature.



PI-IN'ERE

OLYMPIMANIA 48K Spec. M/C Arcade Style. Currah Micro Speech & Kempston Joystick compatible. For all those who just can't get enough of the Olympics, the Piman stages his own just for you! Yes he's going for gold in the craziest events you've ever seen! Can you set new world records in the Speepchase, Alpi Ski-ing, Pitathlon, Pi-Jump, or even the Butterpi? The Piland International Anthem on the flip side.



OLYMPIMANIA

PI-BALLED 48K Spec. M/C Arcade Style. Currah Microspeech & Kempston Joystick compatible. Bouncy, bouncy, this fast action game will let you have a ball! Starring The Balls Brothers, Sid the Snake, Jas'n'Col, and your friend and ours The Piman.



PI-BALLED

MORRIS MEETS THE BIKERS 16/48K Spec. M/C Arcade Style. Kempston Joystick compatible. Morris finds himself abandoned in a multi-storey car park. Help him gather the 10 coins per screen to pay his way out, while avoiding the kamikaze bikers.



MORRIS/BIKERS

GO TO JAIL 48K Spec. Family fun. A computer property trading game for up to 5 players. Your computer not only acts as a banker, but can also take on the roll of a ruthless player, buying, selling and trading its own property.



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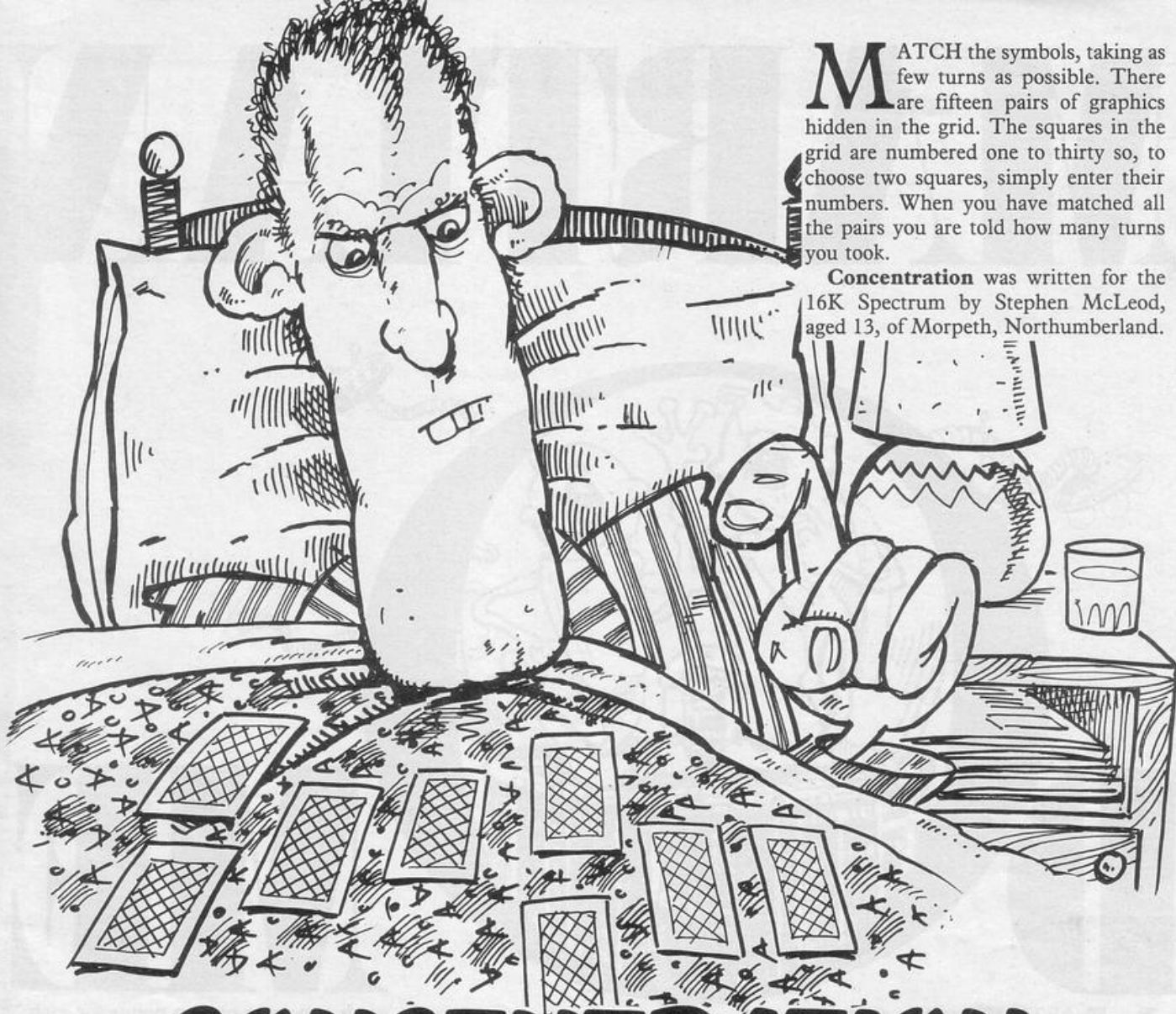
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CONCENTRATION

MATCH the symbols, taking as few turns as possible. There are fifteen pairs of graphics hidden in the grid. The squares in the grid are numbered one to thirty so, to choose two squares, simply enter their numbers. When you have matched all the pairs you are told how many turns you took.

Concentration was written for the 16K Spectrum by Stephen McLeod, aged 13, of Morpeth, Northumberland.

```

1 BORDER 6: PAPER 7: INK 0: B
RIGHT 1: OVER 0: INVERSE 0: FLAS
H 0: CLS : LET TRIES=0: LET SC=0
2 DIM B(2)
5 GO SUB 9000
10 LET A$="AABCCDDEEFFGGHHIIJ
JKKLLMMNNDD"
20 GO SUB 1000
30 GO SUB 2000
40 GO SUB 3000
1000 LET B$=""
1010 FOR C= LEN A$ TO 1 STEP -1
1020 LET N= INT ( RND *C)+1
1030 LET B$=B$+A$(N)
1040 LET A$=A$( TO N-1)+A$(N+1 T
D )
1050 NEXT C
1060 RETURN
2000 FOR N=60 TO 180 STEP 24
2010 FOR M=20 TO 148 STEP 32
2020 PLOT N,M
2030 DRAW 0,16: DRAW 16,0: DRAW
0,-16: DRAW -16,0
2040 NEXT M: NEXT N
2050 FOR N=2 TO 18 STEP 4: FOR M
=8 TO 23 STEP 3
2060 PRINT AT N,M;"?"
2070 NEXT M: NEXT N
2080 RETURN
3000 FOR N=1 TO 2
3002 INPUT "ENTER GUESS ";B(N)
3005 IF B(N)<1 OR B(N)>30 OR B(N
)<> INT B(N) THEN GO TO 3002
3010 IF A(B(N),3) <> 0 THEN BEE
P 1,0: GO TO 3002

```

```

3020 PRINT AT A(B(N),1),A(B(N),
2); CHR$( 79+ CODE B$(B(N))) : LE
T A(B(N),3)=1
3030 NEXT N
3040 IF B$(B(1))=B$(B(2)) THEN
GO TO 3100
3050 BEEP .5,0: BEEP .5,-20
3060 FOR N=1 TO 2: PRINT AT A(B
(N),1),A(B(N),2);"?: LET A(B(N)
,3)=0: NEXT N
3065 LET TRIES=TRIES+1: PRINT A
T 0,12;"TRIES ";TRIES
3070 GO TO 3000
3100 FOR N=1 TO 4: BEEP .01,0: B
EEP .01,20: BEEP .2,30: BEEP .01
,5: BEEP .01,0: NEXT N
3110 LET SC=SC+1: IF SC=15 THEN
GO TO 4000
3120 GO TO 3000
4000 FOR N=40 TO 0 STEP -1: BEEP
.01,N: NEXT N: BEEP .5,-1
4010 PRINT AT 0,3;"IT TOOK YOU
";TRIES;" TRIES..."
4020 PRINT #1;"PRESS 'ENTER' FOR
ANOTHER GAME.."
4030 IF INKEY$ <> CHR$ 13 THE
N GO TO 4030
4040 RUN
9000 FOR N= USR "A" TO USR "D"+
7: READ A: POKE N,A: NEXT N
9010 DATA 0,8,28,62,127,62,28,8
9020 DATA 8,28,62,127,127,62,8,6
2
9030 DATA 0,54,127,127,127,62,28
,8

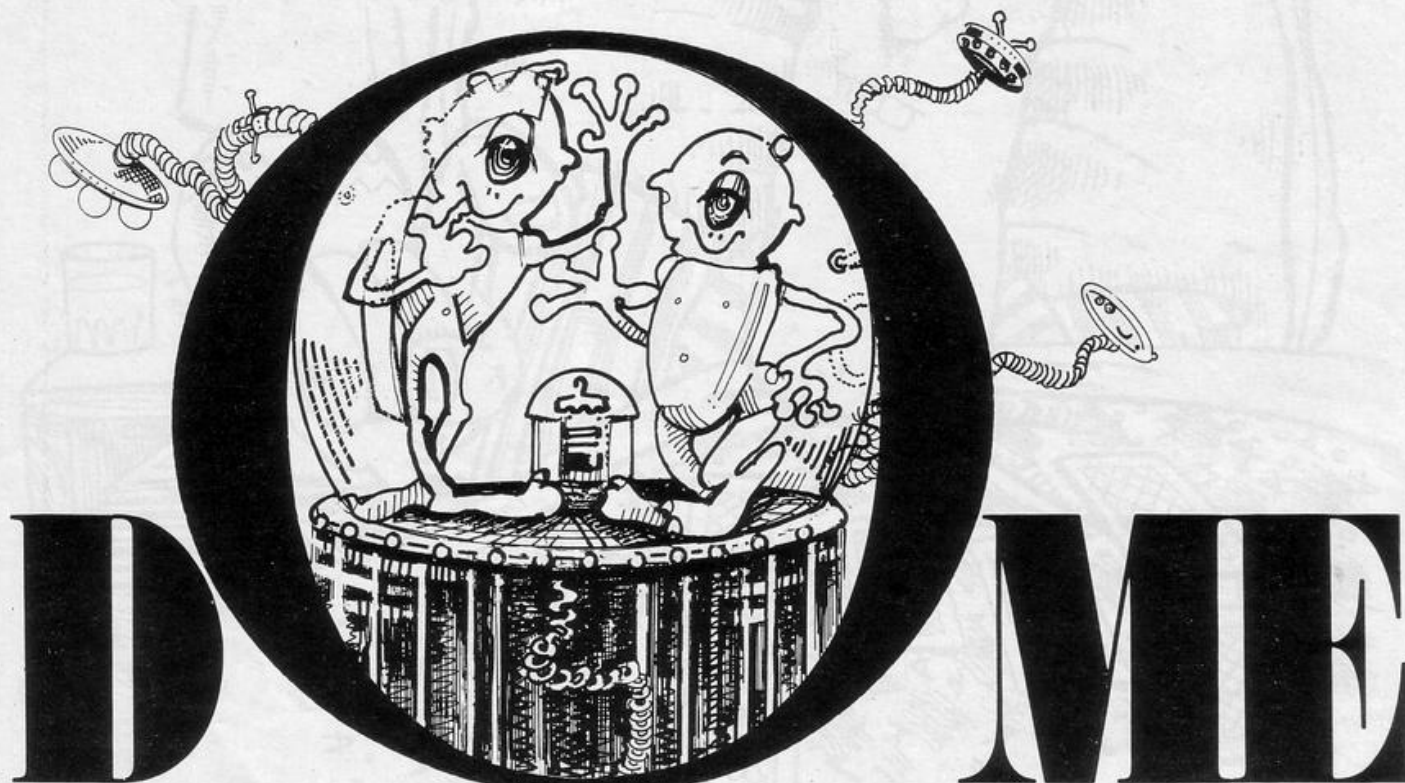
```

```

9040 DATA 8,28,8,54,127,107,8,28
9050 DATA 8,24,56,120,8,255,126,
60
9060 DATA 24,24,126,126,24,24,24
,24
9070 DATA 0,0,65,165,191,160,64,
0
9080 DATA 0,56,16,215,148,214,84
,199
9090 DATA 129,90,36,90,90,36,90,
129
9100 DATA 0,14,72,72,127,9,9,56
9110 DATA 8,28,62,28,62,127,8,28
9120 DATA 28,28,10,62,40,28,20,5
4
9130 DATA 62,8,8,8,62,62,28,8
9140 DATA 16,58,126,254,254,254,
238,238
9150 DATA 28,62,119,31,127,62,28
,0
9160 DIM A(30,3)
9165 LET Z=-2
9170 FOR N=1 TO 30: LET Z=Z+(4 A
ND (N=1 OR N=7 OR N=13 OR N=19 O
R N=25)): READ A(N,1),A(N,2)
9175 IF N=6 OR N=12 OR N=18 OR N
=24 THEN RESTORE 9190
9180 LET A(N,3)=0: NEXT N
9190 DATA Z,8,Z,11,Z,14,Z,17,Z,2
0,Z,23
9200 RETURN
9999 RUN

```


MARTIAN



MARTIAN Dome is a simulation program in which you play the part of the prime minister of a colony on Mars. Your tasks include paying for food and oxy-

gen and undertaking repairs to the dome. The only way to make money for food and oxygen is to sell your sculptures to other domes. Each sculptor

needs two more oxygen points for each sculpture produced.

Martian Dome was written for the 16K ZX-81 by Colin Walsham of Leigh on Sea, Essex.

```

1 GOSUB 5000
2 CLS
10 LET POP=100
20 LET YEAR=0
30 LET MON=5000
40 LET REP=225
50 LET OX=1500
60 LET OXCOST=8
70 LET POPOX=5
80 LET FOOD=2000
90 LET FOODCOST=5
100 LET POPFOOD=3
110 LET ARTOX=2
120 LET ARTPAY=30
200 PRINT AT 0,0;"YEAR ";YEAR;"A
T 0,15;"POPULATION=";POP
210 PRINT AT 2,0;"OXYGEN LEFT="
;OX;" UNITS"
220 PRINT AT 4,0;"COST OF OXYGE
N PER UNIT=";OXCOST;"
230 PRINT AT 6,0;"CASH IN TREAS
URY=";MON
240 PRINT AT 8,0;"REPAIR BILL T
HIS YEAR=";REP;"
250 PRINT AT 10,0;"FOOD LEFT="
;FOOD;" UNITS"
260 PRINT AT 12,0;"FOOD COST PE
R UNIT=";FOODCOST;"
270 PRINT AT 14,0;"EACH PERSON
NEEDS "POPOX;" UNITS OF OXYG
EN AND "POPFOOD;" FOOD UNITS PE
R YEAR"
280 PRINT AT 18,0;"EACH SCULPTU
RE PAYS "ARTPAY;" BUT THE MAKE
REPAIRS "ARTOX;" UNITS MORE OXYG
EN"
400 PRINT AT 21,0;"HOW MUCH OXY
GEN DO YOU WANT
410 INPUT AMOX
420 IF AMOX*OXCOST>MON THEN GOT
O 400
425 LET OX=OX+AMOX
430 LET MON=MON-(AMOX*OXCOST)
435 PRINT AT 2,0;"OXYGEN LEFT="
;OX;" UNITS"
436 PRINT AT 6,0;"CASH IN TREAS
URY=";MON;
440 PRINT AT 21,0;"

```

```

450 PRINT AT 21,0;"HOW MUCH FOO
D DO YOU WANT ?"
460 INPUT AMFOOD
470 IF FOODCOST*AMFOOD>MON THEN
GOTO 450
475 LET FOOD=FOOD+AMFOOD
480 LET MON=MON-(FOODCOST*AMFOO
D)
481 PRINT AT 8,0;"CASH IN TREAS
URY=";MON
482 PRINT AT 10,0;"FOOD LEFT="
;FOOD;" UNITS"
490 PRINT AT 21,0;"
500 PRINT AT 21,0;"HOW MANY SCU
LPTURES TO BE MADE?"
510 INPUT AMART
520 LET OX=OX-(AMART*ARTOX)
530 LET MON=MON+(AMART*ARTPAY)
540 LET MON=MON-REP
550 LET FOOD=FOOD-(POP*POPOX)
560 LET OX=OX-(POP*POPOX)
570 IF OX>0 THEN GOTO 700
580 GOTO 1000
590 IF FOOD>0 THEN GOTO 800
600 GOTO 2000
610 IF MON>0 THEN GOTO 900
620 GOTO 3000
630 LET YEAR=YEAR+1
640 LET REP=REP+INT (RAND*499)+1
650 LET POP=POP+INT (RAND*50)+1
660 LET ARTPAY=ARTPAY+INT (RAND*
5)+1
670 LET OXCOST=OXCOST+1
680 LET FOODCOST=FOODCOST+INT (
RAND*3)+1
690 CLS
695 FOR A=0 TO 100
700 NEXT A
710 GOTO 200
720 CLS
1000 FOR A=0 TO 20
1010 PRINT AT 11,5;"YOU RAN OUT
OF OXYGEN"
1020 PRINT AT 11,5;"YOU RAN OUT
OF FOOD"
1030 NEXT A
1040 PRINT AT 0,0;"YOU SURVIVED
";YEAR;" YEARS"

```

```

1050 STOP
2000 CLS
2005 FOR A=0 TO 20
2010 PRINT AT 11,6;"YOU RAN OUT
OF FOOD"
2020 PRINT AT 11,6;"YOU RAN OUT
OF FOOD"
2030 NEXT A
2040 PRINT AT 0,0;"YOU LASTED ";
YEAR;" YEARS"
2050 STOP
3000 CLS
3005 FOR A=0 TO 20
3010 PRINT AT 11,5;"YOU RAN OUT
OF MONEY"
3020 PRINT AT 11,5;"YOU RAN OUT
OF MONEY"
3030 NEXT A
3040 PRINT AT 0,0;"YOU HELD OUT
FOR ";YEAR;" YEARS"
3050 STOP
5000 PRINT AT 0,10;"MARTIAN DOME"
5010 PRINT
5020 PRINT "YOU ARE THE PRIME MI
NISTER OF THE INDEPENDANT FEDE
RATION DOME NINE ON MARS.IT IS Y
OUR JOB TO MAKE SURE THE TREASU
RY CAN PAY"
5030 PRINT "FOR FOOD AND OXYGEN
FOR ALL THE POPULATION.IF NOT TH
E POPULATION WILL DIE.ALSO YOU MA
KE SURE YOU CAN PAY FOR THE EVER
INCREASING"
5040 PRINT "COST OF REPAIRING DA
MAGE TO THE DOME BY METEOR STORM
S.YOUR ONLY WAY TO MAKE MONEY IS
TO SELL YOUR UNIQUE SCULPTUR
ES TO THE REST OF MARS.BUT REM
EMBER MORE OXYGEN IS USED WHEN
SCULPTURES ARE MADE"
5050 PRINT AT 21,9;"PRESS ANY KE
Y"
5099 PAUSE 4E4
6000 RETURN
9997 REM MARTIAN DOME BY COLIN W
ALSHAM
9998 SAVE "MARTIAN DOME"
9999 RUN

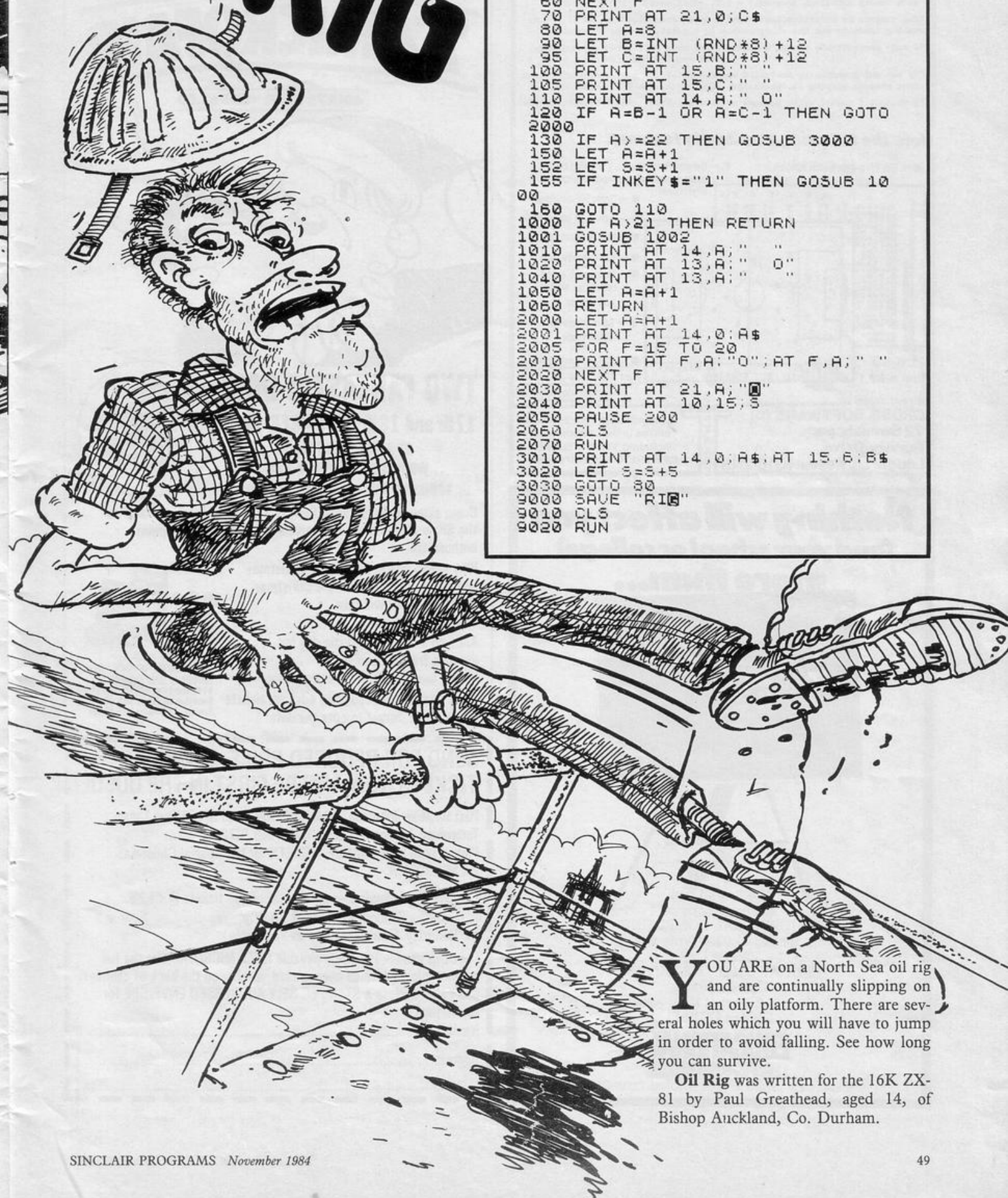
```


OIL RIG

```

1 REM RIG
5 LET S=0
10 LET A$=""
15 LET C$=""
20 LET B$=""
30 PRINT AT 15,6;B$
40 FOR F=16 TO 20
50 PRINT AT F,8;"| |";AT F,22;"
60 NEXT F
70 PRINT AT 21,0;C$
80 LET A=8
90 LET B=INT (RND*8)+12
95 LET C=INT (RND*8)+12
100 PRINT AT 15,8;" "
105 PRINT AT 15,0;" "
110 PRINT AT 14,A;" 0"
120 IF A=B-1 OR A=C-1 THEN GOTO 2000
130 IF A>=22 THEN GOSUB 3000
150 LET A=A+1
152 LET S=S+1
155 IF INKEY$="1" THEN GOSUB 10
00
160 GOTO 110
1000 IF A>21 THEN RETURN
1001 GOSUB 1002
1010 PRINT AT 14,A;" "
1020 PRINT AT 13,A;" 0"
1040 PRINT AT 13,A;" "
1050 LET A=A+1
1080 RETURN
2000 LET A=A+1
2001 PRINT AT 14,0;A$
2005 FOR F=15 TO 20
2010 PRINT AT F,A;"0";AT F,A;" "
2020 NEXT F
2030 PRINT AT 21,A;"0"
2040 PRINT AT 10,15;S
2050 PAUSE 200
2060 CLS
2070 RUN
3010 PRINT AT 14,0;A$;AT 15,6;B$
3020 LET S=S+5
3030 GOTO 80
5000 SAVE "RIG"
5010 CLS
5020 RUN

```



YOU ARE on a North Sea oil rig and are continually slipping on an oily platform. There are several holes which you will have to jump in order to avoid falling. See how long you can survive.

Oil Rig was written for the 16K ZX-81 by Paul Greathead, aged 14, of Bishop Auckland, Co. Durham.

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Sheff Utd	6	8	12	19	12	36
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Sheff Utd	4	8	14	13	10	32
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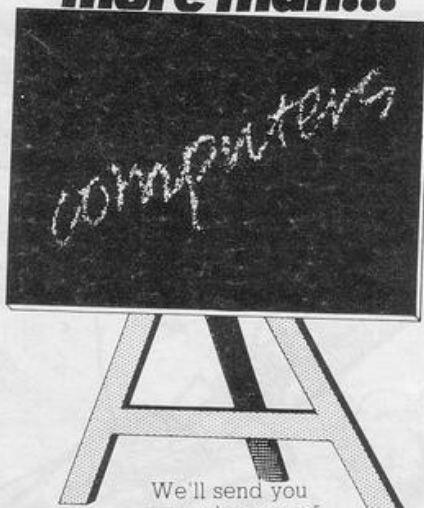
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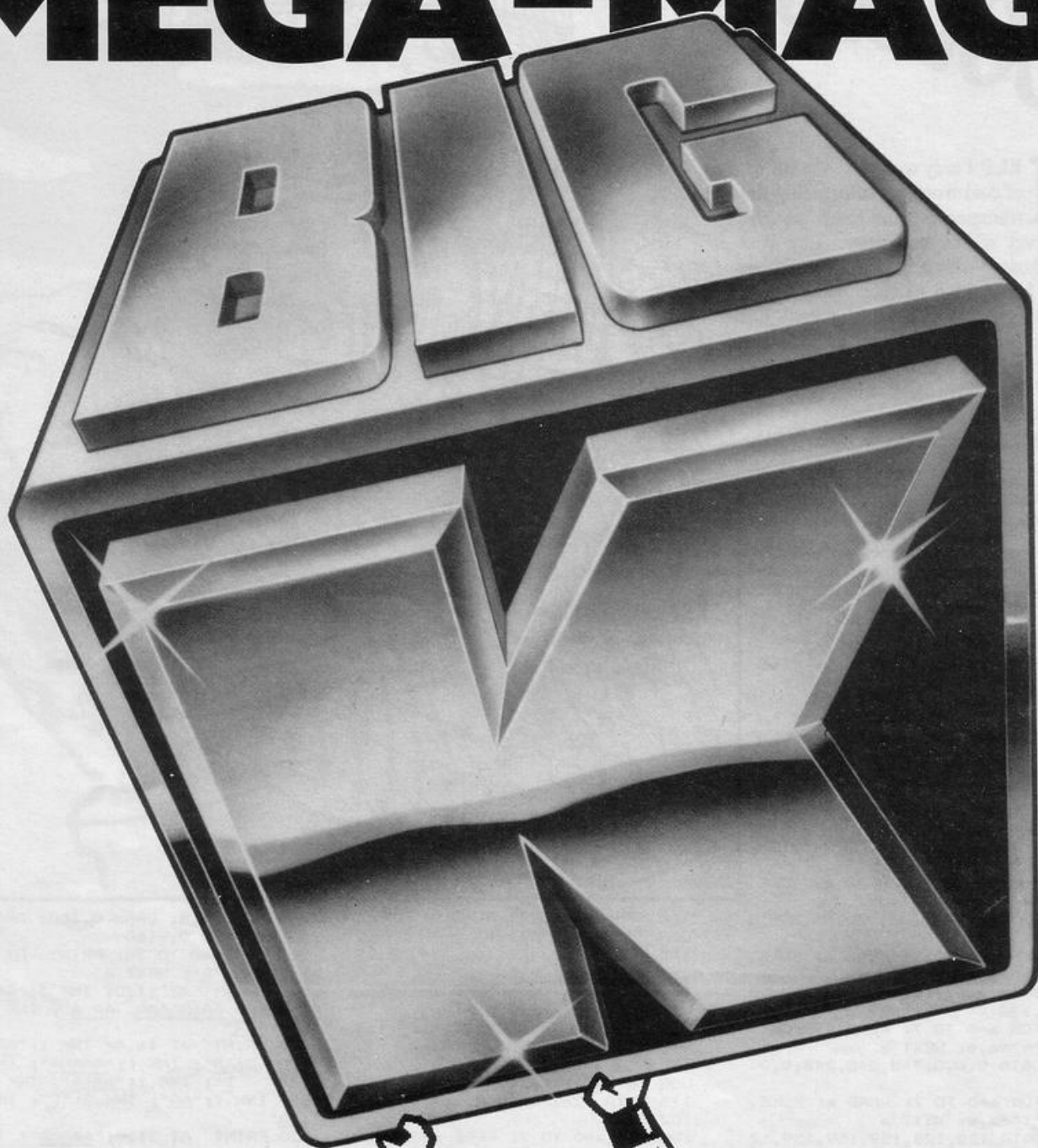
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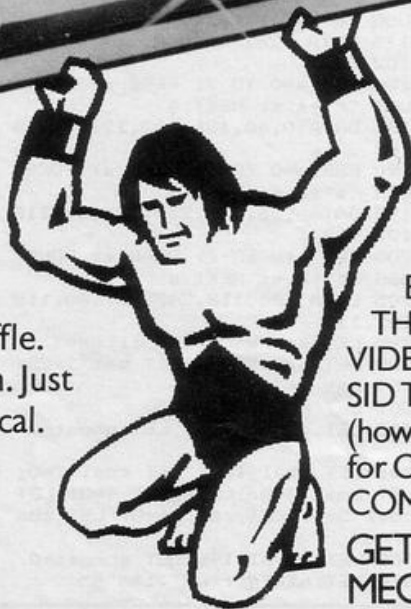
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COAL COLLECTOR

HELP Percy to collect the lumps of coal from the mine using the transporters to jump to the next level where necessary. The bats and ghosts which haunt the mine should be avoided as they will impede your progress. Once all the coal has been collected, make your way to the top of the mine and begin again. Use Q and W to move left and right and SPACE to jump.

Coal Collector was written for the 48K Spectrum by Craig Cole of Hull.



```

2 CLS
10 FOR a=0 TO 7: READ s: POKE
USR "a"+a,s: NEXT a
15 DATA 255,170,255,60,66,129,
129,129
20 FOR a=0 TO 7: READ s: POKE
USR "b"+a,s: NEXT a
25 DATA 255,129,129,231,231,10
2,36,60
30 FOR a=0 TO 7: READ s: POKE
USR "c"+a,s: NEXT a
35 DATA 86,170,86,170,86,170,8
6,170
40 FOR a=0 TO 7: READ s: POKE
USR "d"+a,s: NEXT a
45 DATA 0,16,16,144,144,146,14
6,146
50 FOR a=0 TO 7: READ s: POKE
USR "e"+a,s: NEXT a
55 DATA 24,62,127,255,255,126,
62,12
60 FOR a=0 TO 7: READ s: POKE
USR "f"+a,s: NEXT a
65 DATA 85,255,85,255,85,255,8
5,255
70 FOR a=0 TO 7: READ s: POKE
USR "g"+a,s: NEXT a
75 DATA 128,132,140,159,191,15
9,140,132
80 FOR a=0 TO 7: READ s: POKE
USR "h"+a,s: NEXT a
85 DATA 0,0,0,248,248,248,0,0

90 FOR a=0 TO 7: READ s: POKE
USR "i"+a,s: NEXT a
95 DATA 128,128,159,159,159,12
8,128,128
100 FOR a=0 TO 7: READ s: POKE
USR "j"+a,s: NEXT a
105 DATA 32,48,248,252,248,48,3
2,0
110 FOR a=0 TO 7: READ s: POKE
USR "k"+a,s: NEXT a
115 DATA 2,2,3,125,31,15,6,5
120 FOR a=0 TO 7: READ s: POKE
USR "l"+a,s: NEXT a
125 DATA 64,64,192,190,248,240,
96,160
130 FOR a=0 TO 7: READ s: POKE
USR "m"+a,s: NEXT a
135 DATA 192,224,176,184,248,24
8,216,236
140 FOR a=0 TO 7: READ s: POKE
USR "n"+a,s: NEXT a
145 DATA 3,7,13,29,31,31,27,25
146 FOR a=0 TO 7: READ s: POKE
USR "u"+a,s: NEXT a
147 DATA 126,118,247,251,60,56,
56,56

```

```

150 FOR a=0 TO 7: READ s: POKE
USR "o"+a,s: NEXT a
155 DATA 0,60,126,102,254,14,12
4,60
160 FOR a=0 TO 7: READ s: POKE
USR "p"+a,s: NEXT a
165 DATA 126,118,247,251,60,119
,99,231
170 FOR a=0 TO 7: READ s: POKE
USR "q"+a,s: NEXT a
175 DATA 126,110,239,223,60,110
,102,238
180 FOR a=0 TO 7: READ s: POKE
USR "r"+a,s: NEXT a
185 DATA 0,60,126,102,127,112,6
2,60
190 FOR a=0 TO 7: READ s: POKE
USR "s"+a,s: NEXT a
195 DATA 126,118,239,223,60,118
,102,119
200 FOR a=0 TO 7: READ s: POKE
USR "t"+a,s: NEXT a
205 DATA 126,118,247,251,60,118
,102,119
295 LET score=0: LET lives=3
300 LET bat 1=28: LET bat 2=25:
LET bat 3=28
301 LET number=0
303 LET ghost 1=6: LET ghost 2=
5
306 LET coal 1=0: LET coal 2=0:
LET coal 3=0: LET coal 4=0: LET
coal 5=0: LET coal 6=0: LET coa
l 7=0
308 LET level=19: LET across=0
310 LET h$="R": LET l$="S"

```

```

499 PLOT 0,8: DRAW 0,160: DRAW
248,0: DRAW 0,-160
500 FOR a=0 TO 30: PRINT AT 6,
a: INK 2;"A": NEXT a
510 PRINT AT 11,0: INK 3;"AAAA
AAAA AAAAAAA AA A": INK 2;
"B": "AAA"
520 PRINT AT 16,4: INK 1;"AAA"
; INK 2;"B": INK 1;"AAAAA": INK
2;"B B": INK 1;"AAAA": INK 2;
"B": INK 1;"AA": INK 2;"B": INK
1;"A"
530 PRINT AT 21,0;"AAAAA": INK
2;"B": INK 0;"A AAAAAA"
; INK 2;"B": " "; INK 2;"B": I
NK 0;"AAA"
535 PRINT AT 20,14: INK 0;"D"

536 PRINT AT 21,7: INK 0;"DDDD
DDD"
537 PRINT AT 21,23;"DDDD"
540 PRINT AT 18,15: INK 1;"CC"
: PRINT AT 19,15: INK 1;"CC": P
RINT AT 20,15: INK 1;"CC"
542 PRINT AT 1,0: INK 3;"FFFFF
FFFFF": PRINT AT 2,0: INK 3;"FF
FFFFFFF": PRINT AT 3,0: INK 2;
"GH": INK 3;"FFFFFFF"
545 PRINT AT 1,10: INVERSE 1;"
PERCY AND"
546 PRINT AT 2,10: INVERSE 1;"
THE "
547 PRINT AT 3,10: INVERSE 1;"
PICKETTS"
560 PRINT AT 3,0: INK 2;"GH"
565 PRINT AT 18,0: INK 2;"IJ"

```




```

620 PRINT AT 20,bat 3; INK 1;"
"
623 LET bat 1=bat 1-1: LET bat
2=bat 2-1: LET bat 3=bat 3-1
625 LET ghost 1=ghost 1+1: LET
ghost 2=ghost 2+1
630 IF bat 1=20 THEN LET bat 1
=28
632 IF bat 2=16 THEN LET bat 2
=25
634 IF bat 3=18 THEN LET bat 3
=28
636 IF ghost 1=16 THEN LET gho
st 1=6
638 IF ghost 2=13 THEN LET gho
st 2=5
639 GO SUB 650
640 GO TO 600
650 PRINT AT level,across;h$:
PRINT AT level +1,across;l$
660 IF INKEY$ ="w" THEN GO TO
680
670 IF INKEY$ ="q" THEN GO TO
700
675 IF INKEY$ =" " THEN GO SU
B 940
678 IF INKEY$ =" " THEN GO TO
679
679 RETURN
680 IF across=30 AND level=19 T
HEN GO TO 685
681 IF across=30 AND level=9 TH
EN GO TO 685
682 IF across=30 AND level=4 TH
EN GO TO 685
683 PRINT AT level,across;" ":
PRINT AT level+1,across;" "
684 LET across=across+1: PRINT
AT level,across;"R": PRINT AT
level+1,across;"T": LET h$="R":
LET l$="S": FOR a=0 TO 8: NEXT a
685 GO TO 706
700 IF across=17 AND level=19 T
HEN GO TO 706
701 IF across=0 AND level=9 THE
N GO TO 706
702 IF across=0 AND level=19 TH
EN GO TO 706
703 PRINT AT level,across;" ":
PRINT AT level+1,across;" "
705 LET across=across-1: PRINT
AT level,across;"Q": PRINT AT
level+1,across;"P": LET h$="Q":
LET l$="Q": FOR a=0 TO 8: NEXT a
706 IF level=19 THEN GO TO 710
707 IF level=14 THEN GO TO 730
708 IF level=9 THEN GO TO 720
709 IF level=4 THEN GO TO 740
710 IF across=7 OR across=23 TH
EN GO TO 900
711 IF across=bat 3 THEN GO TO
900
712 IF across=26 THEN GO TO 90
0
714 IF across=17 AND coal 1=0 T
HEN LET coal 1=1: GO TO 960
716 IF across=30 AND coal 2=0 T
HEN LET coal 2=1: GO TO 960
719 GO TO 600
720 IF across=8 OR across=12 TH
EN GO TO 920
721 IF across=bat 1 OR across=g
host 1 THEN GO TO 900
722 IF across=21 OR across=22 T
HEN GO TO 920
723 IF across=25 THEN GO TO 92
0
724 IF across=0 AND coal 5=0 TH
EN LET coal 5=1: GO TO 960
726 IF across=18 AND coal 6=0 T
HEN LET coal 6=1: GO TO 960
728 IF across=30 AND coal 7=0 T
HEN LET coal 7=1: GO TO 960
729 GO TO 600
730 IF across=14 THEN GO TO 90
0
731 IF across=bat 2 OR across=g
host 2 THEN GO TO 900
732 IF across=3 OR across=17 TH
EN GO TO 920

```

```

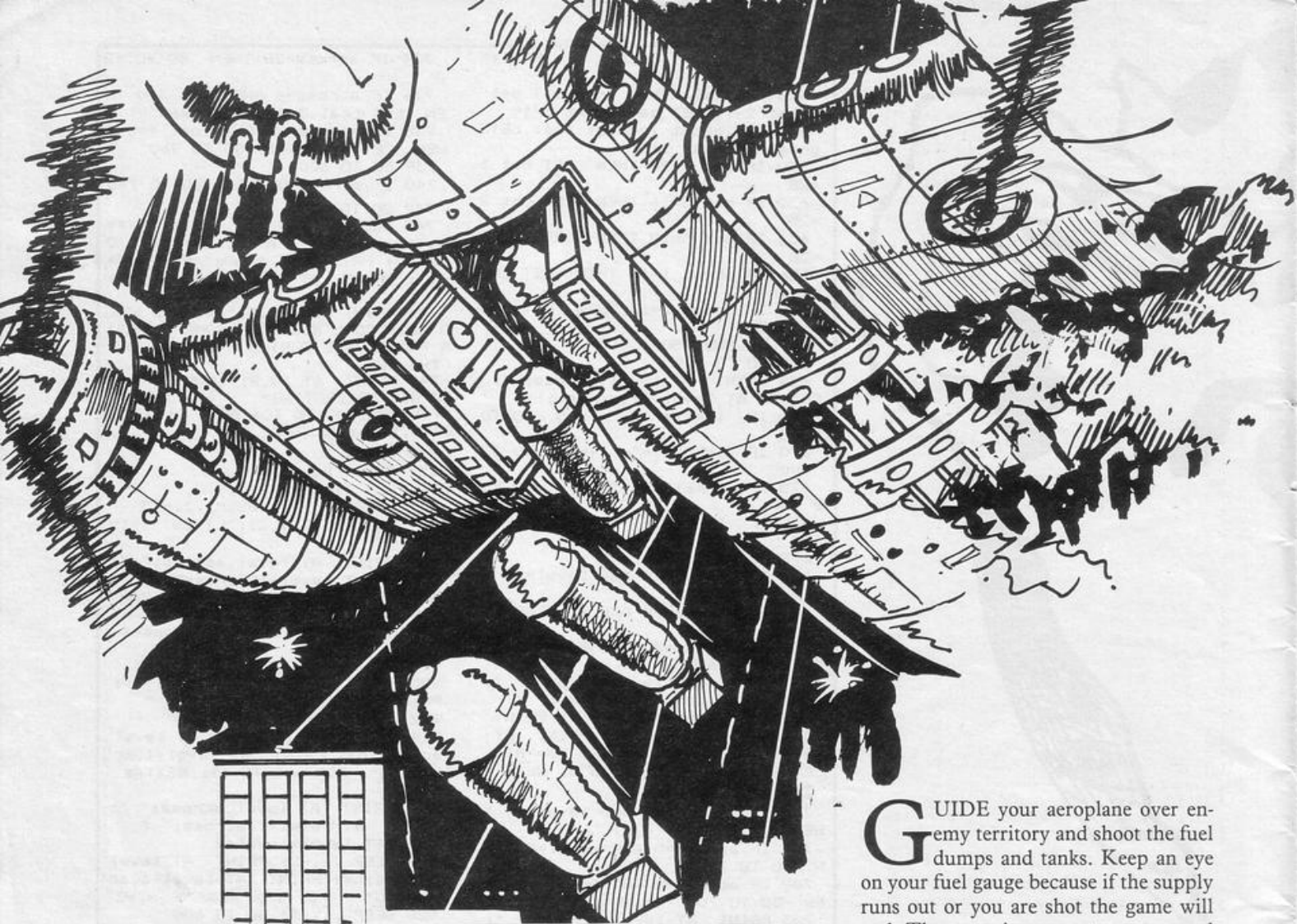
734 IF across=28 THEN GO TO 92
0
736 IF across=4 AND coal 3=0 TH
EN LET coal 3=1: GO TO 960
738 IF across=27 AND coal 4=0 T
HEN LET coal 4=1: GO TO 960
739 GO TO 600
740 IF across=0 THEN GO TO 745
742 GO TO 600
745 CLS : PRINT AT 4,10;"*****
*****": PRINT AT 5,10;"*WELL D
ONE*": PRINT AT 6,10;"**PERCY*
**": PRINT AT 7,10;"*****"
746 PRINT AT 10,0;"BUT YOU NEE
D MORE COAL BECAUSE SOME OF YOU
R FAMILY ARE COMING FOR
THE WEEK"
747 PRINT AT 18,8; INVERSE 1;"
SO GET COLLECTING"
748 FOR a=0 TO 10: BEEP .1,a: B
EEP .1,-a: NEXT a
750 PAUSE 0
751 CLS : GO TO 300
900 LET lives=lives-1
901 BEEP .5,-10: BEEP .3,-15
902 PRINT AT 1,21;"LIVES ";liv
es
904 PRINT AT level,across;" ":
PRINT AT level+1,across;" "
906 IF lives=0 THEN GO TO 980
908 LET level=19: LET across=1
910 GO TO 600
920 PRINT AT level,across;" ":
PRINT AT level+1,across;" "
922 LET level=level+3
924 BEEP .1,-1: PRINT AT level
,across;h$: PRINT AT level+1,ac
ross;"U": FOR a=0 TO 15: NEXT a
926 PRINT AT level,across;" ":
PRINT AT level+1,across;" "
927 LET level=level+2
928 BEEP .1,-2: PRINT AT level
,across;h$: PRINT AT level+1,ac
ross;"U"
929 BEEP .1,-3: GO TO 600
940 IF across=5 AND level=19 TH
EN GO TO 951
942 IF across=22 AND level=19 T
HEN GO TO 951
943 IF across=27 AND level=9 AN
D number=7 THEN GO TO 951
944 IF across=27 AND level=19 T
HEN GO TO 951
945 IF across=23 AND level=14 T
HEN GO TO 951
946 IF across=7 AND level=14 TH
EN GO TO 951
947 IF across=18 AND level=14 T
HEN GO TO 951
948 IF across=13 AND level=14 T
HEN GO TO 951
949 IF across=26 AND level=14 T
HEN GO TO 951
950 RETURN
951 PRINT AT level,across;" ":
FOR a=0 TO 8: NEXT a: PRINT AT
level+1,across;" "
952 LET level=level-5
956 FOR a=1 TO 2: BEEP .1,a: NE
XT a: PRINT AT level,across;h$:
NEXT a: PRINT AT level+1,acros
s;l$
958 RETURN
960 LET score=score+27: PRINT
AT 3,21;"SCORE ";score
961 LET number=number+1
962 GO TO 600
980 CLS : PRINT AT 10,9; INVER
SE 1;" GAME OVER "
982 PRINT AT 19,1; INVERSE 1;"
DO YOU WANT ANOTHER GAME (Y/N)"
984 IF INKEY$ ="y" THEN GO TO
988
986 IF INKEY$ ="n" THEN CLS :
PRINT AT 10,8; FLASH 1;"G.O.O.
D B.Y.E": FOR a=0 TO 8: BEEP .1,
a: NEXT a: STOP
987 GO TO 984
988 CLS : GO TO 295

```

```

570 PRINT AT 10,0; INK 0;"E":
PRINT AT 10,18; INK 0;"E": PRIN
T AT 10,30; INK 0;"E"
575 PRINT AT 15,4; INK 0;"E":
PRINT AT 15,27; INK 0;"E"
580 PRINT AT 20,17; INK 0;"E":
PRINT AT 20,30; INK 0;"E"
600 PRINT AT 10,bat 1; INK 2;"
KL": PRINT AT 10,ghost 1; INK 1
;"NM"
601 IF level=19 AND across=bat
3 THEN GO TO 900
602 PRINT AT 15,bat 2; INK 0;"
KL": PRINT AT 15,ghost 2; INK 2
;"NM"
603 IF level=14 AND across=bat
2 THEN GO TO 900
604 PRINT AT 20,bat 3; INK 1;"
KL"
605 IF level=14 AND across=ghos
t 2 THEN GO TO 900
606 PRINT AT 1,21;"LIVES ";liv
es
607 IF level=9 AND across=ghost
1 THEN GO TO 900
608 PRINT AT 3,21;"SCORE ";sco
re
609 IF level=9 AND across=bat 1
THEN GO TO 900
610 FOR a=0 TO 20: NEXT a
612 PRINT AT 10,bat 1; INK 2;"
": PRINT AT 10,ghost 1; INK 1
;" "
613 IF level=19 AND across=bat
3+1 THEN GO TO 900
614 IF level=14 AND across=bat
2+1 THEN GO TO 900
615 PRINT AT 15,bat 2; INK 0;"
": PRINT AT 15,ghost 2; INK 2
;" "
616 IF level=14 AND across=ghos
t 2+1 THEN GO TO 900
617 IF level=9 AND across=ghost
1+1 THEN GO TO 900
618 IF level=9 AND across=bat 1
+1 THEN GO TO 900

```

AIR RAID

GUIDE your aeroplane over enemy territory and shoot the fuel dumps and tanks. Keep an eye on your fuel gauge because if the supply runs out or you are shot the game will end. The game incorporates some good sound effects and explosion routines.

Air Raid was written for the 48K Spectrum by Neil Bates, of Coventry, West Midlands.

```

6 GO TO 1000
7 LET hi=0: GO SUB 1990
8 GO SUB 9000
20 GO SUB 7000
30 GO SUB 2070
35 FOR j=1 TO 224: GO SUB 3000

40 IF INKEY#="" THEN GO SUB 7500
45 LET u=u-1: PRINT AT 19,11;
PAPER 4;u;" "
46 IF u=0 THEN PRINT AT 10,1
0: FLASH 1; INK 6; PAPER 2;"OUT
OF FUEL": GO SUB 8000
47 POKE 65107,1
50 IF b$(238)="L" THEN LET g=
88: LET h=103: GO SUB 7600
55 IF b$(466)="I" THEN LET g=
80: GO SUB 7700
60 IF b$(463)="L" THEN LET g=
80: LET h=111: GO SUB 7600
65 IF b$(242)="I" THEN LET g=
88: GO SUB 7700
70 IF b$(688)="L" THEN LET g=
72: LET h=119: GO SUB 7600
75 IF b$(692)="I" THEN LET g=
71: GO SUB 7700
80 IF b$(913)="L" THEN LET g=
64: LET h=127: GO SUB 7600
85 POKE 65107,5
90 NEXT j
100 GO SUB 1990
110 GO TO 35
1000 DATA 0,0,0,0,0,1,7,15,7,7,7,
3,3,0,0,0,0,0,0,193,243,251,253,
253,255,255,255,255,254,254,124,
56,0,56,254,255,255,255,255,255

```

```

,255,251,251,253,254,124,0,0,0,0,
0,112,248,252,252,252,252,252,2
40,224,0,0,0,0
1010 DATA 0,144,216,254,255,24,1
6,0,0,128,64,160,80,168,84,170,1
2,5,10,21,42,85,170,128,64,44,2
8,126,255,255,102,8,34,128,4,32,
2,64,8,126,195,219,195,255,85,17
0,85
1020 DATA 34,28,8,127,73,73,127,
127,15,63,15,15,31,127,255,255,8
,16,32,242,146,154,254,248,192,2
24,193,194,228,248,252,252,85,42
,21,10,5,2,1,0,0,14,254,14,127,2
55,255,102,85,170,85,170,85,170,
85,170
1030 DATA 33,0,64,30,64,126,1,31
,0,9,6,32,203,23,203,22,43,16,25
1,9,35,35,29,32,236,201
1040 DATA 6,3,197,33,15,0,17,0,0
,229,205,181,3,225,17,16,0,167,2
37,90,125,254,255,32,237,193,16,
230,201,0
1050 FOR f=USR "a" TO USR "u"+
7: READ a: POKE f,a: NEXT f
1060 CLEAR 64999: FOR f=65000 TO
65025: READ a: POKE f,a: NEXT f

1070 FOR f=65100 TO 65129: READ
a: POKE f,a: NEXT f
1080 GO TO 7
1990 DIM a$(5,224)
2000 LET a$(1)="

```

```

2010 LET a$(2)="
UUJ
T L KUUUUUUJ
L KUUUUJ KUUUUUJ
LL
QQ
2020 LET a$(3)=" T NNNN KUUUUUUJ
UUJ T KUUUUJ L
LKUUUUUUUUUUUUUUUUUUUUUUUUUUUU
KUUUUUUUUUUU KUUUUUUUUU
UUUUUJ QQ
T L N
T NNNN LPR N
2040 LET a$(4)="UUUUUUUUUUUUUUUUUU
UUUJ LKUUUJ KUUUUUUUUUJ
TKUUUUUUUUUUUUUUUUUUUUUUUUUUUU
L KUUUUUUUUUUUUUJ L KUUUUUUUUU
UUUUUJ LPR
KUUUUUUUJ
UUUUUUUUUUUUUUUU
K
2050 LET a$(5)="UUUUUUUUUUUUUUUUUU
UUUUUUUUUUUUUUJ N L KUUUUUUUUUUUJ
N KUUUUUUUUUUUUUUUUUUUUUUUUUUUUU
UUUUUUUUUUUUUUUUUUUUUUUUUUUUUU
UUUUUUUUJAAAAAAAAAAAAAAAAASUUUUUAAA
AAAAAAAAAAAAAAAAAKUUUUUUUUUUJAAAAAA
AAAAAAAAAAAAAAAAASUUUUUUUUUUUAAAA
AAAAAAAAAAAAAAAAAKU"
2060 LET b$=a$(1)+a$(2)+a$(3)+a$
(4)+a$(5): DIM a$(160): RETURN
2070 LET a=7: LET sc=0

```



```

2071 LET u=200
2080 RETURN
3000 LET b$=b$(2 TO 224)+b$(1)+b
$(226 TO 448)+b$(225)+b$(450 TO
672)+b$(449)+b$(674 TO 896)+b$(6
73)+b$(898 TO 1120)+b$(897)
3005 LET a$=b$(1 TO 32)+b$(225 T
O 256)+b$(449 TO 480)+b$(673 TO
704)+b$(897 TO 928)
3006 PRINT AT a,10;" "
3007 RANDOMIZE USR 65000
3010 PRINT AT 10,0;a$
3012 IF SCREEN$(a,10)="" THEN
GO SUB 8000
3015 IF INKEY$="7" THEN LET a
=a-1: IF SCREEN$(a,10) <> " "
THEN LET a=a-2
3016 IF INKEY$="6" THEN LET a
=a+1: IF SCREEN$(a,10) <> " "
THEN IF a<8 THEN LET a=a+2
3020 PRINT AT a,10;"I"
3025 IF a>14 THEN GO TO 8000
3030 RETURN
6000 BEEP .5,7: BEEP .5,16: BEEP
.25,17: BEEP .25,16: BEEP .5,14
: BEEP .1,16: BEEP .5,12: BEEP .5
,16: BEEP .25,17: BEEP .25,16: B
EEP .5,14: BEEP .1,19
6005 RETURN
6010 BEEP .5,16: BEEP .5,16: BEE
P .112,14: BEEP .112,12: BEEP .1
12,14: BEEP .112,11: BEEP .5,12:
BEEP .25,14: BEEP .25,16: BEEP
.1,7
6015 RETURN
6020 BEEP .5,9: BEEP .25,11: BEE
P .25,14: BEEP .25,12: BEEP .112
,11: BEEP .112,9: BEEP .25,7: BE
EP .25,0: BEEP .25,5: BEEP .25,7
: BEEP .25,9: BEEP .112,11: BEEP
.112,9: BEEP .1,7
6025 RETURN
7000 PAPER 1: INK 7: BORDER 1: C
LS
7010 FOR f=15 TO 21: PRINT INK
f-15: AT f,0;"(32+ig8)": NEXT f

```

```

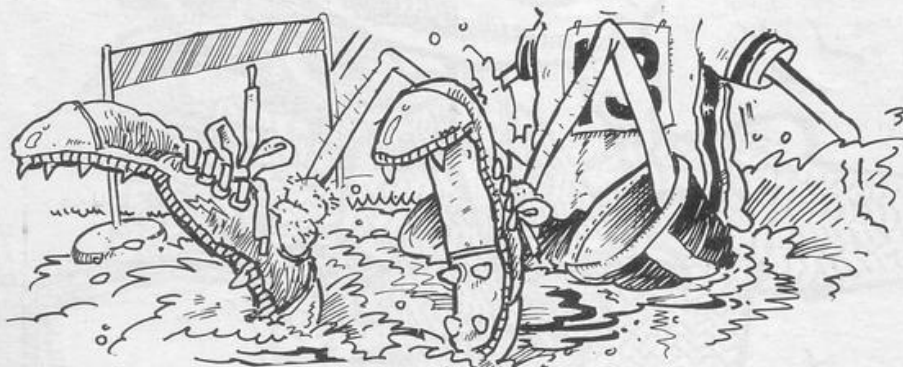
7015 PRINT AT 15,0;"UUUUUUUUUUUU
UUUUUUUUUUUUUUUUUUUUUU"
7020 PRINT AT 17,0; PAPER 2; IN
K 0;" SCORE = 0 HI-SCORE
= ";hi
7030 PRINT AT 3,10;"ACEG"; AT 4
,10;"BDFH"
7031 PRINT AT 19,0; PAPER 4; IN
K 0;" FUEL = 200"
7040 RETURN
7500 FOR w=11 TO 15: IF a>9 THEN
IF b$(224*(a-10)+w)="K" THEN
RETURN
7510 IF a>9 THEN IF b$(224*(a-1
0)+w)="N" THEN LET sc=sc+2: PRI
NT AT a,w-1;"M": RANDOMIZE USR
65100: PRINT AT a,w-1;" ": LET
b$(((a-10)*224)+w)=" ": PRINT
AT 17,11; PAPER 2;sc: RETURN
7520 IF a>9 THEN IF b$(224*(a-1
0)+w)="L" THEN LET sc=sc+10: PR
INT AT a,w-1;"M": RANDOMIZE US
R 65100: PRINT AT a,w-1;" ": LE
T b$(((a-10)*224)+w)=" ": PRINT
AT 17,11; PAPER 2;sc: RETURN
7525 IF a>9 THEN IF b$(224*(a-1
0)+w)="T" THEN LET sc=sc+10: PR
INT AT a,w-1;"M": RANDOMIZE US
R 65100: PRINT AT a,w-1;" ": LE
T b$(((a-10)*224)+w)=" ": PRINT
AT 17,11; PAPER 2;sc: RETURN
7530 PLOT (w*8)+3,((21-a)*8)+3:
DRAW 7,0: NEXT w
7535 PRINT AT a,11;" "
7540 RETURN
7600 PLOT INK 6;h,g: DRAW INK
6;-(109-g),(109-g): RANDOMIZE U
SR 65100
7610 IF ATTR (a,10) <> 15 THEN
GO TO 8000
7620 PLOT INK 1;h,g: DRAW INK
1;-(109-g),(109-g): RANDOMIZE U
SR 65100: RETURN

```

```

7700 PLOT INK 6;134,g-3: DRAW
INK 6;-48,0: RANDOMIZE USR 6510
0
7710 IF ATTR (a,10) <> 15 THEN
GO TO 8000
7720 PLOT INK 1;132,g-3: DRAW
INK 1;-48,0: RANDOMIZE USR 6510
0: RETURN
8000 FOR f=144 TO 151: POKE 6510
7,(f-143): PRINT INK 6; AT a,10
; OVER 1: CHR$(f): RANDOMIZE U
SR 65100: NEXT f: PRINT AT a,10
;"M": RANDOMIZE USR 65100: PRIN
T AT a,10;" "
8010 GO SUB 6000
8020 GO SUB 1990
8030 IF sc>hi THEN GO SUB 6010:
LET hi=sc: PRINT AT 17,27;hi
8035 PRINT AT 10,0; FLASH 1: IN
K 6; PAPER 2; BRIGHT 1;" PRESS
ANY KEY FOR ANOTHER GO ": PAUSE
2: PAUSE 0
8040 GO TO 10
9000 PAPER 0: BORDER 0: CLS : PR
INT AT 2,8; INK 7;" A I R R
A I D "
9010 LET h$=" Guide your plane o
ver the enemy territory and shoot
as many fuel dumps(N) and tanks
as possible. You must keep an ey
e on your fuel guage,for when
your fuel expires or you get
shot then the game will end.
Controls:
'6' - UP
'7' - DOWN
'0' - SHOOT"
9020 PRINT AT 5,0;" INK 7: FOR
f=1 TO LEN h$: PRINT h$(f);: BE
EP .001,40: NEXT f
9030 PRINT AT 19,6;"PRESS ANY K
EY TO PLAY"
9035 PAUSE 0: CLS
9040 RETURN

```



HURDLER

RACE along the track and jump as many hurdles as possible. The game ends if you hit a hurdle or land in the water. Use keys 7 and 8 to play.

Hurdler was written for the 16K Spectrum by Neil Bates, aged 15, of Coventry, W Midlands.

```

10 GO SUB 9000: GO SUB 8000
15 BORDER 7: PAPER 7: INK 0: C
LS: FOR f=12 TO 21: PRINT PAPE
R 4; AT f,0;"
": NEXT f
16 PRINT AT 12,0; INK 4;"UUUU
UUUUUUUUUUUUUUUUUUUUUU"
18 FOR t=1 TO 10000
19 FOR r=0 TO LEN b$
20 LET a$=a$(2 TO 6)+a$(1)+a$(
8 TO 12)+a$(7): LET b$=b$(2 TO )
+b$(1)
25 PRINT AT 11,0;b$(1 TO 32)
26 IF SCREEN$(11,10) <> " "
THEN GO TO 500
27 BEEP .001,20
30 PRINT AT 10,10;a$(1); AT 1
1,10;a$(7)
40 FOR f=1 TO a*1.5: NEXT f
50 IF INKEY$="8" THEN LET a
=a-5
55 PRINT AT 15,10; PAPER 4;"L
AP ";t; AT 17,10;"SCORE ";sc
60 IF INKEY$="7" THEN GO SU
B 100
65 LET sc=sc+1

```

```

69 NEXT r
70 NEXT t
100 FOR f=1 TO (15-(a/5))/5
110 FOR g=1 TO 10: NEXT g
115 BEEP .005,40:
120 PRINT AT 9,10;"IK"; AT 10,
10;"JL": LET b$=b$(2 TO )+b$(1):
PRINT AT 11,0;b$(1 TO 32): NEX
T f
130 LET a=10: PRINT AT 9,10;"M
O"; AT 10,10;"NP": FOR f=0 TO 15
: NEXT f: IF SCREEN$(11,10) <>
" " THEN GO TO 520
140 PRINT AT 9,10;" "; AT 10,
10;" ": RETURN
500 GO SUB 600
505 PRINT AT 5,4;"You hit a ba
rrier.... You Scored ";
sc: PRINT AT 8,2;"PRESS ANY KE
Y FOR ANOTHER GO"
510 IF INKEY$ <> "" THEN GO
SUB 8000: CLS : GO TO 15
515 GO TO 510
520 PRINT AT 9,10;" "; AT 10,
10;"A "; AT 11,10; OVER 1;"B": O
VER 0: GO TO 500
600 FOR f=0 TO 30: BEEP .001,f:
NEXT f: RETURN

```

```

8000 LET a$="ACEGECBDFHFD"
8005 LET a=10
8006 LET sc=0
8010 LET b$="
RST RS RST RS
8020 RETURN
9000 DATA 56,124,124,56,18,18,12
4,144,144,16,24,20,18,226,130,3,
56,124,124,56,16,19,252,144,80,1
6,24,20,34,196,136,4,56,124,124,
56,16,16,252,211,16,16,40,40,36,
40,72,108,56,124,124,56,16,16,56
,84,50,16,40,24,248,132,2,3
9010 DATA 0,0,0,0,0,15,16,1,2,7,
8,16,32,64,32,0,112,248,248,112,
34,252,128,48,200,8,8,12,0,0,0
,0,0,0,0,12,131,64,33,30,1,0,0,0
,0,0,0,112,248,248,112,32,192,22
4,24,0,0,128,64,32,16,12,0
9020 DATA 3,3,3,1,1,1,1,127,24,2
4,24,8,24,40,75,123,0,0,0,0,0,0,
38,255,0,0,0,0,0,0,76,252,0,255,
255,255,255,255,255,255
9030 FOR f= USR "a" TO USR "a"+
167: READ a: POKE f,a: NEXT f
9040 RETURN

```


MATHS FARM

MATHS FARM is an educational game for children aged between five and nine years. Several questions are asked and for each correct answer part of a farm scene is drawn. If the farm is completed before the questions finish a short burst of "Old MacDonald" is played.

Written for the 48K Spectrum by Stuart Wilson, aged 15, of Bridgnorth, Shropshire.

```

0> REM BASIC MATHS By
    Stuart Wilson
1 BORDER 1: PAPER 1: INK 7: C
LS
5 POKE 23561,0: POKE 23658,8

10 LET a=9600: LET x=170: LET
y=30: LET count=0: LET z=120: LE
T F= INT ( RND *12): LET S= INT
( RND *12)
100 PRINT AT 0,4:"PRESS ONE OF
THE FOLLOWING "; AT 3,4:"S...SI
GNS": AT 5,4:"G...GAME"
110 LET K$= INKEY$
115 IF K$="S" THEN GO TO 1000
120 IF K$="G" THEN GO TO 2000

125 GO TO 110
1000 CLS : FOR n=170 TO 185: INK
5: PLOT n,50: DRAW 0,95: NEXT n
: FOR n=90 TO 105: PLOT 130,n: D
RAW 95,0: NEXT n:
1005 PLOT 185,105: DRAW 25,25: D
RAW 0,40: DRAW -15,0: DRAW -25,-
25: DRAW 15,0: DRAW 25,25: PLOT
225,105: DRAW 25,25: DRAW -40,0:
PLOT 225,90: DRAW 25,25: DRAW 0
,15
1010 PLOT 130,105: DRAW 25,25: D
RAW 20,0: PLOT 185,50: DRAW 25,
25: DRAW 0,15
1015 INK 7
1020 LET a$="THIS SIGN IS USED W
HEN YOU ADD NUMBERS TOGETHER HER
E IS AN EXAMPLE": FOR N=1 TO LE
N A$+33: PRINT AT 18,0:("
+A$+"

") (N TO N+31): PAUSE 4: NEXT N

1025 PRINT AT 4,1:F; " + ";S;" =
";F+S
1030 LET count=0: LET z=120: FOR
m=6 TO 16 STEP 2:
1033 LET F= INT ( RND *12): LET
S= INT ( RND *12)
1035 INPUT "WHAT IS ";(F); " + ";
(S); " ";c
1040 PRINT AT m,1:(F); " + ";(S)
; " = ";c
1045 IF c=f+s THEN INK 2: PLOT
110,z: DRAW 0,-3: DRAW 5,10: INK
7: LET count=count+1
1050 IF c <> f+s THEN INK 2: BE
EP .5,-2: BEEP .5,-10: PLOT 110,
z: DRAW 5,8: PLOT 115,z: DRAW -5
,8: INK 7
1055 IF count=6 THEN GO SUB 900
0
1060 LET z=z-16: NEXT m
1065 PRINT AT 21,0:"ANOTHER GO
(Y/N)": LET K$= INKEY$
1070 IF K$="Y" THEN GO SUB 9100
: GO TO 1030
1075 IF K$="N" THEN GO TO 1100
1080 GO TO 1065
1100 INK 5: CLS : FOR n=90 TO 10

```




```
5: PLOT 130,n: DRAW 95,0: NEXT n
: PLOT 225,105: DRAW 25,25: DRAW
-95,0: DRAW -25,-25: PLOT 225,9
0: DRAW 25,25: DRAW 0,15: INK 7
```

```
1110 LET A$="THIS SIGN IS USED W
HEN YOU TAKE AWAY NUMBERS HERE I
S AN EXAMPLE": FOR N=1 TO LEN A
$+33: PRINT AT 18,0;("
```

```
"A$+"
") (
```

```
N TO N+31): PAUSE 4: NEXT N
1115 PRINT AT 4,1;"5 - 3 = 2"
```

```
1120 LET count=0: LET z=120: FOR
m=6 TO 16 STEP 2:
```

```
1125 LET F= INT ( RND *12): LET
S= INT ( RND *12)
```

```
1127 IF S>F THEN LET S=S<F
1130 INPUT "WHAT IS ";(F);" - ";
```

```
(S);" ";c
1140 PRINT AT m,1;(F);" - ";(S)
```

```
; " = ";c
1145 IF c=f-s THEN INK 2: PLOT
```

```
110,z: DRAW 0,-3: DRAW 5,10: INK
7: LET count=count+1
```

```
1150 IF c <> f-s THEN INK 2: BE
EP .5,-2: BEEP .5,-10: PLOT 110,
```

```
z: DRAW 5,8: PLOT 115,z: DRAW -5
,8: INK 7
```

```
1155 IF count=6 THEN GO SUB 900
0
```

```
1160 LET z=z-16: NEXT m
1165 PRINT AT 21,0;"ANOTHER GO
```

```
(Y/N) ": LET K$= INKEY$
1170 IF K$="Y" THEN GO SUB 9100
```

```
: GO TO 1120
1175 IF K$="N" THEN CLS : GO SU
B 1200
```

```
1180 GO TO 1165
1200 FOR n=130 TO 145: PLOT n,50
```

```
: DRAW 95,95: NEXT n: FOR n=240
TO 225 STEP -1: PLOT n,50: DRAW
```

```
-95,95: NEXT n
1220 LET A$="THIS SIGN IS USED W
```

```
HEN YOU MULTIPLY NUMBERS TOGETHE
R HERE IS AN EXAMPLE": FOR N=1 T
```

```
O LEN A$+33: PRINT AT 18,0;("
+A$+"
") (N TO N+31): PAUSE 4: NEX
T N.
```

```
1225 PRINT AT 4,1;"5 x 2 = 10"
1230 LET count=0: LET z=120: FOR
```

```
m=6 TO 16 STEP 2:
1233 LET F= INT ( RND *5)+1: LET
S= INT ( RND *5)+1
```

```
1235 INPUT "WHAT IS ";(F);" x ";
(S);" ";c
```

```
1240 PRINT AT m,1;(F);" x ";(S)
;" = ";c
```

```
1245 IF c=f*s THEN INK 2: PLOT
110,z: DRAW 0,-3: DRAW 5,10: INK
```

```
7: LET count=count+1
1250 IF c <> f*s THEN INK 2: BE
EP .5,-2: BEEP .5,-10: PLOT 110,
```

```
z: DRAW 5,8: PLOT 115,z: DRAW -5
,8: INK 7
```

```
1255 IF count=6 THEN GO SUB 900
0
```

```
1260 LET z=z-16: NEXT m
1265 PRINT AT 21,0;"ANOTHER GO
```

```
(Y/N) ": LET K$= INKEY$
1270 IF K$="Y" THEN GO SUB 9100
```

```
: GO TO 1230
1275 IF K$="N" THEN CLS : GO TO
10
```

```
1280 GO TO 1265
1999 STOP
```

```
2000 CLS : INK 7: PRINT AT 10,2
;"SEE HOW MANY QUESTIONS YOU CAN
```

```
"; AT 12,2;"ANSWER IF YOU GET O
NE RIGHT"; AT 14,6;"WATCH THE F
```

```
ARM BUILD UP"
2010 LET count=0: LET z=120: FOR
```

```
m=1 TO 6
2015 LET F= INT ( RND *12): LET
S= INT ( RND *12)
```

```
2020 INPUT "WHAT IS ";(F);" + ";
(S);" = ";C
```

```
2030 IF C=F+S THEN GO SUB A: LE
T A=A+20:
```

```
2035 IF C <> F+S THEN BEEP .5,-
```

```
2: BEEP .5,-10
2040 NEXT m
2050 GO SUB 9400: PAUSE 0: GO TO
1
```

```
9000 RESTORE 9010: FOR N=1 TO 8:
READ A,B: BEEP A,B: NEXT N
```

```
9010 DATA .125,3,.125,5,.125,7,.
75,7,.125,8,.125,8,.125,7,.25,5
```

```
9020 PLOT 150,45: DRAW 0,-8: DRA
W 3,3: DRAW 3,-3: DRAW 0,8: PLOT
```

```
160,41
9025 DRAW 4,0: PLOT 160,37: DRAW
```

```
7,0: PLOT 160,45: DRAW 7,0: PLO
T 160,45: DRAW 0,-8: PLOT 170,45
```

```
: DRAW 0,-8: DRAW 7,0: PLOT 180,
45: DRAW 0,-8: DRAW 7,0
```

```
9030 PLOT 195,45: DRAW 0,-8: DRA
W 6,0: DRAW 1,2: DRAW 0,4: DRAW
```

```
-1,2: DRAW -6,0: PLOT 205,43: DR
AW 0,-4: DRAW 2,-2: DRAW 4,0: DR
```

```
AW 2,2: DRAW 0,4: DRAW -2,2: DRA
W -4,0: DRAW -2,-2: PLOT 215,37:
```

```
DRAW 0,8: DRAW 8,-8: DRAW 0,8
9040 PLOT 226,45: DRAW 7,0: PLOT
```

```
226,41: DRAW 4,0: PLOT 226,37:
DRAW 7,0: PLOT 226,45: DRAW 0,-8
```

```
:
9050 RETURN
9100 FOR n=16 TO 18: PRINT AT n
```

```
,17;"
": NEXT n:
FOR n=0 TO 21: PRINT AT n,0;"
```



```
FOR N=1 TO 12: READ A,B: BEEP A
,B: NEXT N: NEXT M
```

```
9405 DATA .5,7,.5,7,.5,7,.5,2,.5
,4,.5,4,.5,2,.5,11,.5,11,.5,9,.5
```

```
,9,1,7
9410 RESTORE 9415: FOR N=1 TO 10
```

```
: READ A,B: BEEP A,B: NEXT N
9415 DATA .5,7,.5,7,.5,7,.5,2,2,
```

```
.5,7,.5,7,1,7,.25,7,.25,7,.45,7
```

```
9420 RESTORE 9425: FOR N=1 TO 21
```

```
: READ A,B: BEEP A,B: NEXT N
9425 DATA .25,7,.25,7,.5,7,.25,7
```

```
,.25,7,.25,7,.25,7,.5,7,.5,7,.5,
```

```
7,.5,7,.5,7,.5,2,.5,4,.5,4,.5,2,
```

```
.5,11,.5,11,.5,9,.5,9,1,7
9430 RETURN
```

```
9600 CLS : PLOT 100,30: DRAW 100
,0: DRAW 0,90: PLOT 100,30: DRAW
```

```
-55,15: DRAW 0,90: DRAW 35,35:
PLOT 100,30: DRAW 0,90
```

```
9610 FOR n=80 TO 180: INK 6: PLO
T n,170: DRAW 20,-30- RND *25: N
```

```
EXT n: INK 7
9615 RETURN
```

```
9620 BRIGHT 1: INK 3: PLOT 60,30
```

```
: DRAW 10,30: DRAW 5,10,1: PLOT
70,60: DRAW -2,10,-1: PLOT 70,60
```

```
: DRAW 1,10: FOR n=71 TO 73: PLO
T n,35: DRAW 14,25: NEXT n: FOR
```

```
n=60 TO 62: PLOT 79,n: DRAW 12,-
3: NEXT n: PLOT 63,25: DRAW 10,-
```

```
2: DRAW 4,10: DRAW -10,2: DRAW -
4,-10: RETURN
```

```
9640 INK 7: PLOT 190,30: DRAW I
NVERSE 1;10,0: DRAW INVERSE 1;0
```

```
,10: INK 7: PLOT 200,25: DRAW -7
,2,1: DRAW -5,5,-1: DRAW 7,7,-1
```

```
: DRAW 3,4: DRAW 3,-4: DRAW 14,-1
0,1: DRAW 12,0: DRAW 9,-5,-2: DR
```

```
AW -2,-5,1: DRAW 2,-5,-1
9645 DRAW 2,-10,-1: DRAW -2,-2:
```

```
DRAW -2,-1: DRAW 0,3: DRAW 0,-2:
```

```
DRAW -3,-2: DRAW 0,3: DRAW 1,10
```

```
,1: DRAW -3,-7,-1: DRAW -2,-1: D
RAW 0,3: DRAW 0,-2: DRAW -3,-2:
```

```
DRAW 0,3: DRAW 2,6,1
9650 DRAW -3,3,-1: DRAW -13,0,-1
```

```
: DRAW 2,-10,1: DRAW -2,-2: DRAW
```

```
-2,-1: DRAW 0,2: DRAW 0,-2: DRA
W -3,-2: DRAW 0,3: DRAW 1,5,1: D
```

```
RAW 0,-3: DRAW -2,-2: DRAW -2,-1
```

```
: DRAW 0,2: DRAW 0,-2: DRAW -3,-
2: DRAW 0,3: DRAW 1,5,1
```

```
9655 DRAW 2,17,1: PLOT 190,33: D
RAW 1,0: PLOT 195,36: DRAW 1,1,1
```

```
9658 RETURN
9660 PLOT 25,30: DRAW 1,7,1: DRA
W -2,5,-2: DRAW -3,3: DRAW 1,2,-
```



```
1: DRAW 3,-3: DRAW 3,-5,-2: DRAW
1,-15,-1: DRAW -5,-7,-1: DRAW -
20,1,-2: DRAW 15,1,1: DRAW -15,2
```

```
, -1
9665 DRAW 10,4,1: DRAW 10,4,-1:
PLOT 23,14: DRAW 0,-7: DRAW 4,1:
```

```
DRAW -4,1: PLOT 20,12: DRAW 0,-
5: DRAW -4,1: DRAW 4,1
```

```
9670 RETURN
9680 PLOT 120,30: DRAW 0,50: DRA
```

```
W 45,7,-3: DRAW 0,-55: PLOT 143,
30: DRAW 0,75: CIRCLE 135,60,2:
```

```
CIRCLE 150,60,2: RETURN
9700 PLOT INVERSE 1;100,30: DRA
```

```
W INVERSE 1;30,0: PLOT INVERSE
1;120,30: DRAW INVERSE 1;0,60:
```

```
INK 7: PLOT 110,70: DRAW 8,-3,1
```

```
: DRAW 8,3,1: DRAW 0,9: DRAW 5,2
```

```
: DRAW -7,2: DRAW -1,5: DRAW -10
```

```
, -1,1: DRAW -1,-5: DRAW -7,-2: D
0,-1: DRAW 0,-9
```

```
RAW 5,-2: DRAW 15,0,1: DRAW -15,
```

```
9705 FOR n=69 TO 71: INK 2: PLOT
110,n: DRAW 8,-3,1: DRAW 8,3,1:
```

```
NEXT n: INK 7
9710 PLOT 117,63: DRAW -12,-3,1:
```

```
DRAW -2,-30,1: DRAW 7,2,1: DRAW
```

```
-2,20,-1: DRAW 1,-20: DRAW -2,-
```

```
20: DRAW 10,0: DRAW 0,-12: DRAW
```

```
-7,0: DRAW -2,5,-3: DRAW 3,0: DR
```

```
AW 0,7: DRAW 12,0
9712 DRAW 0,-12: DRAW 7,0: DRAW
```

```
2,5,3: DRAW -3,0: DRAW 0,7: DRAW
```

```
-5,0: DRAW 10,0: DRAW -2,20: DR
```

```
AW -1,20
9715 DRAW -5,-3: DRAW 5,3: DRAW
```

```
-7,-8: DRAW 7,8: DRAW 10,-5: DRA
```

```
W 5,5,1: DRAW 2,3,2: DRAW -5,5,2
```

```
: DRAW -2,-60: DRAW 2,60: DRAW -
```

```
2,-5: DRAW -5,2: DRAW -15,5,1
```

```
9716 INK 4: CIRCLE 115,74,1: CIR
```

```
CLE 121,74,1: INK 7
```

```
9718 RETURN
```


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ELSE (used with IF...THEN)
EXIT leave DO-LOOP

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GET wait for keypress
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KEYIN a string
KEYWORDS new keywords on/off
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FUNCTIONS

AND (bit-by-bit)
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CHAR# number to 2 characters
CODE fast cosine
DEC# hexadecimal to decimal
DPOKE double PEEK
FILLED filled area

HEX# decimal to hexadecimal
INSTR string search
MEM free memory
MEM# all of memory as a string
MOD modules
NUMBER 2 characters to number
OR (bit-by-bit)

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SCRN# recognises user graphics
SNE fast sine
STRINGS repeats strings
TIME# current time
USING# formats numbers
XOR (bit-by-bit)

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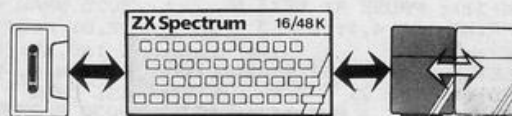
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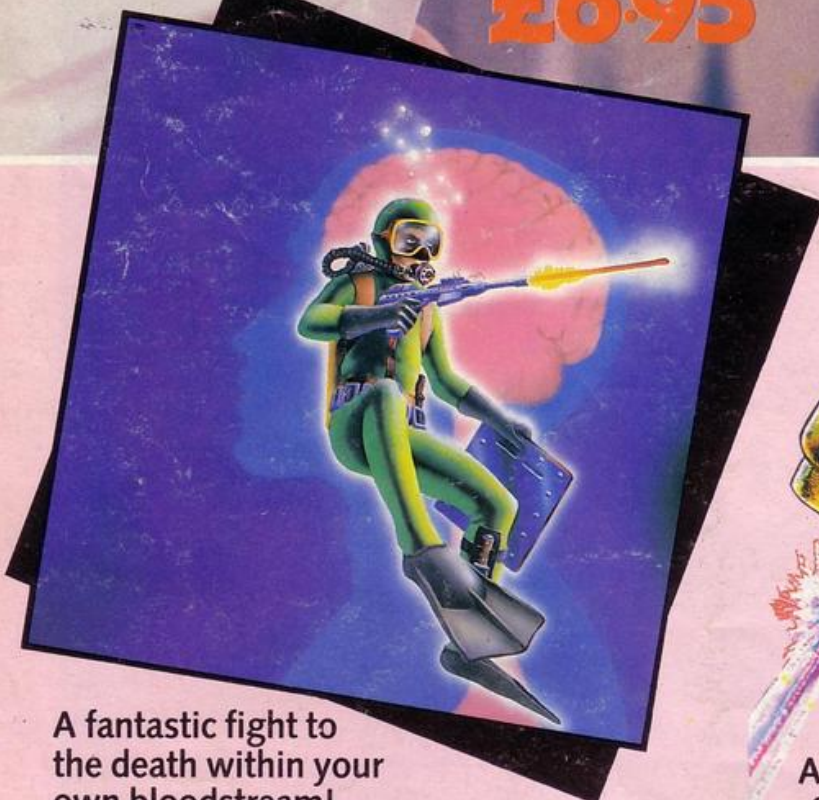
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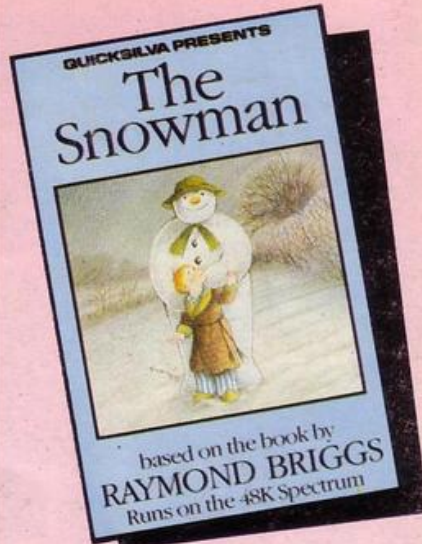
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