

95p

sinclair programs

November/December

40 Programs for the Spectrum, ZX-81 and ZX-80

Spaceman, Detective, Ghost trekk
3-d hunt, Music machine, Spy plane
Sticks and stones, Binomial distribu

(A)



*Dambusters, Postman, Scoffer,
and many more.*

C90

SP



MICHAEL ORWIN'S ZX81 CASSETTES

THE BEST SOFTWARE (BY VARIOUS AUTHORS) AT LOW PRICES

QUOTES

"Michael Orwin's £5 Cassette Two is very good value. It contains 10 stolid well designed games which work, offer plenty of variety and choice, and are fun."

From the ZX Software review in Your Computer, May '82 issue.

"I had your Invaders/React cassette . . . I was delighted with this first cassette."

P. Rubython, London NW10

"I have been intending to write to you for some days to say how much I enjoy the games on 'Cassette One' which you supplied me with earlier this month."

E.H., London SW4

" . . . I previously bought your Cassette One and consider it to be good value for money!"

Richard Ross-Langley
Managing Director
Mine of Information Ltd.

CASSETTE 1 (eleven 1k programs)

machine code:

React, Invaders, Phantom aliens, Maze of death, Planet lander, Bouncing letters, Bug splat.

Basic:

I Ching, Mastermind, Robots, Basic Hangman, PLUS Large screen versions of Invaders and Maze of Death, Ready for when you get 16k.

Cassette One costs £3.80

CASSETTE 2

Ten games in Basic for 16k ZX81

Cassette Two contains Reversi, Awari, Laser Bases, Word Mastermind, Rectangles, Crash, Roulette, Pontoon, Penny Shoot and Gun Command. Cassette Two costs £5.

CASSETTE 3

8 programs for 16k ZX81

STARSHIP TROJAN



Repair your Starship before disaster strikes. Hazards include asphyxiation, radiation, escaped biological specimens and plunging into a Supernova.

STARTREK This version of the well known space adventure game features variable Klingon mobility, and graphic photon torpedo tracking.

PRINCESS OF KRAAL An adventure game.

BATTLE Strategy game for 1 to 4 players.

KALABRIASZ World's silliest card game, full of pointless complicated rules.

CUBE Rubik Cube simulator, with lots of functions including 'Backstep'.

SECRET MESSAGES This message coding program is very txlp qexi jf.

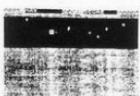
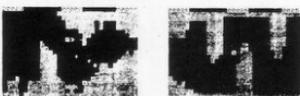
MARTIAN CRICKET A simple but addictive game (totally unlike Earth cricket) in machine code. The speed is variable, and its top speed is very fast.

Cassette 3 costs £5.

CASSETTE 4

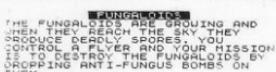
8 games for 16k ZX81

ZX-SCRAMBLE (machine code) with 3 stages.
Bomb and shoot your way through the fortified caves.



GUNFIGHT
(machine code)

INVADERS
(machine code)



GALAXY INVADERS (machine code)

Fleets of swooping and diving alien craft to fight off.

SNAKEBITE (machine code)

Eat the snake before it eats you. Variable speed.
(very fast at top speed).

LIFE (machine code)

A ZX81 version of the well known game.

3D TIC-TAC-TOE (Basic)

Played on a 4x4x4 board, this is a game for the brain. It is very hard to beat the computer at it.

7 of the 8 games are in machine code, because this is much faster than Basic. (Some of these games were previously available from J. Steadman). Cassette 4 costs £5.

Recorded on quality cassettes, sent by first class post, from:
Michael Orwin, 26 Brownlow Rd., Willesden, London NW10 9QL (mail order only please)

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Sinclair Programs is published monthly by ECC Publications Ltd. It is not in any way connected with Sinclair Research Ltd.

Telephone
All departments
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We pay £1.00 for each program published and £50 per 1,000 words for each article used.

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Sinclair Programs
ISSN No. 0263-0265
Printed and typeset by
Bournehall Press Ltd,
Welwyn Garden City,
Herts.

Distributed by
Spotlight Magazine Distribution Ltd,
1 Benwell Road
Holloway,
London N7
01-607 6411

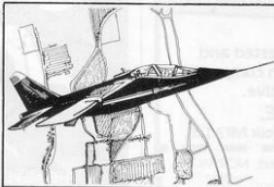
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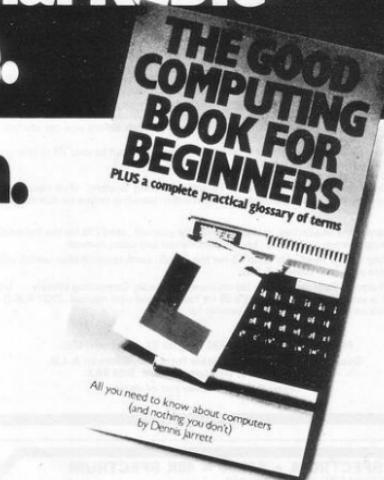
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The Personal Banking System (as reviewed in Popular Computing Weekly — 1st July) is available separately for £9.95 for cassette and user manual. ZX81 P.B.S. owners can order the Spectrum version for just £5.

Please specify whether ZX81 (16K) or ZX Spectrum (48K).
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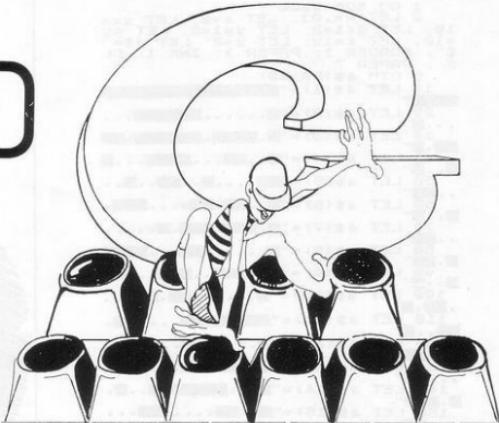
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KEYBOARD

KEYBOARD is a test for all sharpshooters of the computer keyboard. A letter will appear on the screen heading full tilt for self-obliteration in an inverse space at stage left. Your task is to hit the appropriate key before the letter auto-destructs. Your flying-fingered reviewer managed only five in fast mode.

Submitted by Graham Woods of Redhill, Surrey for the 1K ZX-81.



```

1 PRINT "ENTER LEVEL; 1 (HARD)
OR 2 (EASIER)
5 INPUT A
10 IF A=1 THEN LET P=15
15 IF A=2 THEN LET P=22
15 CLS
15 LET S=0
15 LET N=8
20 LET M$=CHR$(INT(RND*26)+3
B) 25 PRINT AT 11,0;""
30 FOR X=1 TO 12 STEP -1
35 PRINT AT 12,X,M$;""
37 IF INKEY$<> THEN GOTO 50

```

```

40 NEXT X
45 POINT "NOT FAST ENOUGH"
45 GOTO 10
50 LET N#=INKEY$
55 IF N#=M$ THEN PRINT "YES"
55 IF N#=M$ THEN LET S=S+1
60 IF S>M$ THEN PRINT "WRONG"
100 FOR Z=0 TO 50
105 NEXT Z
105 CLS
105 LET N=N+1
105 IF N=10 THEN GOTO 111
110 GOTO 20
111 PRINT S

```

THE DISPLAY of Sticks and Stones will show you three sticks lying horizontally in the middle of the screen. You are required to move each of them so that the holes in them line up and allow the stone "O" to pass through them. After 10 attempts your score is displayed.

Manoeuvre the top stick with keys

1 and 0, the middle stick with Q and P, and the bottom one with A and NEWLINE. A small but exasperating routine for the 1K ZX-81 from Timothy Taylor, of Perterfield, Hampshire. Graphics notes:

20 - LET E=INT(RND*4)+12

40 - Inverse spaces; graphic inverse As; inverse spaces.

104 - FOR J=9 TO 11

STICKS AND STONES



```

1 LET G=0
4 LET A=12
4 LET B=12
4 LET C=12
10 FOR E=1 TO 18
10 LET E=INT(RND*4)+12
20 FOR F=2 TO 12
20 PRINT AT 9,A;" ";AT 10,B;" ";AT 11,C;" ";AT F,E
20 LET A=A+(INKEY$="0")-(INKEY$="1")
20 LET B=B+(INKEY$="P")-(INKEY$="Q")
20 LET C=C+(INKEY$=CHR$(118))-(INKEY$="A")
104 FOR J=9 TO 11
104 IF F=J AND E=A+3 AND E=B+1
AND E=C+2 THEN LET G=G+1
105 NEXT J
105 PRINT AT F,E;" "
120 NEXT F
130 NEXT D
140 PRINT "SCORE=";INT(G/3)

```

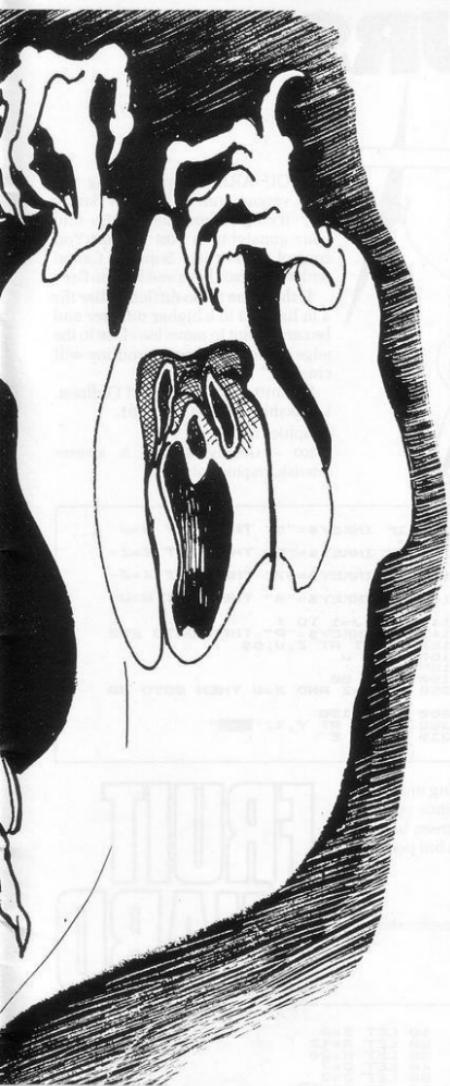
```

1 GO SUB 8000
2 LET R=.01: LET a=0: LET 3X=
10: LET 9X1=0: LET 9Y1=2: LET 9%
10: LET X=19: LET Y=2: LET A=9%
5: BORDER 1: PAPER 1: INK 1: CL
PAPER 7
9 DIM a$(20,20)
10 LET a$(1)=""
11 FOR F=1 TO 20: PRINT a$(F): NEXT F
12 FOR F=1 TO 20: PRINT a$(F): NEXT F
13 FOR F=1 TO 20: PRINT a$(F): NEXT F
14 FOR F=1 TO 20: PRINT a$(F): NEXT F
15 FOR F=1 TO 20: PRINT a$(F): NEXT F
16 FOR F=1 TO 20: PRINT a$(F): NEXT F
17 FOR F=1 TO 20: PRINT a$(F): NEXT F
18 FOR F=1 TO 20: PRINT a$(F): NEXT F
19 FOR F=1 TO 20: PRINT a$(F): NEXT F
20 FOR F=1 TO 20: PRINT a$(F): NEXT F
210 PRINT "FOR F=1 TO 20: PRI
NT ""a$(F): NEXT F
1000 LET a$(10,10)=""
1001 IF S=180 OR S=450 OR S=740
THEN LET S=S+100: PAPER 1: CLS : PA
P 7: GO TO 10
1010 IF INKEY$="" THEN GO TO 105
1020 IF INKEY$="5" THEN LET d$=""
1030 IF INKEY$="6" THEN LET d$=""
1040 IF INKEY$="7" THEN LET d$=""
1050 IF INKEY$="8" THEN LET d$=""
1060 IF d$="5" AND a$(x,y)="" THEN LET x=x-1
1061 IF d$="6" AND a$(x,y+1)="" THEN LET y=y+1
1062 IF d$="7" AND a$(x+1,y)="" THEN LET x=x+1
1063 IF d$="8" AND a$(x,y-1)="" THEN LET y=y-1
1064 PRINT AT x,y; INK 0:D$=1064
1070 IF a$(x,y)="" THEN LET S=S+1: PRINT AT 0,0;"": BEEP .1,-10
1080 PRINT AT 0,0;"": S=INT((RND*1000)*.999): I
F INT((RND*2)+10*GX1) AND a$(gx1-1)="" THEN LET 9X=9X-1
1090 IF INT((RND*2)+10*GX1) AND a$(gx1-1)=99 THEN LET 9X=9X+1
1091 IF INT((RND*2)+10*GX1) AND a$(gx1-1)=999 THEN LET 9Y=9Y+1
1092 IF INT((RND*2)+10*GX1) AND a$(gx1-1)=9999 THEN LET 9%=
9%+1: PRINT AT 9X,9Y; INK 3: "": IF (9X=X) AND (9Y=Y) OR (9X=1
X AND 9Y=1) THEN PRINT AT X,Y: FLASH:d$: STOP
1093 PRINT AT 9X1,9Y1;a$(gx1,y1)
: IF INT((RND*2)+10*GX1) AND a$(gx1-1,y1)="" THEN LET 9X1=9X1
1094 IF INT((RND*2)+10*GX1) AND a$(gx1,y1)=99 THEN LET 9Y1=9Y1+1
1095 IF INT((RND*2)+10*GX1) AND a$(gx1,y1)=999 THEN LET 9%=
9%+1: PRINT AT 9X1,9Y1; INK 4: "": IF (9X1=X) AND (9Y1=Y) OR (9X1=1
X AND 9Y1=1) THEN PRINT AT X,Y: FLASH:d$: STOP
1096 GO TO 1000
7000 FOR F=1 TO 25
7001 PRINT AT 10,25; INK 7;"0"
7010 PRINT AT 10,5; INK 3; " "
7020 INK 6;"": BEEP .1,-15
7030 NEXT F

```

SP/





```
7035 BEEP .2,-20
7040 FOR F=25 TO 0 STEP -1
7050 PRINT AT 10,F; INK 5;" ";
INK 6;" "
7060 BEEP 0.1,0
7070 F: CLS : RETURN
8999 STOP
9000 DATA 0,BIN 1000010,BIN 1110
0111,255,255,BIN 111110,BIN 111
100,BIN 11000
9010 DATA 0,BIN 000011100,BIN 111
100,BIN 111100,BIN 1111000,BIN 1
11000,BIN 111100,BIN 1111000,BIN 1
N 111100
9020 DATA 0,BIN 00011000,BIN 001
11100,BIN 0111110,255,255,BIN 1
10011,BIN 011111000,BIN 00111
9030 DATA 0,BIN 00111000,BIN 0111
11000,BIN 00111100,BIN 0011100
0,BIN 001111000,BIN 001110000
9035 DATA 24,56,126,219,219,255,
24,126,219,219,255
9040 RESTORE 9000
9045 FOR f=0 TO 7: READ a: POKE
USR "u",f,a: NEXT f
9050 FOR f=0 TO 7: READ a: POKE
USR "u",f,a: NEXT f
9055 FOR f=0 TO 7: READ a: POKE
USR "d",f,a: NEXT f
9060 FOR f=0 TO 7: READ a: POKE
USR "l",f,a: NEXT f
9075 FOR f=0 TO 7: READ a: POKE
USR "r",f,a: NEXT f
9080 RETURN
```

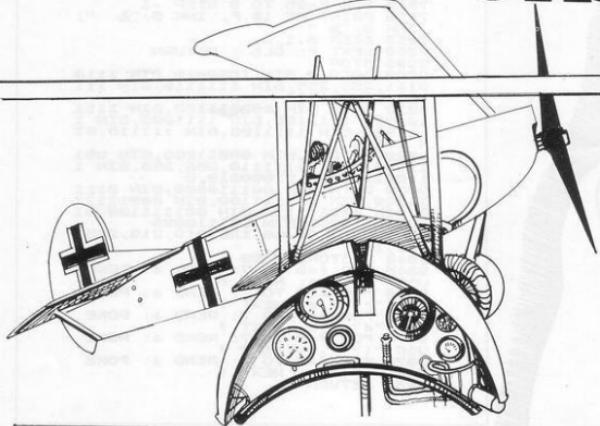
SPACMAN is a good version of the perennial Pacman from S J Stearn of Harpenden, Herts, for the 16K Spectrum.

Naturally it suffers in any comparison with arcade machines; there are no power pills, no exit, and the two ghosts are decidedly more dumb than their cousins in the amusement halls, though still fast enough to catch you more often than not.

This listing is a big leap forward in our quest for an arcade-quality Pacman and provides a good basis for anyone wanting to do further work on the project; providing exits, for example, would probably not be too difficult.

ACMAN

HOT PURSUIT



```

5 LET A$=" "
10 LET A=12
20 LET X=3
25 LET B$="--"
30 LET Z=5
35 LET U=5
40 LET E=0
50 LET P=INT (RNDR 4)
55 LET E=E+1
57 IF X>23 THEN GOTO 70
60 IF P=0 THEN LET X=X+1
65 IF X>4 THEN GOTO 80
70 IF X=1 THEN LET X=-1
75 IF Y>18 THEN GOTO 85
80 IF P>2 THEN LET Y=Y+1
85 IF Y<3 THEN GOTO 100
90 IF P=3 THEN LET Y=Y-1
100 PRINT AT Y,X;A$
```

```

110 IF INKEY$="S" THEN LET U=U-
112 IF INKEY$="S" THEN LET Z=Z+
113 IF INKEY$="7" THEN LET I=Z-
114 IF INKEY$="8" THEN LET U=U+
115 FOR J=1 TO 4
116 IF INKEY$="P" THEN GOTO 250
117 PRINT AT Z,W;B$
118 LET J
119 CLS
120 GOTO 50
125 IF Y=Z AND X=U THEN GOTO 30
130 GOTO 150
135 PRINT AT Y,X; " "
140 PRINT E
```

FRUIT GUARD is a game for the 1K ZX-81, submitted by C Regaud of London SW7. The object is for you (graphic shifted M) to fetch the fruit (graphic shifted U) and take it home (inverse H) by evading the monster (graphic shifted P).

The best way to make sure you are

munching instead of being munched is to keep to the sides, since you can use them to cross the screen but the monster cannot. It is fun but perhaps a little too easy.

Graphics notes:

60 - Graphic shifted U
70 - Graphic shifted M, graphic shifted P, inverse H.



FRUIT GUARD

```

10 LET S=0
20 LET A=12
30 LET B=20
40 LET C=7
50 LET D=3
60 LET R$="B"
70 PRINT AT 12,20;" ";AT C,D;" "
;AT 12,20;" ";AT 7,3;A$;
80 LET A=A+ (INKEY$="6") - (INKEY
$="7")
90 LET B=B+ (INKEY$="8") - (INKEY
$="9")
100 LET C=C+(A>C)-(A<C)
110 LET D=D+(B>D)-(B<D)
120 IF A=0 THEN LET A=1
130 IF A=21 THEN LET A=1
140 IF B=0 THEN LET B=30
150 IF B=31 THEN LET B=1
160 CLS
170 IF A=12 AND B=20 AND A$=".."
THEN GOTO 210
180 IF A=C AND B=D THEN PRINT A
;A,B;"MUNCH";AT 0,0;S,X
190 IF A=7 AND B=8 THEN LET A$=
200 GOTO 70
210 LET S=S+1
220 GOTO 60
```



DETECTIVE

THIS INTERESTING concept for the 1K ZX-81 requires you to play the **Detective**, cross-questioning a series of murder suspects. You must first enter their names with the following short routine:

```
10-DIM A$(8,8)  
20-FOR A=1 TO 8  
30-INPUT BS  
40-LET A$(A,1 TO 8)=BS  
50-NEXT A
```

That should be RUN and eight names of five letters or fewer should be entered. That routine should then be deleted—by typing-in the line numbers only—and the complete program entered.

Note that there is no need to enter the names again after the program has been taped, as the names are also saved. To run the program you must press GOTO 0—not RUN. The computer then takes a few seconds to establish the position of the suspects, who can be in towns A or B, in the N or S and E or W of that town.

You are then given the position of the murderer and must establish his identity. Do that by entering a number between 1 and 8 to choose a suspect. Inputting 1 will reveal the town where the suspect was at the time of the murder and 2 and 3 will discover his position in the N or S, E or W. After 12 questions you must make an accusation by entering the number of a suspect. If you want to arrest someone early, enter 9.

A diverting idea from Colin Cushings, of Harlow, Essex.

```
10 FOR N=1 TO 8  
20 LET A$(N,6)=CHR$ ((INT (RND#  
2)+38))  
30 LET A$(N,7)=CHR$ ((INT (RND#  
2)+35)+51)  
40 LET A$(N,8)=CHR$ ((INT (RND#  
2)+18)+42)  
50 NEXT N  
60 LET M=INT (RND#8)+1  
65 FOR A=1 TO 12  
70 PRINT AT 18,13,A$(M,6),"; "  
A$(M,7),"; ",A$(M,8)  
80 INPUT C  
95 IF C=9 THEN GOTO 155  
110 PRINT AT 9,13,A$(1,1 TO 5)  
120 PRINT AT 10,13,A$(2,1 TO 5)  
130 PRINT AT 11,13,A$(3,1 TO 5)  
135 PAUSE 200  
140 CLS  
150 NEXT A  
155 PRINT "WHO DO YOU ACCUSE"  
160 INPUT A$  
165 PRINT AT 11,13;"A$"  
170 IF A=M THEN PRINT AT 11,13;  
"DETECTIVE"  
180 PRINT A$(M,1 TO 5),"; DID IT
```

LONG OR SHORT

LONG OR SHORT is a game for the unexpanded ZX-80 and is a variation of the game Hi-Lo. The random number generator of the machine produces a number between 1 and 100. You have to guess that number but instead of telling you in figures how near your guess was to the answer, the ZX-80 will display a line.

The shorter the line the closer you are to the correct answer. When the game is finished the machine will tell you what it thought of your effort to guess the number.

The program was written by G Gill of Westerham, Kent.

```
5 LET C=0
10 PRINT "SHORT OF LONG"
15 PRINT
20 PRINT "I'M THINKING OF A
NUMBER (1-100)"
25 PRINT
30 PRINT "AS A CLUE, I'LL DRAW
A LINE"
35 PRINT
40 PRINT "THE SHORTER IT IS,
THE NEARER"
45 PRINT
50 PRINT "YOU ARE"
55 LET A=RND(100)
60 PRINT, "YOUR GUESS?"
65 INPUT B
70 LET C=C+1
80 IF A=B THEN GOTO 200
85 LET D=ABS((A - B)/2)
90 FOR G=1 TO D
95 PRINT "INVERSE SPACE"; (shift
A)
100 NEXT G
105 PRINT B
110 PRINT
115 GOTO 65
200 IF C< 5 THEN PRINT
"EXCELLENT";
205 IF C> 4 AND C<10 THEN
PRINT "NOT BAD";
210 IF C> 9 THEN PRINT "WAKE
UP";
215 PRINT "THAT TOOK
:C."GOES"
220 POKE 16421, 24
225 STOP
```



An illustration of a screenwriter, a man with a mustache wearing a cap and a jacket, climbing a ladder to reach the top of a large, stylized letter 'S'. The 'S' is rendered with fine horizontal lines and a decorative flourish at the bottom. The screenwriter is holding a wrench and appears to be working on the top of the letter. The background is plain white.

SCREENWRITER is not a program for would-be employees of MGM but a neat routine for producing the kind of large-scale graphics shown in our listing.

A maximum of four lines of eight characters can each be displayed on the screen at one time. The prompt for a string entry is given and a maximum of seven characters can then be entered.

The enlarged string is then displayed and will scroll up to make way for a new string. With a COPY command, the program could be used with the ZX-81 printer.

SPIROGRAPH, from Martin Richards, of Stevenage, Herts uses the hi-res graphics of the Spectrum to fascinating effect.

The program produces graphics in the style of those line-drawing machines with the swinging weights and turning tables. On the Spectrum, too, it is fun to watch and you have good pictures.

```

10 INPUT A$  

20 FOR L=SGN PI TO LEN A$  

30 LET X=VAL "7681"+CODE A$(L)  

*CODE ""  

40 FOR Y=NOT PI TO CODE "#"  

50 LET P=PEEK (X+Y)  

60 FOR G=7 TO 6 STEP -1  

70 IF P<0**G THEN GOTO 100  

80 PLOT 0\$L-G, 8-Y  

90 LET P=P-0**G  

100 NEXT G  

110 PAUSE CODE ";"  

120 NEXT Y  

130 NEXT L  

140 SCROLL  

150 SCROLL  

160 SCROLL  

170 SCROLL  

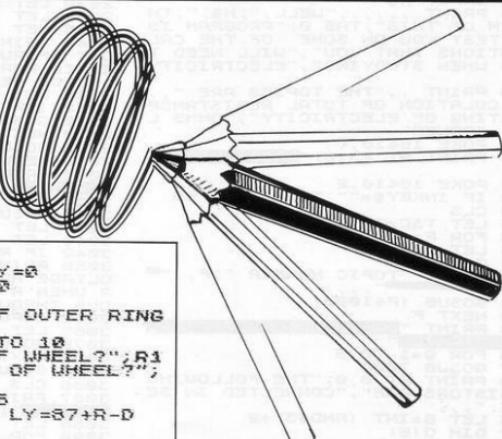
178 GOTO SGN DT

```

```

5 LET LX=0: LET LY=0
6 LET X=0: LET Y=0
7 CLS
8 INPUT "RADIUS OF OUTER RING"
9 ?-N
10 IF R=0 THEN GO TO 10
11 INPUT "RADIUS OF WHEEL?"; R1
12 INPUT "POSITION OF WHEEL?"; D
13 INPUT "SPEED?"; S
14 LET LX=127: LET LY=87+R-D
15 PLOT LX,LY
16 LET A=0
17 LET X=(R-R1)*SIN (A)+(R1-D)
18 LET Y=(R-R1)*COS (A)+COS (A)
19 *(R1-D)/+87
20 DRAW X-LX,Y-LY
21 DRAW X-LX,Y-LY
22 LET LX=X
23 LET LY=Y
24 LET A=A+S
25 IF INKEY$="" THEN GO TO 100
26 GO TO 20

```



SPIROGRAPH

DO YOU teach physics or study it? **Physics** is a program for the 16K ZX-81 which tests you on some of the calculations necessary in basic electrical physics.

There are four topics in the listings but two of them are divided into subsections giving a total of seven types of problem. After each question you are told whether you

are correct, incorrect or close enough and your score is displayed at the end of every section.

As each new topic is introduced every 1,000 lines, new sections could easily be included by changing the 5 in line 110 and by moving lines 4225-4270 to the end of the last topic.

Sent by Michael Coombes, of Newport, Gwent.



PHYSICS

```

10 REM "PHYSICS"-M.COOMBES,AUG
.1982
20 PRINT TAB 12;"PHYSICS"
30 PRINT "HELLO.WELCOME
TO ""PHYSICS";AT 8,0;"PLEASE T
YPE IN YOUR NAME"
40 INPUT N$
50 PRINT "WELL ",N$,".TH
E AIM OF THIS";TAB 8;"PROGRAM IS
TO TEST YOU ON SOME OF THE CAL
CULATIONS THAT YOU";"WILL NEED T
O DO WHEN STUDYING";"ELECTRICITY"
.60 PRINT "/ THE TOPICS ARE:",".
CALCULATION OF TOTAL RESISTANCE
COSTING OF ELECTRICITY","OHMS L
AW","POWER"
70 POKE 16418,0
80 PRINT AT 23,0;"PRESS NEWLIN
S"
85 POKE 16418,2
90 IF INKEY$="" THEN GOTO 98
100 CLS
105 LET TSC=0
110 FOR F=1 TO 5
115 LET SC=0
117 CLS
120 PRINT "TOPIC NUMBER ";F,,""
130 GOSUB (F*1000)
140 NEXT F
145 PRINT "CALCULATION OF TOTAL
RESISTANCE"
150 FOR S=1 TO 5
151 GOSUB 7000
1520 PRINT AT 8,0;"THE FOLLOWING
RESISTORS ARE",CONNECTED IN SE
RIES:"
1525 LET B=INT (RND#3)+2
1527 DIM O(B)
1528 LET ANS=0
1530 FOR G=1 TO B
1535 LET O(G)=INT (RND#5)+1
1535 LET ANS=ANS+O(G)
1535 NEXT G
1535 FOR G=1 TO B
1536 PRINT " ";O(G);;" OHMS"
1536 NEWL N
1536 PRINT " ";O(G);;" OHMS"
1536 PRINT " ";O(G);;" WHAT IS THE TOT
AL RESISTANCE?"
1100 INPUT T
1120 GOSUB 8000
1130 NEXT 9
1140 GOSUB 8500
1150 RETURN
2000 PRINT TAB 4;"COSTING OF ELE
CTRICITY"
2010 FOR S=1 TO 5
2020 GOSUB 7000
2030 LET WA=(INT (RND#5)*10)+50
2032 LET P=INT (RND#4)+2
2035 LET H=INT (RND#5)+2
2040 PRINT AT 8,0;"WHAT IS THE C
OST OF RUNNING A";WA;" WATT APPL
IANCE,FOR ";H;" HOURS,";AT 7,0;"P;"
PENCE PER UNIT?"
2045 LET ANS=(WA/1000)*H*P
2050 INPUT T
2060 GOSUB 8000
2070 NEXT 9
2080 GOSUB 9500
2090 RETURN
3000 PRINT TAB 5;"THE OHMS LAW E
QUATION"
3010 FOR S=1 TO 5
3020 GOSUB 7000
3030 LET R=INT (RND#5)+1
3040 LET I=INT (RND#5)+1
3042 IF R=8 THEN GOTO 3030
3050 PRINT AT 8,0;"WHAT IS THE V
OLTAGE ACROSS A";R;" OHM RESISTO
R WHEN A CURRENT OF";I;" AMPS FL
OWS THROUGH IT?"
3060 INPUT T
3065 LET ANS=R*I
3070 GOSUB 8000
3080 NEXT 9
3085 GOSUB 9500
3095 CLS
3097 PRINT TAB 5;"THE OHMS LAW E
QUATION";TAB 5;"(PART 2)"
3098 LET SC=0
3099 FOR S=1 TO 5
3100 GOSUB 7000
3110 LET R=INT (RND#5)+1
3120 IF R=8 THEN GOTO 3110
3130 LET V=INT (RND#18)+1
3135 IF R>4 THEN GOTO 3110
3140 PRINT AT 8,0;"WHAT CURRENT
FLOWS THROUGH A";R;" OHM RESISTO
R,WITH ";V;" VOLTS";"ACROSS IT?"
3150 LET ANS=V/R
3160 INPUT T
3170 GOSUB 8000
3180 NEXT 9

```



```

3190 GOSUB 9500
3200 CLS
3210 PRINT TAB 5;"THE OHM'S LAW E
MULTEER";TAB 5;"(PART 3)"
3215 LET SC=0
3220 FOR Q=1 TO 5
3230 GOSUB 7000
3240 LET I=INT (RND*5)+1
3250 LET V=INT (RND*10)+10
3260 LET ANS=V/I
3270 PRINT TAB 8,Q;"WHAT VALUE OF "
;RESISTOR GIVES Q," CURRENT OF "
;I," AMPS WHEN V," VOLTS ARE A
PLIED ACROSS IT."
3280 INPUT T
3290 GOSUB 8000
3300 NEXT Q
3310 GOSUB 9500
3320 RETURN
4000 PRINT TAB 13;"POWER"
4010 FOR Q=1 TO 5
4020 GOSUB 7000
4030 LET I=INT (RND*5)+1
4040 LET V=INT (RND*20)+2
4050 LET ANS=V*I
4060 PRINT TAB 8,Q;"WHAT IS THE P
OWER OF A LIGHT BULB IF I," I,"
AMPS FLOW THROUGH IT? WHEN THERE
ARE V," V," VOLTS ACROSS IT?"
4070 INPUT T
4080 GOSUB 8000
4090 NEXT Q
4100 GOSUB 7000
4100 GOSUB 9500
4105 CLS
4110 PRINT TAB 13;"POWER",TAB 12
;"(PART 2)"
4115 LET SC=0
4120 FOR P=1 TO 10
4125 NEXT P
4130 GOSUB 7000
4140 LET V=240
4145 LET I=INT ((RND*10)+10)+50
4150 LET ANS=V/I
4170 PRINT TAB 8,P;"WHAT CURRENT
FLOWS THROUGH A," I," WATT APPLI
ANCE WHEN WITH A," 240 VOLT SUPPL
Y?"
4180 INPUT T
4190 GOSUB 8000
4200 NEXT P
4210 GOSUB 7000

```

```

4215 FOR Q=1 TO 10
4220 NEXT Q
4220 GOSUB 9500
4225 CLS
4230 PRINT AT 2,0;"WELL";N$;" Y
OU HAVE NOW";TAB 0;"TRIED ALL TH
E CALCULATIONS";"YOUR FINAL
SCORE IS ";TSC
4240 PRINT "/";"DO YOU WISH TO
START AGAIN?"
4250 IF INKEY$="Y" THEN GOTO 100
4260 IF INKEY$="N" THEN STOP
4270 GOTO 4250
7000 FOR R=8 TO 21
7010 PRINT AT R,0;_
7020 NEXT R
7030 RETURN
8000 IF T=ANS THEN PRINT "/";"WE
LL DONE ";N$;"/";TAB 0;"THAT IS
CORRECT."
8005 IF T>ANS AND INT ANS=INT T
THEN PRINT "/";"CLOSE ENOUGH ";
N$;TAB 0;TAB 0;"THE EXACT ANSW
ER WAS ";ANS
8010 IF T=ANS OR INT ANS=INT T T
HEN LET SC=SC+1
8015 IF INT ANS=INT T THEN GOTO
8040
8020 IF T>ANS THEN PRINT "/";"NO
";N$;" THAT IS WRONG. ";THE ANSW
ER WAS ";ANS
8040 GOSUB 9000
8050 RETURN
9000 FOR P=1 TO 28
9010 NEXT P
9020 RETURN
9500 CLS
9505 PRINT "YOUR SCORE FOR THIS
SECTION IS ";SC;" OUT OF ";Q-1
9510 LET TSC=TSC+SC
9520 PRINT "/";"YOUR TOTAL SCO
RE SO FAR IS ";TSC
9530 FOR Y=1 TO 3
9540 GOSUB 9000
9550 NEXT Y
9555 FOR P=1 TO 5
9564 SCROLL
9555 NEXT P
9560 RETURN
9900 SAVE "PHYSICS"
9910 RUN

```

HANGMAN II is an improved and updated version of G. Gill's ZX-80 Hangman game the July/August issue of Sinclair User. This version makes the giant stride of showing a display of the gallows, advanced one stage for every incorrect guess.

The 120-word vocabulary consists of 40 six-, seven- and eight-letter words selected randomly from a dimensioned string.

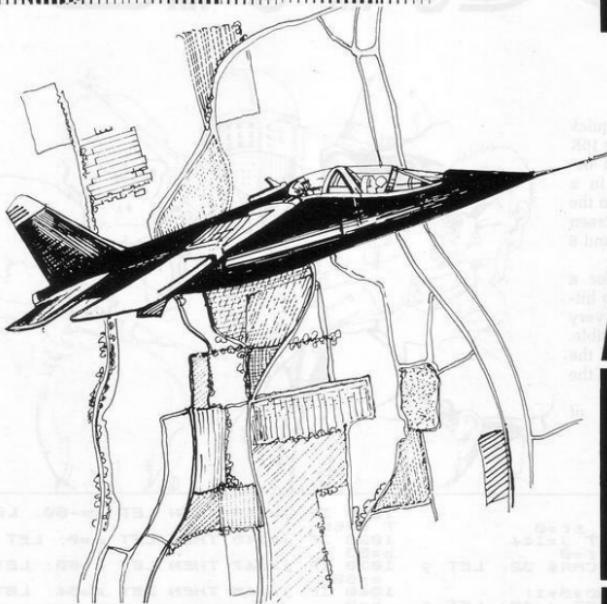
This seems a reasonably definitive listing for this game and is therefore worth a place in anyone's cassette collection. It was sent by P Marsland, of Tamworth, Staffs, for the 16K ZX-81.

HANGMAN

10



SPY PLANE



SPY PLANE

```

10 LET S=VAL "5"
20 LET X=VAL "11"
30 CLS
40 LET A=VAL "15"
50 FOR B=VAL "12" TO VAL "58"
50 LET R=A+(A*VAL "19" AND RND
>VAL ".4")-(A*VAL "13" AND RND*VAL
AL ".5")
70 FOR C=VAL "13" TO A
80 PLOT B,C
90 NEXT C
100 IF RND*VAL ".8" AND B>VAL "
12" THEN PLOT B,A+VAL "RND*.6"
110 NEXT B
120 FOR A=VAL "4" TO VAL "26"
130 LET X=X+(INKEY$="8")-(INKEY$="7")
140 PRINT AT X,A;
150 GOSUB VAL "258"
160 IF M>VAL "8" AND M<VAL "8"
OR M>VAL "127" AND M<VAL "136" T
HEN PRINT S,A
170 PRINT AT X,A;" "
180 PRINT AT X,A+VAL "2";
190 GOSUB VAL "258"
200 IF M>VAL "8" AND M<VAL "8"
OR M>VAL "127" AND M<VAL "136" T
HEN LET S=S+PI/PI
210 PRINT AT X,A;".."
220 NEXT A
230 PRINT S+PI/PI
240 STOP
250 LET M=PEEK VAL "PEEK 16398+
256*PEEK 16399"
260 RETURN

```

SPY PLANE is a quick program for the 1K ZX-81 in which you are the pilot of a reconnaissance aircraft swooping over enemy territory.

You can photograph the installations successfully only by getting them less than two print positions in front of the nose camera. Gain or lose height with keys 6 and 7 and beware of crashing.

Submitted by J Corney, of Braintree, Essex, who reckons that 10 photographs or more is the mark of a real daredevil.

CLOCKMAN

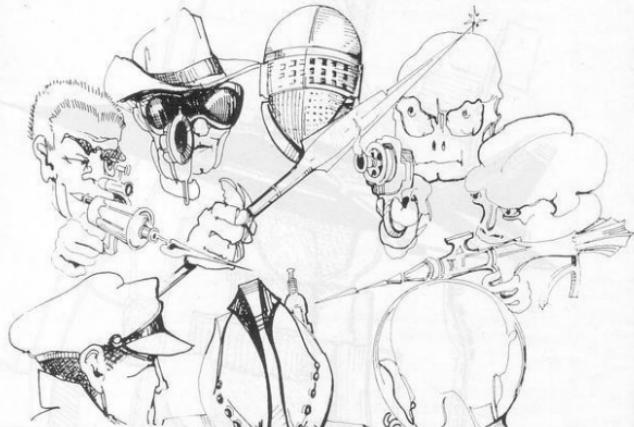
CLOCKMAN is a very quick reaction-type game for the 16K Spectrum. It is so-called because your enemies appear in a circle around the screen as if on the face of a clock. Your gun, at screen centre, is rotated with keys 5 and 8 and fired with 1.

Men stay on the screen for a shorter time after every hit, so hitting more than 40 out of 50 is very good. Fifty out of 50 is impossible. You can adjust the difficulty of the program by altering the length of the BEEP in line 180.

Sent by Arthur Douglas, of London E4 Graphics notes:

70,80 etc—k.

1000,1010 etc—j,a,b.



```

20 GO SUB 9000
30 LET g=0: LET sc=0
40 LET g=100: LET j=144
50 LET d=0: LET c=0
60 PRINT AT d,c;CHR$ 32: LET g
=90+1
70 LET k=INT (RAND*8+1)
80 IF k=1 THEN LET d=10: LET c
=5
90 IF k=2 THEN LET d=3: LET c
=8
100 IF k=3 THEN LET d=0: LET c
=15
110 IF k=4 THEN LET d=3: LET c
=22
120 IF k=5 THEN LET d=10: LET c
=25
130 IF k=6 THEN LET d=17: LET c
=22
140 IF k=7 THEN LET d=20: LET c
=15
150 IF k=8 THEN LET d=17: LET c
=6
160 PRINT INK 1;AT d,c;CHR$ 152
170 FOR k=1 TO 9
180 BEEP .8,.01,5
190 PRINT INK 2;AT 18,15;CHR$ j
200 IF INKEY$="8" THEN LET j=j+
1: IF j=152 THEN LET j=j+144
210 IF INKEY$="5" THEN LET j=j-
1: IF j=143 THEN LET j=151
220 IF INKEY$="1" THEN GO SUB 1
900
230 NEXT k
240 IF g=50 THEN GO TO 260
250 GO TO 60
260 PRINT AT 19,8;"YOU HAVE SCO
red": sc: OUT OF 50"
270 PRINT AT 20,8;"Hit ""y"" FO
r another, 20 for ""b"" to STOP"
280 IF INKEY$="y" AND INKEY$="d"
THEN GO TO 260
290 IF INKEY$="b" THEN STOP
300 RUN
1000 IF j=144 THEN LET g=-84: LE
T b=0
1010 IF j=145 THEN LET g=-60: LE
T b=60
1020 IF j=146 THEN LET g=0: LET
b=83
1030 IF j=147 THEN LET g=60: LET
b=60
1040 IF j=148 THEN LET g=84: LET
b=0
1050 IF j=149 THEN LET g=60: LET
b=160
1060 IF j=150 THEN LET g=0: LET
b=84
1070 IF j=151 THEN LET g=-60: LE
T b=-60
1080 PLOT 124,92: DRAW INK 4;b,b
1090 IF k=143 THEN PRINT AT g
c,"": BEEP 0,1,k#2: PLOT 124,92
; DRAW OVER 3/3,b,b: LET sc=sc+1:
LET q=q-2: GO TO 60
1100 PAUSE 1/2: PLOT 124,92: DRA
W OVER 1/2,b
1110 RETURN
9890 FOR j=144 TO 152: FOR k=0 T
O 9
990 READ ud9: POKE USA CHR$ j+k
9910 ud9
9920 NEXT k: NEXT j
9930 DATA 2,13,50,195,195,50,13,
3
9940 DATA 192,175,75,67,44,48,16
16
9950 DATA 24,24,36,36,88,98,165,
195
9960 DATA 3,13,58,194,52,20,8,8
9970 DATA 192,175,75,34,34,78,17
6,192
9980 DATA 8,8,28,52,194,58,13,3
9990 DATA 195,165,98,88,26,36,24
24
6100 DATA 16,16,48,44,67,76,176,
192
9110 DATA 24,80,98,126,24,36,88
129
9120 RETURN
9999 SAVE "clockmen" LINE 10

```



BINOMIAL DISTRIBUTION

BINOMIAL DISTRIBUTION might be the first of a new style of program. It was submitted by P R Scott, of Goldalming, Surrey, who believes that there are many fundamental scientific principles which could profitably be illustrated on Sinclair machines.

This program for the 16K ZX-81 serves to illustrate the principle of

binomial distribution. The display shows a ball falling through a triangular matrix of pegs. When the ball hits one of the pegs it rebounds to the left or right, entirely at random.

Its final position is recorded and a further ball produced. The distribution of final positions is the binomial distribution, familiar to most O level mathematics candidates. You may

not know that this characteristic pattern is also of importance in spectral intensities and polymer conformations.

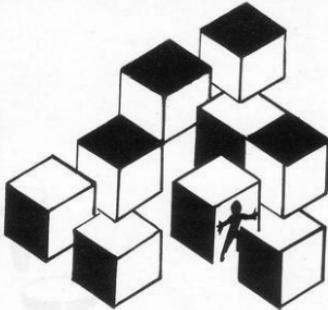
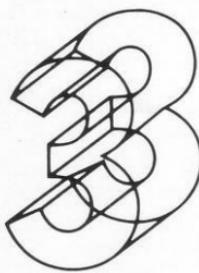
An excellent program, likely to prove of immediate use to teachers and students of mathematics. Graphics notes:

120—Minus, Four spaces, minus and so on.

```

10 DIM A(7)
20 FOR X=1 TO 7
30 LET R(X)=0
40 NEXT X
50 PRINT AT 0,5;"BINOMIAL DIST
RIBUTION"
60 PRINT AT 5,15;""
70 PRINT AT 5,14;""
80 PRINT AT 5,13;""
90 PRINT AT 5,12;""
100 PRINT AT 5,11;""
110 PRINT AT 5,10;""
120 PRINT AT 5,9;""
130 PRINT AT 5,8;""
140 PRINT AT 5,7;""
150 LET X=15
160 LET Y=3
170 LET P=0
180 LET Q=0
190 LET R=0
200 LET S=0
210 LET T=0
220 LET U=0
230 LET V=0
240 GOSUB 400
250 IF Y=16 THEN GOTO 490
260 LET R=RND
270 IF R<0.5 THEN LET X=X+1
280 IF R>0.5 THEN LET X=X-1
290 GOSUB 400
300 GOTO 230
400 PRINT AT Y,X;""
410 LET Y=Y+1
420 PRINT AT Y,X;""
430 RETURN
440 PRINT AT 16,X;""
500 LET Z=(X-7)/2
510 LET A(Z)=A(Z)+1
520 LET P=1
530 IF Z/2=INT(Z/2) THEN LET P=
540 LET Q=X
550 IF A(Z)>=10 THEN LET Q=Q-1
560 PRINT AT P,Q;A(Z)
570 IF A(Z)=50 THEN INPUT Z#
580 GOTO 200

```



HUNT

WE HAVE received many programs for finding something hidden in a grid. **3-D Hunt** is the first we have had requiring a search in a cube.

The display is of a 9 by 9 numbered board representing the front of the cube. Beneath it is a strip representing depth, the right-hand end of the strip being the front of the cube. The computer has a choice of 729 positions in which to hide itself.

Enter a number for the line, another for the column, and a third for the depth. Your position will be displayed and so will three letters to show the relative position of the computer.

A report of NWF, for example, would indicate that your first and second numbers should be less, and your third should be greater. The last F indicates "in front of".

If one of the report figures does not appear, assume that you have hit the correct value. A black square shows you have found the fugitive and the number of attempts you required is displayed.

An interesting game for the 1K ZX-81 from Paul Allen of Wigan, Greater Manchester. Graphics notes.

6—Inverse hyphen
7—Nine graphic As
8—Graphic D
100—Inverse O
180—Inverse space

```

1  LET J=CODE " "
2  LET K=M-M-D-1
3  LET T=N-M-N
4  LET R=Q
5  LET P=CODE " "
6  LET W#=CODE " "
7  LET G=CODE " "
8  PRINT
9  FOR I=0 TO G
10 PRINT Q,W#
11 LET Q=Q+R
12 NEXT I
13 PRINT N, "12345678", G, ,N,W#
14 GOSUB 6
15 LET L=0
16 GOSUB 6
17 LET C=0
18 GOSUB 6
19 INPUT A
20 INPUT B
21 INPUT C
22 INPUT D
23 LET K=K+R
24 LET R#="
25 LET Q#=R#
26 LET C#=R#
196 IF M=L AND N=C AND F=C THEN
GOTO CODE[""]
197 IF M>L THEN LET R#="
198 IF M<L THEN LET R#="
199 IF N>C THEN LET R#="
200 IF N<C THEN LET R#="
201 IF F>D THEN LET R#="
202 IF F<D THEN LET R#="
203 PRINT AT T, Q,W#, C#, D#, AT N,
204 CHR#7, AT 11,N,K
205 GOTO 80
206 LET D=INT (RND*J)
207 IF D<R OR D>J THEN GOTO P
208 RETURN
209 PRINT AT M,N, " "; K

```

SPACE RESCUE



SPACE RESCUE is a kind of stellar docking game for the 16K ZX-81. You attempt to manoeuvre a series of unmanned space probes into the open bay of a space station positioned in the middle of an asteroid belt. Steer yourself with the four cursor keys but beware—in those weightless conditions your craft will continue to move in a given direction, even when propulsive force is no longer being applied.

The probes naturally will be destroyed if they hit an asteroid and the collision will leave behind a cloud of debris big enough to wreck the next vehicle but too small to show up on the radar.

Ten marks are deducted for every crash and your score is displayed at the end of the game. If things become too easy, change line 50 to give more asteroids.

```

1 LET U=@
10 DIM R(40,40)
15 FAST
20 FOR F=0 TO 21
30 PRINT " "
40 NEXT F
50 FOR N=0 TO 30
55 LET X=INT (RND*30)+1
60 LET Z=INT (RND*20)+1
65 LET A(Z*2,X)=1
70 PRINT AT X,Z;CHR$ 130
80 NEXT N
90 GOSUB 5000
110 SLOW
120 LET Y=0
130 LET R=30
140 LET E=15
150 LET A=CODE INKEY$
160 IF INKEY$="" THEN LET A=Y
170 PRINT AT R,E;A
180 IF A=33 AND E>0 AND E<30 TH
EN LET E=E-1
190 IF A=35 AND R>0 AND R<21 TH
EN LET R=R-1
200 IF A=34 AND R<21 AND R>0 TH
EN LET R=R+1
220 LET S=A(E,R)
230 IF A=35 AND E>0 AND E<30 TH
EN LET E=E+1
240 IF A=35 AND R>0 AND R<21 TH
EN LET R=R-1
250 IF A=34 AND R<21 AND R>0 TH
EN LET R=R+1
255 LET U=U+1
260 LET S=A(E,R)
265 PRINT AT R,E;S
270 IF S=1 THEN GOSUB 1000
280 IF S=2 THEN GOSUB 2000
290 GOTO 200
1000 PRINT AT 0,0;"SCORE";U-10
1010 LET U=U-10
1020 PRINT AT R,E;"ERREH"
1030 PAUSE 50
1040 PRINT AT R,E;" "
1050 GOTO 170

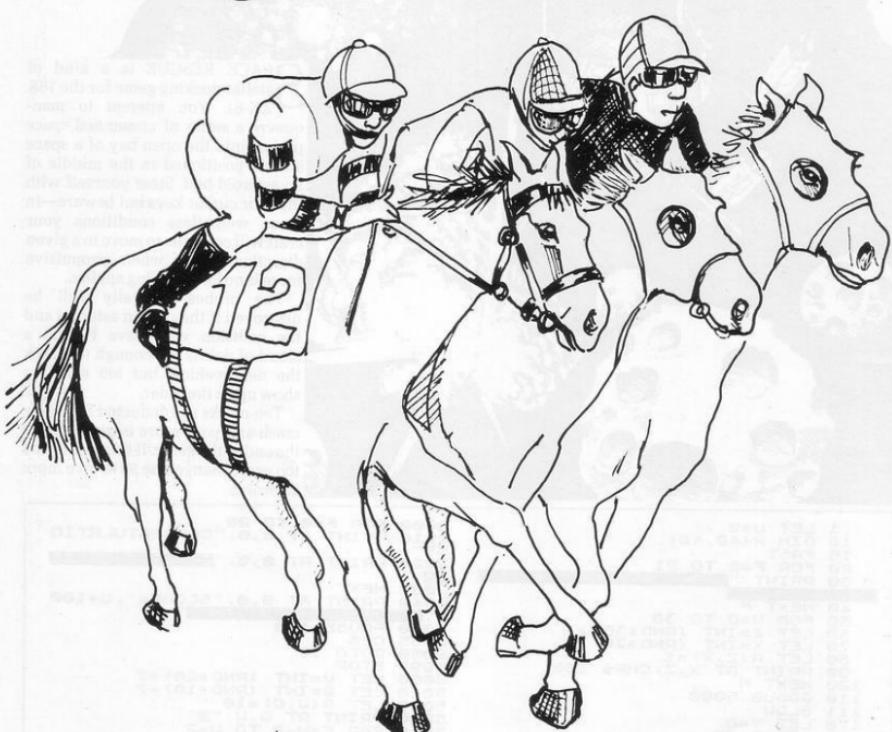
```

```

2000 FOR F=0 TO 20
2010 PRINT AT 0,0;"CONGRATULATIO
NS"
2020 PRINT AT 0,0;"CONGRATULATIO
NS"
2030 NEXT F
2040 PRINT AT 0,0;"SCORE";U+100
2050 PAUSE 100
2055 CLS
2060 GOTO 10
4999 STOP
5000 LET U=INT (RND*10)+7
5010 LET Q=INT (RND*10)+7
5020 LET A(W,Q)=10
5030 PRINT AT Q,W;""
5040 FOR F=W-2 TO U+2
5050 PRINT AT Q+2,F;""
5055 LET A(Q+2,F)=1
5060 PRINT AT Q-2,F;""
5065 LET A(Q-2,F)=1
5070 NEXT F
5080 FOR F=Q-2 TO U+2
5090 PRINT AT F,W,Q;""
5095 LET A(F,W-2)=1
5100 PRINT AT F,W+2;""
5105 LET A(F,W+2)=1
5110 NEXT F
5120 LET T=(INT (RND*4))
5130 IF T=0 THEN PRINT AT Q,W+2;
5140 IF T=0 THEN LET A(Q,W+2)=0
5150 IF T=1 THEN PRINT AT Q,W-2;
5160 IF T=1 THEN LET A(Q,W-2)=0
5170 IF T=2 THEN PRINT AT Q+2,W;
5180 IF T=2 THEN LET A(Q+2,W)=0
5190 IF T=3 THEN PRINT AT Q-2,W;
5200 IF T=3 THEN LET A(Q-2,W)=0
5210 RETURN

```

HORSE



```
1 DIM R(6)
2 DIM W(6)
3 LET P=0
4 FOR N=1 TO 6
5 LET R(N)=10.00
6 NEXT N
7 LET S=0
8 LET Y=0
9 DIM A$(6,18)
10 FOR N=1 TO 6
110 PRINT "TYPE NAME OR INITIAL"
120 PRINT "OR PLAYER NO."IN
130 INPUT A$(N)
135 CLS
140 IF A$(N)(1)="#" THEN GOTO 2
150 NEXT N
160 PRINT AT 1,1;"HORSE NO. 0
165 RACE NO. Y
170 LET Y=Y+1
```

NOW YOU can watch a horse race without having to listen to Peter O'Sullevan tying himself in knots for the last furlong. It is a race game for up to six players. Each punter enters his initials and then inputs the number of the horse he has selected and whether he wants to bet each way or to win.

The players start with 10 points' worth of capital and score according to the odds on each horse and the type of bet laid. The game ends when one of the punters finds himself without cash.

Sent by C Winn for the expanded ZX-81.

RACE

```

010 LET P$=" 1 2 3 5 7101216"
015 FOR N=1 TO 5
020 LET B=N$2
025 LET A=B-1
030 LET X=N+1
035 PRINT AT X,5;N;"      ";P$:
2 TO B;" : 1"
070 NEXT N
280 PRINT AT 11,1;"EACH PLAYER
TYPE IN NO. OF"
290 PRINT AT 12,1;"HORSE SELECT
ED"
300 PRINT AT 14,1;"E.G. TYPE IN
24 FOR NO. 2 TO WIN"
310 PRINT AT 15,1;"OR SE FOR NO
.5 EACH WAY"
320 DIM B$(6,5)
330 DIM H(6)
340 DIM E(6)
350 FOR N=1 TO 5
355 IF A$(N,1)="#" THEN GOTO 5
360 PRINT AT 17,5;A$(N); ""
365 PRINT AT 19,6;"TYPE IN NOW"
370 INPUT B$(N)
375 LET H(N)=B$(N,1)
380 LET E(N)=B$(N,2)
385 IF E(N,2)="#E" THEN LET P=1
390 NEXT N
400 DIM D(8)
405 CLS
410 LET D$=" ====="
415 PRINT D$;
420 PRINT D$;
430 FOR N=1 TO 8
435 LET R(N)=0
440 PRINT TAB 29;"";N;""
445 PRINT TAB 29;"";N;""
450 NEXT N
460 PRINT D$;
470 PRINT D$;
475 LET F=INT((RND*16)+1
480 IF F<5 THEN GOTO 700
485 IF F<8 THEN GOTO 710
490 IF F<10 THEN GOTO 720
500 IF F<12 THEN GOTO 730
505 LET G=F-5
510 GOTO 800
520 LET G=1
525 LET G=2
530 LET G=3
535 LET G=4
540 LET G=5
545 LET G=6
550 LET G=7
555 LET G=8
560 IF P(G)=000 THEN GOTO 560
565 LET K=INT((RND*3)+1
570 LET K=K+INT(G/2)
575 PRINT AT 17,5;G;""
580 LET D(G)=D(G)-K
585 IF D(G)<1 THEN GOTO 570
590 PRINT AT 17,5;G;""
595 IF D(G)<0 THEN GOTO 900
600 GOTO 600
605 PRINT AT F,0;"";G;""
610 GOTO 550
615 IF P<2 THEN LET W(G)=1
620 LET D(G)=500
625 PRINT AT F,0;G;""
630 IF W(G)=1 THEN PRINT AT 17
635 IF W(G)=1 THEN PRINT AT 17
640 LET P=0
645 LET P=1
650 LET P=2
655 LET P=3
660 LET P=4
665 LET P=5
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```

SINCE WE loaded Bio-rhythms we have not been able to see the TV screen for interested parties. Everyone in the office is becoming a bio-rhythm bore.

The program requires your date of birth and the current date and then displays a neat chart of the month, with curves for the physical, mental and emotional cycles.

Your physical state varies over a 23-day cycle and relates to your endurance, strength and aggressiveness. The emotional cycle lasts 28 days and governs anger, moodiness and optimism/pessimism. Mentally, you oscillate between Einstein and ape over a 33-day cycle.

The program was submitted by R Clark, of Saltash, Cornwall.

BIO-RHYTHMS

```
1 RESTORE
2 PRINT AT 0,0;"          BIO-R
HYTHM
10 INPUT "Enter Date Of Birth"
"Day ";a;" Month ";b;" Year "
;"c
20 INPUT "Enter Date Now ", "M
onth ";d;" Year ";e
25CLS
30 LET t=INT ((e-c)*365.25)+(d-b)*30.35-a
300 FOR r=0 TO 255
310 PLOT r,10
315 IF r=INT (r/8)+8 THEN FOR u
=10 TO 20: PLOT r,u: NEXT u
320 NEXT r
330 PRINT AT 21,0;"1st      10th
20th 30th"
340 PRINT AT 0,0; INK 1;"Physical"
345 INK 2;"Mental"; INK 4;"Emotional"
350 FOR r=1 TO 3
355 READ u
360 LET l=2*PI*(t-(INT (t/u)*u))
370 LET k=2*PI*(33-u)*.03
380 FOR s=l TO k+l+(2*PI) STEP
.1
390 PLOT INK ((1 AND u=23)+(2
AND u=28)+(4 AND u=33)); (s-l)*(33
-u)+u), 90+SIN a*60
3920 NEXT a
3930 NEXT r
3940 DATA 23,28,33
3950 INPUT "Another Go ? ";a$: I
f a$(1)="y" THEN GO TO 1
```





GHOST TREKKER is a genuinely challenging game requiring quick thinking and quick cursor fingers as you chase a ghost around the haunted house.

You begin as an inverse V in the top left of the screen and change direction anti-clockwise with 1 and clockwise with 0. Both you and the ghost leave a trail which you are not allowed to cross in your attempt to corner the wayward wraith.

If you have sufficient luck and animal cunning to corner the fugitive phantom, you will be congratulated and your time displayed. A demanding game for the expanded ZX-81 from Alistair Crowe, of Llandudno, Gwynedd. Graphics notes:

- 110—Thirty-two inverse full stops.
- 130—Inverse A, graphic shifted M, inverse V, graphic shifted N.
- 350 & 400—Inverse full-stop.
- 410—Graphic A.
- 530—Inverse "Congratulations, you have caught the ghost. It took you time units.
- 550—You hit a trail and have been killed.
- 560—For another go, press any key.

HOST TREKKER

```

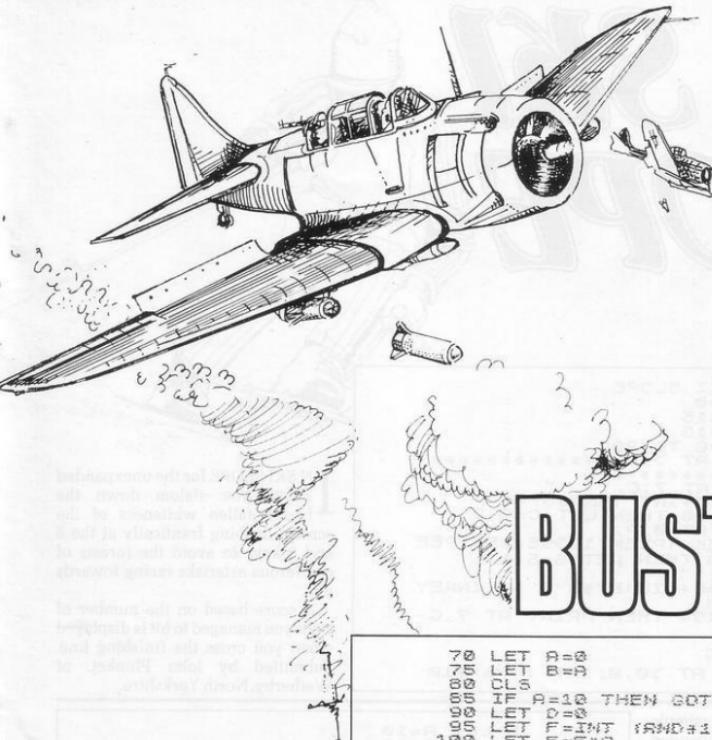
10 FOR A=0 TO 21
110 PRINT AT A,0;""
120 NEXT A
130 LET A$="-----"
140 LET X$=" "
150 LET Y$=" "
160 LET Y=1
170 LET P=INT (RND#18)+2
180 LET Q=P
190 LET DIR=INT (RND#4)+1
200 LET T=0
210 GOTO 370
220 LET A=A+(INKEY$)="0")-(INKEY
$="1")
10 FOR A=0 TO 21
110 PRINT AT A,0;""
120 NEXT A
130 LET A$="-----"
140 LET X$=" "
150 LET Y$=" "
160 LET A=3
170 LET P=INT (RND#18)+2
180 LET Q=P
190 LET DIR=INT (RND#4)+1
200 LET T=0
210 GOTO 370
220 LET A=A+(INKEY$)="0")-(INKEY
$="1")
230 IF A<1 THEN LET A=4
240 IF A>4 THEN LET A=1
250 LET X$=X$+(A=3)-(A=1)
260 LET Y$=Y$+(A=3)-(A=1)
270 IF X$>10 THEN LET X$=1
280 IF Y$>10 THEN LET Y$=1
290 IF Y$>0 THEN LET Y$=1

```

```

300 IF Y<1 THEN LET Y$=0
310 PRINT AT XX,YY;""
320 PRINT AT X,Y
330 LET C=PEEK (PEEK 16395+256+8
PEEK 16399)
340 IF C=11 THEN GOTO 530
350 IF C<0CODE " " THEN GOTO 55
360 PRINT AT X,Y,RELAY
370 LET XX=X
380 LET T=T+1
390 LET YY=Y
400 PRINT AT INT (RND#22),INT (
RND#32);":"
410 PRINT AT P,Q;""
420 LET P=P+(DIR#1)-(DIR#2)
430 LET Q=Q+(DIR#3)-(DIR#4)
440 IF P>20 THEN LET P=20
450 IF Q>20 THEN LET Q=20
460 IF Q<1 THEN LET Q=0
470 IF Q>0 THEN LET Q=1
480 PRINT AT P,Q;""
490 IF RND<.5 THEN GOTO 230
500 LET ZEE=INT (RND#4)+1
510 LET DIR=ZEE
520 GOTO 230
530 PRINT AT 0,0;"CONGRATULAT
IONS YOU HAVE CAPTURED THE
HOST. YOU TOOK TIME UN
540 GOTO 560
550 PRINT AT 0,0;"YOU HIT A TRAIL
AND HAVE BEEN KILLED."
560 PRINT "FOR ANOTHER GO PRESS
ANY KEY."
570 PAUSE 100
580 IF INKEY$="" THEN GOTO 560
590 GOTO 1

```



DAM BUSTERS

Introducing a new game with unique graphics. It will be a challenge to fly a Lancaster in a mission to destroy dams in the heart of Germany.

In addition to the unique graphics, the game has a variety of features to keep you entertained for hours.

A DAMBUSTERS game for the ZX-81. Droning over Hamburg in the flak-riddled Lancaster, the bomb-aimer tensed over his sights, the Barnes-Wallace special already spinning in the bomb bay—and everybody humming the tune.

You have 10 dams to bust and the bombs are bounced by the novel cosine-controlled routine in line 320. The position of the dam is randomised and the bomb is released with any key.

The program uses only 2K and there should be plenty of room for elaboration of the graphics.

Submitted by R Larham, of Chatteris, Cambridgeshire. The reviewer managed to account for only seven. Graphics notes: 600 - Graphic shifted A inverse asterisk, graphic shifted A.

```

70 LET A=0
75 LET B=0
80 CLS
85 IF A=10 THEN GOTO 520
90 LET D=0
95 LET F=INT (RND#*15)+15
100 LET E=F+2
105 LET A=A+1
110 PRINT AT 4,4;"DAM ";A;TAB 1
115;" DESTROYED"
120 PRINT AT 20,8;""
130 PRINT AT 19,F;CHR$ 128
140 GOSUB 400
150 FOR Z=1 TO 12
160 NEXT Z
170 IF INKEY$="" THEN GOTO 120
175 LET D=D+1
180 FOR H=INT G TO 63 STEP 2
190 IF H>63 THEN GOTO 80
200 LET I=INT (G+4+COS (H/(G-4))
*I))
210 PLOT H,I
220 IF I=4 OR I=5 THEN GOSUB 80
230
350 GOSUB 400
370 UNPLOT H,I
380 NEXT H
390 GOTO 80
400 PRINT AT 32,8;" "
410 LET D=D+1
420 IF D>28 THEN GOTO 80
430 RETURN
510 PRINT AT 4,4;"TOTAL DAMS DE
stroyed ";B
520 PRINT AT 5,8;"PRESS NEWLINE
FOR NEXT GAME"
530 IF INKEY$="" THEN GOTO 530
540 RUN
550 PRINT AT 19,F;""
560 LET B=B+1
570 FOR Z=1 TO 24
580 NEXT Z
590 GOTO 80
600 IF H=E OR H=E+1 THEN GOTO 6
610 RETURN

```

SKI SLOPE



```

2 REM SKI SLOPE
30 LET S=0
40 LET P=15
45 LET C=13
49 FOR N=0 TO 200
50 PRINT AT 7,0; "*****"
51 PRINT AT 7,C; " "
52 LET C=C+INT ((RND*3)-1)
53 IF C>=32 THEN LET C=C-2
54 PRINT AT 0,P;
55 IF PEEK (PEEK 16399+256*PEEK
K 16399)=23 THEN LET S=S+1
56 PRINT " "
57 LET P=P+(INKEY#="B")-(INKEY
$="5")
58 IF N=194 THEN PRINT AT 7,C-
1, " "
59 SCROLL
60 NEXT N
61 PRINT AT 10,0; INT (N/S)*10

```

SPOTSWAT is very simple game for the unexpanded ZX-81. When the program is run, nine spots will appear on the screen in a 40 by 40 square. Your flashing spot is manoeuvred with the usual cursor keys to wipe them away.

When the screen has been cleared, press 0 and your time will be displayed. After a few moments a new game will begin.

Sent by J R Oakley, of Sandwell, West Midlands.

```

5 LET A=10
10 LET B=10
20 LET T=0
30 FOR N=1 TO 9
40 LET C=INT ((RND*12)+1
50 LET D=INT ((RND*48)+1
60 PLOT C,D
70 NEXT N
80 UNPLOT A,B
85 LET T=T+1
90 IF INKEY$="5" THEN LET A=A-
1
100 IF INKEY$="B" THEN LET A=A+
1
110 IF INKEY$="6" THEN LET B=B-
1
120 IF INKEY$="7" THEN LET B=B+
1
130 PLOT A,B
140 IF INKEY$="0" THEN GOTO 160
150 GOTO 80
155 PRINT T/5
155 PAUSE 500
170 CLS
180 RUN

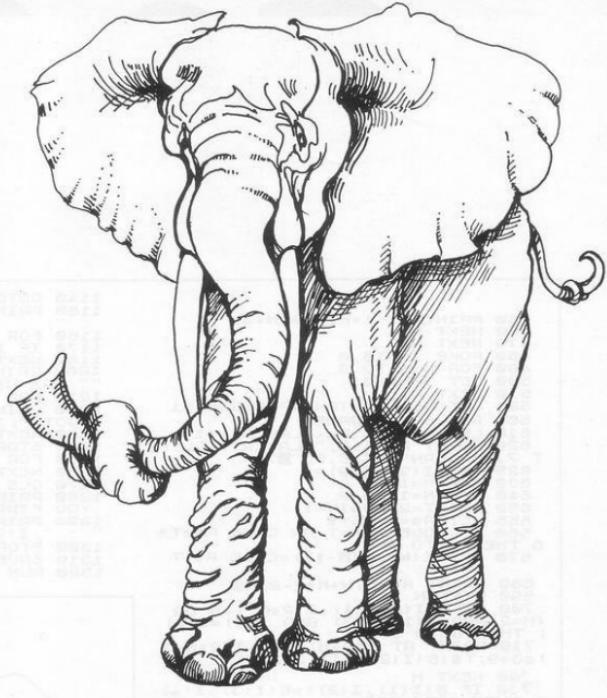
```

IN SKI SLOPE for the unexpanded ZX-81 you slalom down the freshly-fallen whiteness of the screen, dabbing frantically at the 5 and 8 keys to avoid the forests of coniferous asterisks racing towards you.

A score based on the number of trees you managed to hit is displayed when you cross the finishing line. Submitted by John Plunket, of Wetherby, North Yorkshire.



SPOT SWAT



WE HAVE had total recall since we started playing **Memory**. It is a memory-testing routine for the 16K ZX-81 which invites you to try to recollect the positions of various symbols in a six by six grid.

The program first displays the grid and the 36 characters enclosed in it. You have very few seconds in which to absorb the display and are then required to input the positions of matching pairs of the symbols. Up to four players can compete and a running score is kept of your successes.

Submitted by Jack Anderson, of Svenstrup, Denmark.

MEMORY

```

30 DIM B(6,6)
40 DIM I(18)
50 DIM T$(18)
60 PRINT "MEMORY"
65 PRINT
70 PRINT "THE IDEA OF THIS GAME"
80 PRINT "IS TO"
90 PRINT "IMPROVE YOUR MEMORY."
90 PRINT "IN AN ATTEMPT TO FIND MATCHING PAIRS OF CHARACTERS."
100 PRINT "TURN"
110 PRINT "TWO PIECES. IF THE TWO PIECES"
120 PRINT "MATCH, THEY ARE YOURS TO KEEP."
130 PRINT "AND YOU HAVE ANOTHER TURN".
140 PRINT "OTHERWISE, THE NEXT PLAYER HAS AGO."
150 LET S=INT((RND*18+1))
160 FOR N=1 TO 6
170 FOR M=1 TO 6
180 LET S=INT((RND*18+1))
190 IF I(S)=2 THEN GOTO 180
200 LET I(S)=I(S)+1
210 LET S(N,M)=S
220 NEXT M
230 NEXT N

```

```

240 PRINT "INPUT NUMBER OF PLAYERS (MAX 4)"
250 INPUT A$;INKEY$
260 IF CODE A$<29 OR CODE A$>32 THEN GOTO 250
270 LET PLAYERS=VAL A$
280 CLS
290 PRINT
300 PRINT " "
310 FOR N=1 TO 6
320 PRINT " "
330 PRINT " ";CHR$(N+156);";CHR$(N+156)
340 PRINT " "
350 NEXT N
360 PRINT " "
370 FOR N=1 TO 6
380 FOR M=1 TO 6
390 PRINT AT 1+N*3,9+M*3;T$(IBIN(M))
400 NEXT M
410 NEXT N
420 PAUSE 100
430 FOR N=1 TO 6
440 FOR M=1 TO 6

```

```

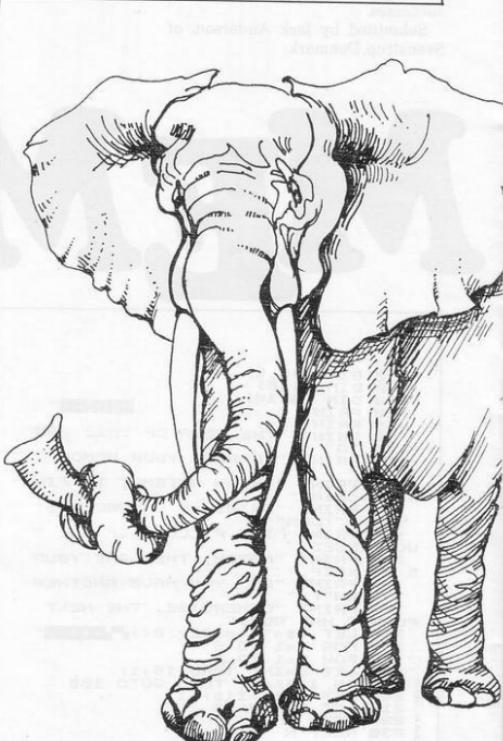
450 PRINT AT 1+M#3, 9+M#3, " "
460 NEXT M
470 NEXT N
480 POKE 36438, 8
490 FOR N=1 TO 9
500 LET I(N)=0
510 NEXT N
520 LET PL=INT (RAND#PLAYERS)+1
530 REM START GAME
540 LET PL=PL+(PL-PLAYERS)+1
550 PRINT AT 4, 0; "PLAYER "; PL; A
560 LET I(0)=I(0)+1
570 FOR M=1 TO 9
580 FOR N=1 TO 2
590 LET I(2*M#N)=1
600 LET I(2*M#N)=2
610 IF CODE RE-T OR CODE RE-T+
6 THEN GOTO 650
620 LET I(N+2*(M-1))=CODE RE-T
630 PRINT AT 8, N+M#2-2; A#
640 NEXT N
650 IF B(I(2*M-1), I(2*M))=0 OR
(M=2 AND I(1)=I(3) AND I(2)=I(4))
660 THEN GOTO 950
670 PRINT AT 1, 2; " "
680 PRINT AT 1, 2; " "
690 PRINT AT 1, 2; " "
700 IF B(I(2*M-1), I(2*M))=0 OR
(M=2 AND I(1)=I(3) AND I(2)=I(4))
710 PRINT AT 1, 2; " "
720 NEXT M
730 IF B(I(1), I(2))=B(I(3), I(4))
740 THEN GOTO 660
750 PRINT AT 10, 0; "YOU MISSED"
760 PRINT AT 11, 0; "IT...."; AT 23, 20; " "
770 KEY$=""; THEN GOTO 750
780 PRINT AT .8, 0; " "; AT 10,
2; " "; AT 23, 20; " "; AT 11, 0; " "; AT I(
1)+3+1, I(1)+3+2; " "; AT I(4)+3+1,
I(3)+3+2; " "
790 GOTO 600
800 PRINT AT 10, 0; "YOU GOT"; AT
11, 0; "IT..."; AT I(2)+3+1, I(1)+3
+2; PL; AT I(4)+3+1, I(3)+3+2; PL
810 LET B(I(1), I(2))=0
820 LET B(I(3), I(4))=0
830 LET I(4+PL)=I(4+PL)+1
840 LET M=0
850 FOR N=1 TO PLAYERS
860 LET M=M+I(N+4)
870 NEXT N
880 IF M=18 THEN GOTO 1000
890 PRINT AT 23, 20; "WINNER"
900 IF INKEY$="" THEN GOTO 990
910 PRINT AT 5, 0; " "; AT 10,
0; " "; AT 23, 20; " "
920 GOTO 650
930 PRINT AT 5, 2*M-1; " "
940 GOTO 640
950 PRINT AT 12, 0; "END OF"; AT 1
3, 0; "GAME..."; AT 12, 0; " "
960 IF PLAYERS=1 THEN GOTO 1250
970 LET M=5
980 FOR N=5 TO PLAYERS+4
990 IF I(N)=I(M) THEN LET M=N
1000 NEXT N
1010 FOR N=5 TO PLAYERS+4
1020 IF I(N)=I(M) THEN LET I(N-4)
=0
1030 NEXT N
1040 LET M=0
1050 FOR N=1 TO PLAYERS
1060 LET M=M+(I(N)=0)
1070 IF I(N)=0 THEN LET WIN=N
1080 NEXT N
1090 IF M>1 THEN GOTO 1150
1100 PRINT "PLAYER "; WIN; " WINS."

```

```

1140 GOTO 1200
1150 PRINT "DRAW BETWEEN PLAYERS"
1160 FOR N=1 TO PLAYERS
1170 IF I(N)=0 THEN PRINT N; " "
1180 NEXT N
1190 PRINT AT 5, 0; I(9); " " "TURN
" WAS USED."
1200 FOR N=1 TO PLAYERS
1210 PRINT AT 5+N, 0; "PLAYER "; N;
1220 GOTO 11(N+4)
1230 STOP
1240 NEXT N
1250 FOR N=1 TO 20
1260 NEXT N
1270 CLS
1280 PRINT "CONGRATULATIONS,
YOU FINALLY MADE IT."
1290 PRINT "NUMBER OF "; " "
1300 PRINT " "; I(9)
1310 STOP
1320 SAVE "MEMOR"
1330 RUN

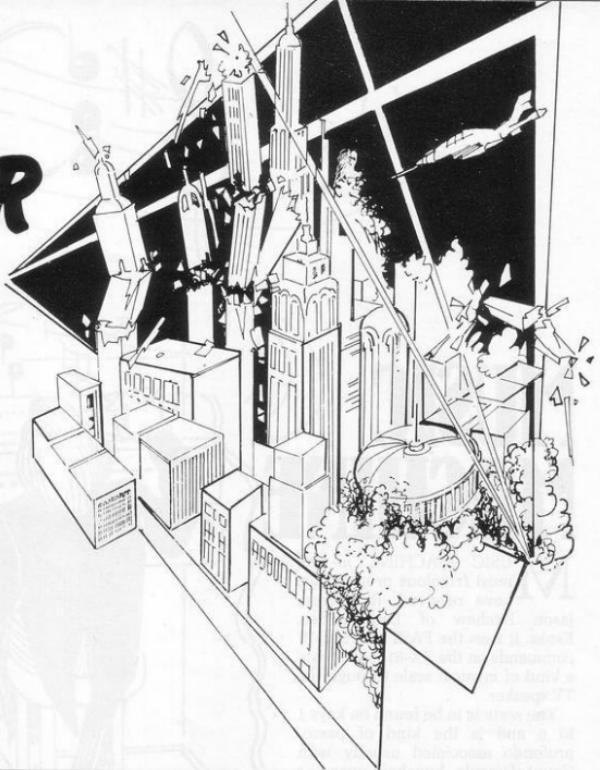
```



CITY BOMBER

CITY BOMBER this is a version of the well-known arcade game, written by E Wrigley of Bury, Lancashire, for the Spectrum. As you would expect, it is in glorious colour and complete with all relevant explosions.

Lines 2 to 16 set up the user-definable graphics and should be RUN before the rest of the program is typed-in. They provide a city of coloured skyscrapers which you must blast away before you crash into them. Only one bomb can be in the air at a time and five levels of difficulty enable you to select the speed of the aircraft. Graphics notes:
 34—Graphics shifted R, graphics shifted S.
 58—Graphics shifted P, graphics shifted Q.
 104—Graphics shifted O.
 122—Graphics shifted A.



```

1 PAPER 0: BORDER 0: CLS
2 DATA 0,0,BIN 00010010,BIN 0
0011110,BIN 00001100,BIN 0000110
0,BIN 00001100,0
3 DATA 0,0,0,BIN 00111111,255
,1,0,0
4 DATA 1,3,7,255,255,BIN 1111
1100,BIN 11111100,BIN 01111100
5 DATA 0,0,0,0,BIN 00011000,18
IN 00111100,BIN 01111110,BIN 111
1111
6 DATA 255,255,255,BIN 01100110,2
55,255,BIN 01100110,255,255
10 FOR i=1 TO 115: FOR n=0 T
0 7
14 READ X: POKE USR CHR$ i+n, X
15 NEXT n: NEXT i
19 LET sc=0
20 PRINT AT 9,5: INK 4; "CITY B
OMB - F DROPS BOMB."; AT 11,7: B
RIGHT 1: INK 3; "DIFFICULTY ? (1-7
0 5)": INPUT D: LET D=D-D
200 PAPER 0: CLS : BORDER 0
200 LET s=-1
30 FOR k=5 TO 25
30 INK 1+INT (RND#7): PAPER 1+
INT (RND#7): LET g=1+INT (RND#7)
34 PRINT AT 9,j: PAPER 0;""
FOR k=9+1 TO 21: PRINT AT k,j;""
NEXT k
36 NEXT j
50 FOR i=1 TO 21
50 PAPER 0: INK 1+INT (RND#7)
54 LET nO=(21-j)
55 FOR k=20 TO 1 STEP -1
58 PRINT AT j,k;"": BEEP .0
1,0
59 FOR t=0 TO d
59 LET s=s+2*(INKEY$=="F")+(s=1
): GO SUB 100
64 NEXT i
68 IF SCREEN$ (j,k-10)<>"" THE
N GO TO 140
70 NEXT k: PRINT AT j,1;""
74 NEXT j
75 DATA 4,4,4,0
76 RESTORE 75: FOR j=1 TO 4: R
END X: BEEP .05*(1+j*(j=4)),X: N
EX(j
80 PRINT AT 21,0: FLASH 1: INK
3; PAPER 5;"SCORE:";sc;.stands
y FOR take-off": PRUSE 300
81 PAPER 0: FOR j=20 TO 0 STEP
-1
82 PRINT AT j+1,j+1;"";AT j,
j: INK 1+INT (RND#5): "
84 NEXT : GO TO 20
100 IF j>21 THEN RETURN : IF s=
1 THEN LET m=j+1
101 IF s=1 THEN LET m=j+2-(j=20
102 IF s=2 THEN LET m=j+2: IF s
=2 THEN LET d=d/2
103 IF s=0 THEN RETURN
104 PRINT AT m-1,h;"";AT m,h;""
": BEEP .005,21-m: LET m=m+1
105 IF SCREEN$ (m,h)<>"" THEN
GO TO 119
108 IF s>21 THEN RETURN : IF m>
21 THEN LET m=21: GO TO 120
119 LET sc=sc+10
120 IF m>21 THEN LET m=21
121 PRINT AT m-1,h: PAPER 0;""
: FOR n=0 TO 0 STEP -1
122 PRINT AT m,h: INK n;"": BE
EP 02,n,12
124 NEXT n
125 LET s=-1: LET d=d*2: RETURN
140 PRINT AT j,k-2;""
142 DATA 0,0,-5,-5,-5,0
144 RESTORE 142: INK 2
146 FOR n=1 TO 7: READ X: CIRCL
E(k#6+(j,(21-j)#5,n): BEEP .05*(1+
n): X: NEXT n
148 PRINT AT 11,10: PAPER 6: IN
K 1;"SCORE:";sc
9995 END
9997 REM Citybom
9998 REM © E.WRIGLEY 29/7/82
9999 SAVE "citybom": RUN

```

MUSIC MACHINE

MUSIC MACHINE is the most frivolous program we have received. It is from Jason Fitchew of Leigh-on-Sea, Essex. It uses the FAST and SLOW commands on the ZX-81 to generate a kind of musical scale through the TV speaker.

The scale is to be found on keys 1 to 6 and is the kind of bassoprofondo associated usually with Count Dracula hunched over the organ keys in the crypt at midnight. Tune the dial slightly off-station to start the background hum, turn up the volume and shake to that vampire beat. Graphics notes: 68, 180 and 243—Inverse.

```

5 FAST
6 SLOW
7 FAST
26 IF INKEY$="3" THEN GOTO COD
27 IF INKEY$="4" THEN GOTO VAL
28 IF INKEY$="5" THEN GOTO COD
E 29 IF INKEY$="6" THEN GOTO VAL
200 GOTO CODE " "
40 FAST
50 SLOW
55 SLOW
60 FAST
65 IF INKEY$="2" THEN GOTO COD
E 67 IF INKEY$="4" THEN GOTO VAL
68 IF INKEY$="5" THEN GOTO COD
E 69 IF INKEY$="6" THEN GOTO VAL
200 GOTO CODE " "
70 GOTO CODE "C"
80 FAST
81 FAST
83 SLOW
90 SLOW
91 SLOW
110 FAST
120 IF INKEY$="2" THEN GOTO COD
E 121 IF INKEY$="3" THEN GOTO COD
E "C" 126 IF INKEY$="5" THEN GOTO COD
E "B"

```



```

127 IF INKEY$="6" THEN GOTO VAL
200
130 GOTO VAL "80"
140 FAST
150 SLOW
152 SLOW
153 SLOW
154 SLOW
160 FAST
170 IF INKEY$="4" THEN GOTO VAL
"80"
171 IF INKEY$="2" THEN GOTO COD
172 IF INKEY$="3" THEN GOTO COD
E 173 IF INKEY$="5" THEN GOTO VAL
1200 GOTO CODE " "
200 FAST
210 FAST
220 SLOW
2201 SLOW
2202 SLOW
2203 SLOW
230 FAST
240 IF INKEY$="2" THEN GOTO COD
241 IF INKEY$="3" THEN GOTO COD
E "C" 242 IF INKEY$="4" THEN GOTO VAL
"80"
243 IF INKEY$="5" THEN GOTO COD
250 GOTO VAL "200"

```

ONE-ARMED BANDIT



IF YOU are too lazy to stand up and gamble, **One-armed Bandit** is a fruit machine simulator for the 16K ZX-81, submitted by Andrew Jackson and Paul Jenner of Warrington, Cheshire.

The aim is to line-up the letters displayed on the three 'reels'. If you manage a jackpot, you are given the chance to take a fifty-fifty gamble with your winnings (Y/N). You can win five pence, or lose 10. Five points can also be won for a diagonal line.

Occasionally you are given a "nudge" option—i.e.,—the chance to change three letters. To move up the reel one place, press 1; for reel two, press 2; and press 3 for reel three. To move a reel down one place, press Q, W or E. If you do not wish to nudge, hit N.

The program usually will wait for some kind of input, so if in doubt hit a key; in desperation, hit RUN. Graphics notes:

1000—Inverse ABCDEABCDEABCDE.

1005—All inverse spaces, except for inverse hyphens after A\$(A) and AS(B).

```

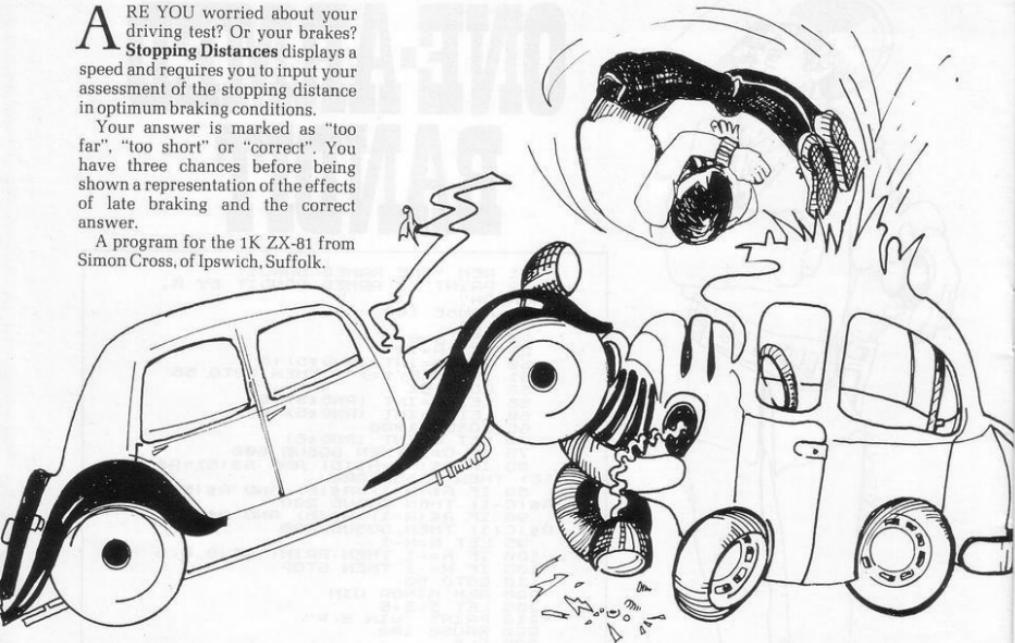
1 REM "ONE ARMED BANDIT"
2 PRINT "1 ARMED BANDIT BY A.
JACKSON"
3 PAUSE 100
400 CLS
500 LET S=0
501 LET N=10
502 LET A=INT (RND*5)+6
503 IF INKEY$(>)" " THEN GOTO 55
504 GOTO 51
505 LET B=INT (RND*5)+6
506 LET C=INT (RND*5)+6
507 GOSUB 1000
508 LET G=INT (RND*5)+7
509 IF G=1 THEN GOSUB 600
510 IF A$(A)=A$(B) AND A$(B)=A$(C) THEN GOSUB 300
511 IF A$(A)=A$(B) AND A$(B)=A$(C+1) THEN GOSUB 200
512 IF A$(A)=A$(B) AND A$(B)=A$(C-1) THEN GOSUB 200
513 LET N=N-1
514 IF N=-1 THEN PRINT AT 0,0;5
515 IF N=-1 THEN STOP
516 GOTO 50
520 REM MINOR WIN
525 LET S=5+5
526 PRINT "WIN 5 P"
527 PAUSE 100
528 CLS
530 RETURN
530 REM JACKPOT
535 PRINT AT 0,0;"JACKPOT"
536 LET K=10
537 PRINT AT 0,30;K
538 PAUSE 200
539 PRINT AT 0,0;"GAMBLE ?"
540 IF INKEY$="N" THEN LET S=+
541 IF INKEY$="Y" THEN RETURN
542 GOTO 330
543 LET L=INT (RND*2)
544 IF L=1 THEN LET K=K+5
545 IF L=0 THEN LET K=K-5
546 IF L=0 THEN RETURN
547 IF K>=50 THEN LET S=5+K
548 GOTO 330
549 REM START OF NUDGE
550 LET H=0
551 PRINT AT 0,0;"NUDGE ?"
552 IF INKEY$="A" THEN CLS
553 IF INKEY$="N" THEN RETURN
554 IF INKEY$="2" THEN LET A=A+
555 IF INKEY$="G" THEN LET A=A-
556 IF INKEY$="4" THEN LET B=B-
557 IF INKEY$="E" THEN LET C=C-
558 IF INKEY$="S" THEN LET B=B+
559 IF INKEY$="3" THEN LET C=C+
560 IF INKEY$(>)" " THEN LET H=H+
561 IF INKEY$(>)" " THEN GOSUB 10
562 IF H>=3 THEN RETURN
563 GOTO 504
564 IF K>=50 THEN RETURN
565 LET A$="ABCDEABCDEABCDE"
566 LET B$="ABCDEABCDEABCDE"
567 LET C$="ABCDEABCDEABCDE"
568 CLS
569 PRINT AT 7,16;"1 2 3"
570 A$(A+1) A$(B-1) A$(C-1)
571 A$(A+1) A$(B-1) A$(C-1)
572 A$(A+1) A$(B-1) A$(C-1)
573 A$(A+1) A$(B-1) A$(C-1)
574 A$(A+1) A$(B-1) A$(C-1)
575 A$(A+1) A$(B-1) A$(C-1)
576 PRINT AT 0,0;N,S
577 RETURN

```

ARE YOU worried about your driving test? Or your brakes? **Stopping Distances** displays a speed and requires you to input your assessment of the stopping distance in optimum braking conditions.

Your answer is marked as "too far", "too short" or "correct". You have three chances before being shown a representation of the effects of late braking and the correct answer.

A program for the 1K ZX-81 from Simon Cross, of Ipswich, Suffolk.



STOPPING DISTANCE

```

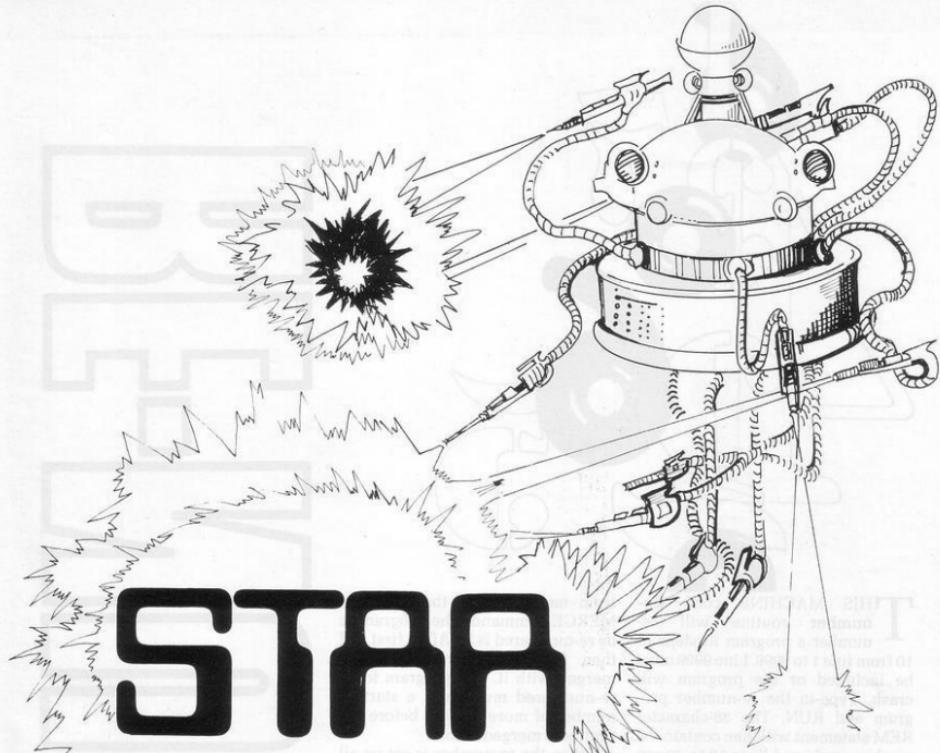
5  CLS
10  LET A=0
20  LET B=10#INT (RND#7)
30  IF B<20 THEN GOTO 20
40  LET C=B+(B-20)/10*.5*B+B
50  PRINT "WHAT IS THE MINIMUM
STOPPING"
60  PRINT "DISTANCE IN FEET FOR
A CAR"
70  PRINT "TRAVELLING AT ";B;""
M.P.H.
80  INPUT D
90  FOR N=5 TO 7
100 PRINT AT N,0;".."
110 NEXT N
120 PRINT AT 5,0;D;" FEET"
130  LET A=A+1
140  IF C>D THEN GOTO 300
150  PRINT AT 7,0;"WRONG-";
160  IF C>D THEN PRINT "TOO FAR,
170  IF D>C THEN PRINT "TOO SHOR
T-";
180  IF A=3 THEN GOTO 210
190  PRINT "TRY AGAIN"
200 GOTO 80

```

```

210  LET A$=" "
220  LET B$=" "
230  PRINT AT 9,17;A$;AT 10,16;B
$;AT 9,1;A$;AT 10,0;B$;
240  FOR N=0 TO 40
250  NEXT N
260  PRINT AT 9,3;A$;AT 10,2;B$;
AT 9,5;A$;AT 10,4;B$;AT 9,7;A$;
270  AT 9,6;B$;AT 9,9;A$;AT 10,8;B$;
AT 9,11;A$;AT 9,0;10;B$;AT 9,13;A$;
AT 9,15;B$;AT 9,15;A$;AT 10,14;
B$;AT 9,17;" ";AT 10,16;" ";
280  CRUNCH;
270  PRINT
280  PRINT "CORRECT ANSWER = ";C
290  FEED 338
298  GOTO 338
300  IF A>1 THEN LET A$=" TRIES"
310  LLIST A=1 THEN LET A$=" TRY
320  PRINT AT 10,0;"CORRECT. YOU
NEEDED ";A;A$;
330  PRINT AT 13,0;"PRESS N/L FO
R ANOTHER GO"
340  INPUT R#
350  RUN

```



STAR BATTLE

```

1 PRINT AT 21,0; "-----"
2 PRINT AT 20,0; "AAAAAAAAAAAAAA"
3 LET G=161
4 LET W=161
10 REM "STAR BATTLE"
10 LET A=10
10 LET B=INT (RND#21)
35 PRINT AT A-1,5;""
40 PRINT AT A,5;CHR$ 5;CHR$ 0;
CHR$ 134
40 PRINT AT A+1,5;""
40 PRINT AT B-1,25;""
40 PRINT AT B,25;CHR$ 5;CHR$ W
;CHR$ 134
50 PRINT AT B+1,25;""
50 LET C=INT (RND#5)
70 IF C=2 THEN GOSUB 260
80 IF INKEY$="0" THEN GOSUB 19
90 IF INKEY$="?" THEN LET A=A-
100 IF INKEY$="6" THEN LET A=A+
110 IF C=0 THEN LET B=B-1

```

FLIGHT the dreaded Ganglions in **Star Battle**. It is desperate hand-to-tentacle combat, an eyeball-to-eyestalk confrontation, fighting tooth and claw.

On the right is your omnivorous opponent, every pulsing pseudopod clutching a laser. You and it can sustain five hits before imploding in airless outer space. Go up with 7, down with 6, and fire the laser with 0.

Sent by Michael Jennings, of Barnsley, Yorkshire for the expanded ZX-81.



THIS MACHINE code **Re-number** routine will re-number a program in steps of 10 from line 1 to 9999. Line 9999 must be included or the program will crash. Type-in the re-number program and RUN. The 38-character REM statement will then contain the machine code and lines 10 to 40 can be deleted.

Then you can type-in your program, not forgetting to put in line 9999 as the last number. Any time you want to re-number, type-in as a direct command PRINT USR 16514.

The routine for the ZX-81 was sent in by J. Stephenson of Bolton.

A similar program for the Spec-

trum makes use of the Spectrum MERGE command. The program to be re-numbered is LOADED first and then the re-number program is merged with it. The program to be re-numbered must have a starting number of more than 10 before the routine is merged with it.

When the re-number is set up all you have to do is run it. You will be asked to enter the start line you want and the required increment. When it has finished re-numbering, the program will STOP.

The program, submitted by W J Steen, of Halesowen, West Midlands, will not re-number GOTOS or GOSUBs.

ZX81

```

1 REM 12345678901234567890123
456789012345678
10 LET A$="217D40110A0046234E2
B3E278820043E0DB9C8722373234E234
62309873E0R3B3001145F18E0"
20 FOR R=A TO 37
30 POKE 15514+R,16#CODE A$(A#2
+1)+CODE A$(A#2+2)-476
40 NEXT A

```

SPECTRUM

```

1 INPUT " start line and inc
rement ? ",SL,IN: LET A=PEEK
23635+256#PEEK 23636
2 IF (256#PEEK A#PEEK (A+1))=
SL THEN GO TO 4
3 LET A=A+4#PEEK (A+2)+256#PE
EK (A+3): GO TO 2
4 LET A=A+4#PEEK (A+2)+256#PE
EK (A+3): LET SL=SL+IN
5 IF A=(PEEK 23627+256#PEEK
23628) THEN STOP
6 POKE A,INT (SL/256): POKE (A+1),SL-INT (SL/256): GO TO 4

```

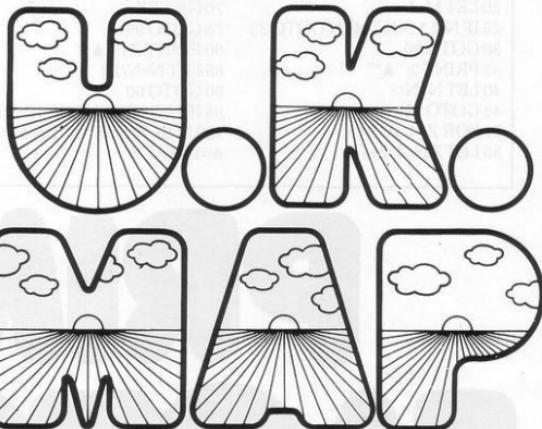


WORLDWIDE JOHNSON
A
and others, now oblique
diagonal orientation, draw
out the entire grid of 100 squares
so that each square, including the
one near the top-left, contains a
square area of 10x10, representing
a 10x10-mile square, and each
square contains a 10x10-mile square.



A USEFUL program for helicopter pilots and long-distance crows, is how D G Chapman describes his **U.K. Map** routine for the 1K ZX-81. AA handbooks and the like generally list towns with a four-figure reference number which refers to the 10-kilometre squares which make up the National Grid.

Input a pair of those numbers—e.g., SK57NW32—and the computer will calculate the distance in miles between the south-west corners of the relevant squares.



```

10 LET A$="SUSRSH      NUNRNHNGN
B$XSSSSNSHSCNXNSNNHNGSYSTSSUSDN
YNTNONJNDZSUSPSKSENZNU  NK  TUT
GTHTFTA      TRHTG"
20 INPUT B$           "
30 LET C$=B$(CODE "A") TO CODE
" "
40 GOSUB CODE "COS "
50 LET M=N
60 LET D=C
70 LET C$=B$(CODE "B") TO CODE
" "
80 GOSUB CODE "COS "
90 LET V=RBS ((M-N)*CODE "B"+V
AL B$(CODE "B")-VAL B$(CODE "B"))
100 LET H=RBS ((D-C)*CODE "B"+V
AL B$(CODE "B")-VAL B$(CODE "B"))
110 PRINT INT (50R (V*#2+H*#2))
*#21;" M ";B$(1 TO 4);;" TO ";
B$(5 TO 8)
120 STOP
130 FOR N=CODE "A" TO 107 STEP
CODE "B"
140 IF C$=R$(IN TO N+CODE "B") T
HEN GOTO 230
150 NEXT N
160 FOR C=CODE "A" TO CODE "B"
170 IF N=C THEN GOTO 27
180 LET N=N-CODE "B"
190 NEXT C
200 RETURN

```

```

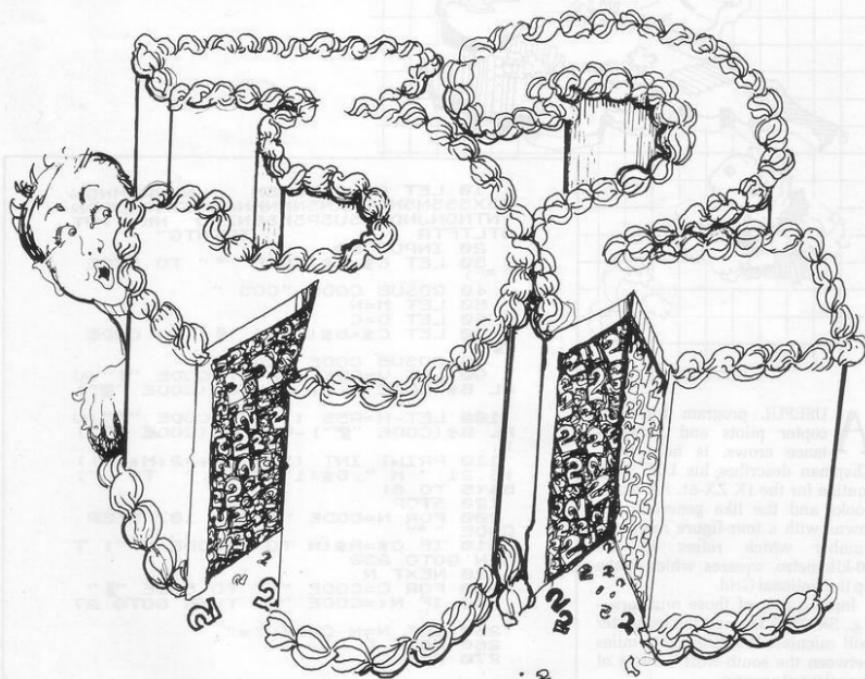
5 REM PRIME FACTORS: JDA
10 INPUT N
20 LET M=N
25 IF N/2 * 2=N THEN GOTO 35
30 GOTO 50
35 PRINT 2; "▲**"
40 LET N=N/2
45 GOTO 25
50 FOR Z=1 TO M/4
55 LET Z1=Z*2+1
60 IF (N/Z1)*Z1=N THEN GOT 80
65 IF N=1 THEN GOTO 95
70 NEXT Z
75 GOTO 95
80 PRINT Z1;"▲**"
85 LET N=N/Z1
90 GOTO 60
95 IF N=M THEN PRINT "PRIME"
100 IF M-N THEN PRINT "=▲";N
▲=1 SPACE

```

ALL SCHOOLCHILDREN could do with friendly help with mathematics especially when trying to find the prime factors of a number. **Prime Factors** runs on an unexpanded ZX-80 and, with a few lines changed, will run on a ZX-81.

The ZX-81 version needs an integer statement at lines 25 and 65. The author, James Annan, of Edinburgh, says that it will not run on the unexpanded ZX-81 but surely at least one reader will find a way.

PRIME FACTORS





POST MAN

POST MAN is one of those games which are so silly that they are good. You are a postman collecting mail from a post box at screen centre but obstructed by a hungry hound in the execution of your duty.

Fortunately, you can out-run the carnivorous canine—you are an express deliverer—and are able to score with every collection you collect.

Control the post man with the usual cursor keys and when you are caught, the number of collections made is displayed.

Submitted by Nicholas Sheard, of Prestbury, Cheshire, for a 1K ZX-81. Graphics Notes:
 20 - Graphic 8, U, space, space, Graphic 4, 1.
 120 - U, graphic 5.

```

10 PRINT "G      POSTMAN"
20 PRINT "U      "
30 PRINT "D      DOG"
40 PAUSE 100
50 LET S=0
60 LET A=0
70 LET A=INT (RND#*10) #3
80 LET B=1
90 LET C=0
100 LET D=0
110 PRINT AT A,B,"O"
120 PRINT AT A+5,B-1,"U"
130 PRINT AT A+2,B+1,"L"
140 PRINT AT C-1,D,"P"
150 PRINT AT C,D,"C"
170 IF A=10 AND B=15 THEN LET S
=+1
180 IF A=C AND B=D THEN PRINT "P
ROWL...YOU DELIVERED ";S;" LETT
ERS."
190 PRINT AT 11,15;"U"
200 LET S=S+2+1:INKEY#=("8")-8+1
210 LET A=A+2+1:INKEY#=("6")-8+1
220 IF C>A THEN LET C=C+1
230 IF C>B THEN LET C=C-1
240 IF D>B THEN LET D=D-1
250 IF D>B THEN LET D=D+1
260 CLS
270 GOTO 110
  
```

OME OF the best graphics we have seen are the striking feature of this reaction game for the 16K ZX-81.

D G Lomas, of Dukinfield, Cheshire, who submitted **Outlaw**, has managed to achieve something approaching the effect of a slow animated film by drawing and re-drawing the outlaws as they fall dead.

There are five of the villians who reach for their guns in a random order. Your task is to press the appropriate key before they can kill you. The pleasure of shooting first is enhanced by those fine graphics.

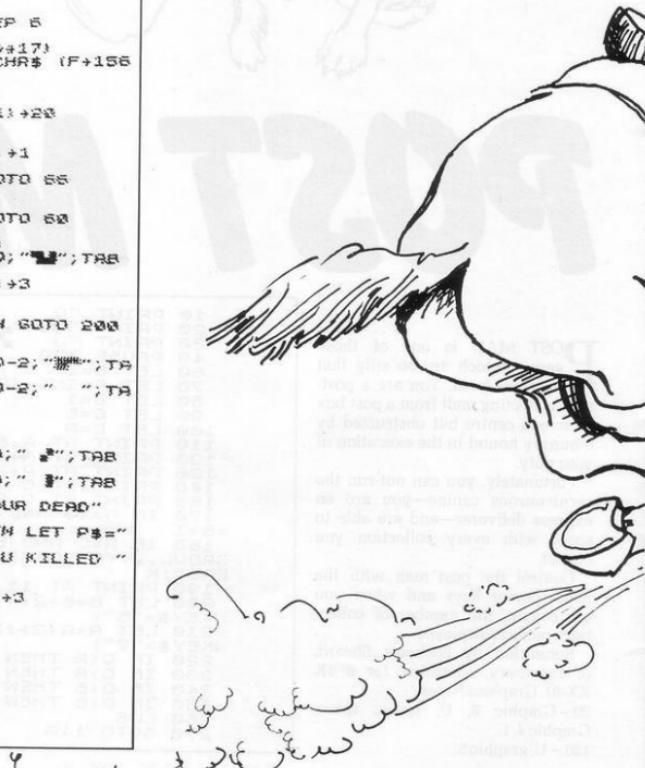
Graphic Notes:

359 - Graphic shifted 1, graphic shifted 2.

1010 - PRINT AT X([F]+I, Y; A & (I).

```
1  RAND
5  LET F=0
6  LET N=0
7  DIM X(5)
8  DIM A$(5)
10  DIM A$(4, 5)
12  LET A$(1) = " "
14  LET A$(3) = " "
16  LET A$(4) = " "
20  FOR Y=2 TO 26 STEP 5
22  LET F=F+1
25  LET X(F)=INT (RND+17)
30  LET A$(2) = " " + (CHR$(F+156)
31  GOSUB 1000
50  NEXT Y
51  LET W=INT (RND+713+28
52  FOR S=1 TO 4
54  NEXT S
55  LET T=INT (RND+5)+1
56  FOR R=1 TO 5
57  IF A(R)=0 THEN GOTO 66
58  NEXT R
66  GOTO 162
67  IF A(T)=1 THEN GOTO 68
68  LET A(T)=1
69  LET B=2+(5*(T-1))
70  PRINT AT X(T)+2, 0; " "; TAB
71  PRINT AT X(T)+2, 0-2; " "; TAB
72  LET L=INT (RND+5)+3
73  LET T#=2*TR$ T
74  FOR R=1 TO T#
75  IF INKEY$=ET$ THEN GOTO 200
76  NEXT R
77  FOR U=1 TO 5
78  PRINT AT X(T)+2, 0-2; " "; TAB
79  PRINT AT X(T)+2, 0; " "; TAB
80  PRINT AT X(T)+2, 0-2; " "; TAB
81  PRINT AT X(T)+2, 0; " "; TAB
82  PRINT AT X(T)+2, 0; " "; TAB
83  PRINT AT X(T)+2, 0; " "; TAB
84  PRINT AT X(T)+2, 0; " "; TAB
85  PRINT AT X(T)+2, 0; " "; TAB
86  PRINT AT X(T)+2, 0; " "; TAB
87  PRINT AT X(T)+2, 0; " "; TAB
88  PRINT AT X(T)+2, 0; " "; TAB
89  PRINT AT X(T)+2, 0; " "; TAB
90  PRINT AT X(T)+2, 0; " "; TAB
91  PRINT AT X(T)+2, 0; " "; TAB
92  PRINT AT X(T)+2, 0; " "; TAB
93  PRINT AT X(T)+2, 0; " "; TAB
94  PRINT AT X(T)+2, 0; " "; TAB
95  PRINT AT X(T)+2, 0; " "; TAB
96  PRINT AT X(T)+2, 0; " "; TAB
97  PRINT AT X(T)+2, 0; " "; TAB
98  PRINT AT X(T)+2, 0; " "; TAB
99  PRINT AT X(T)+2, 0; " "; TAB
100  PRINT AT X(T)+2, 0; " "; TAB
101  PRINT AT X(T)+2, 0; " "; TAB
102  PRINT AT X(T)+2, 0; " "; TAB
103  PRINT AT X(T)+2, 0; " "; TAB
104  PRINT AT X(T)+2, 0; " "; TAB
105  PRINT AT X(T)+2, 0; " "; TAB
106  PRINT AT X(T)+2, 0; " "; TAB
107  PRINT AT X(T)+2, 0; " "; TAB
108  PRINT AT X(T)+2, 0; " "; TAB
109  PRINT AT X(T)+2, 0; " "; TAB
110  PRINT AT X(T)+2, 0; " "; TAB
111  PRINT AT X(T)+2, 0; " "; TAB
112  PRINT AT X(T)+2, 0; " "; TAB
113  PRINT AT X(T)+2, 0; " "; TAB
114  PRINT AT X(T)+2, 0; " "; TAB
115  PRINT AT X(T)+2, 0; " "; TAB
116  PRINT AT X(T)+2, 0; " "; TAB
117  PRINT AT X(T)+2, 0; " "; TAB
118  PRINT AT X(T)+2, 0; " "; TAB
119  PRINT AT X(T)+2, 0; " "; TAB
120  LET D=INT (RND+4)+3
121  LET N=N+1
122  LET F=F
123  LET Y=2+(5*(T-1))
124  GOSUB 51
125  LET A$(2) = " "
126  LET A$(1) = " "
127  LET A$(3) = " "
128  LET A$(4) = " "
129  GOSUB 1000
```

OUTLA





```
315 LET A$(1) = " "
316 LET A$(2) = " "
318 LET A$(3) = " "
320 LET A$(4) = " "
322 GOSUB 1000
325 LET A$(1) = " "
328 LET A$(2) = " "
330 LET A$(3) = " "
332 LET A$(4) = " "
335 LET A$(1) = " "
337 LET A$(2) = " "
339 LET A$(3) = " "
340 GOSUB 1000
345 LET A$(4) = " "
350 GOSUB 1000
355 LET X(T1) = X(T1)+3
357 LET A$(3) = " "
359 LET A$(4) = " "
360 PRINT AT X(T1),Y; " "
365 GOSUB 1000
370 LET A$(1) = " "
372 LET A$(2) = " "
374 LET A$(3) = " "
376 LET A$(4) = " "
378 GOSUB 1000
380 LET A$(1) = " "
382 LET A$(2) = " "
384 LET A$(3) = " "
386 LET A$(4) = " "
388 GOSUB 1000
390 RETURN
4000 LET A$(1) = " "
4001 LET A$(2) = " "
4002 LET A$(3) = " "
4003 LET A$(4) = " "
4100 GOSUB 1000
4101 LET A$(1) = " "
4102 LET A$(2) = " "
4103 LET A$(3) = " "
4104 LET A$(4) = " "
4105 FOR U=1 TO 6
4106 NEXT U
4107 GOSUB 1000
4108 LET A$(1) = " "
4109 LET A$(2) = " "
4110 LET A$(3) = " "
4111 LET A$(4) = " "
4112 PRINT AT X(T1),Y; " "
4113 FOR U=1 TO 6
4114 NEXT U
4115 GOSUB 1000
4116 RETURN
4200 LET A$(1) = " "
4201 LET A$(2) = " "
4202 LET A$(3) = " "
4203 LET A$(4) = " "
4204 GOSUB 1000
4205 LET A$(1) = " "
4206 LET A$(2) = " "
4207 LET A$(3) = " "
4208 LET A$(4) = " "
4209 FOR U=1 TO 6
4210 NEXT U
4211 GOSUB 1000
4212 LET A$(1) = " "
4213 LET A$(2) = " "
4214 LET A$(3) = " "
4215 LET A$(4) = " "
4216 PRINT AT X(T1),Y; " "
4217 FOR U=1 TO 6
4218 NEXT U
4219 GOSUB 1000
4220 LET A$(1) = " "
4221 LET A$(2) = " "
4222 LET A$(3) = " "
4223 LET A$(4) = " "
4224 GOSUB 1000
4225 LET A$(1) = " "
4226 LET A$(2) = " "
4227 LET A$(3) = " "
4228 LET A$(4) = " "
4229 FOR U=1 TO 6
4230 NEXT U
4231 GOSUB 1000
4232 LET A$(1) = " "
4233 LET A$(2) = " "
4234 LET A$(3) = " "
4235 LET A$(4) = " "
4236 PRINT AT X(T1),Y-1; " "
4237 GOTO 1000
4238 RETURN
4300 LET A$(1) = " "
4301 LET A$(2) = " "
4302 LET A$(3) = " "
4303 LET A$(4) = " "
4304 GOSUB 1000
4305 LET A$(1) = " "
4306 LET A$(2) = " "
4307 LET A$(3) = " "
4308 LET A$(4) = " "
4309 FOR U=1 TO 6
4310 NEXT U
4311 GOSUB 1000
4312 LET A$(1) = " "
4313 LET A$(2) = " "
4314 LET A$(3) = " "
4315 LET A$(4) = " "
4316 PRINT AT X(T1),Y-1; " "
4317 GOSUB 1000
4318 LET A$(1) = " "
4319 LET A$(2) = " "
4320 LET A$(3) = " "
4321 LET A$(4) = " "
4322 FOR U=1 TO 6
4323 NEXT U
4324 GOSUB 1000
4325 LET A$(1) = " "
4326 LET A$(2) = " "
4327 LET A$(3) = " "
4328 LET A$(4) = " "
4329 PRINT AT X(T1),Y+3; " "
4330 GOSUB 1000
4331 RETURN
4332 FOR I=1 TO 4
4333 PRINT AT X(IF)+I,Y; A$(I)
4334 NEXT I
4335 RETURN
```



SKY SHOOT



SKY SHOOT for the Spectrum is a kind of target shoot against the clock.

You have four targets—which you must destroy in an unreasonably short time.

```

1 CLS : BORDER 4: BEEP .25,3:
BEEP .5,4: BEEP .25,3: PRINT IN
K 2;"  

"AT 1,0;" SHOOT "  

"AT 2,0;"  

2 PRINT AT 5,0; INK 0; "Use W  

to move right", "Use S to move le  

ft", "Use A to fire",  

3 PRINT AT 16,1; "PRESS ANY KE  

Y TO START"  

4 PAUSE 0  

5 CLS  

9 BORDER 1  

10 LET s=10: LET d=0: LET a=1  

10 LET g=q: LET c=d: LET d=g  

50 LET e=d+d: LET f=e+d: LET g  

=e+d: LET h=g+f  

70 LET i=17: LET j=q: LET k=a  

190 CLS  

195 PRINT AT 4,b; INK 2;"  

200 PRINT AT c,d; "*" AT c,f;"  

AT c,e;" AT c,g;"  

210 PRINT AT g,a,b; INK 3;"  

220 PRINT AT s,s;"  

230 PRINT AT s,s;"  

240 PRINT AT i,s;"  

242 LET h=h+1  

244 IF i=c AND s=a=e OR i=c AND  

s+a=e THEN LET j=j+1  

245 IF i=c AND s+a=e THEN PRINT  

INK 1,AT c,e;"  

246 IF i=c AND s+a=e THEN PRINT  

INK 1,AT c,e;"  

247 IF i=c AND s+a=e THEN PRINT  

INK 1,AT c,e;"  

248 IF i=c AND s+a=e THEN PRINT  

INK 1,AT c,e;"  

250 IF i=c THEN GO TO 350

```

```

255 IF j=4 THEN GO TO 1000
258 IF s=5? THEN LET s=2?
257 IF s=6? THEN LET s=0
260 IF INKEY$="9" THEN LET s=s-
3 270 IF INKEY$="1" THEN LET s=s+
3 280 IF INKEY$="0" THEN LET i=i-
3 290 IF i=55 THEN GO TO 2000
300 GO TO 210
350 LET g=e+1
400 PRINT AT 21,0; "You have tak  

en"; g; "shots"  

402 PRINT AT 3,0; INK 0; "TIME  

ELAPSED TIME: "; g; "SECONDS"  

404 LET i=17
405 FOR n=1 TO 20
406 NEXT n
407 GO TO 210
1000 BORDER 2: PAPER 7: CLS
1001 PRINT AT 1,0; INK 1;"  

1002 PRINT AT 3,0; INK 2;"  

1010 PRINT AT 5,0; INK 1;"  

1011 PRINT AT 9,0; INK 0;"  

1012 INPUT a$  

1030 IF a$="Y" OR a$="Y" THEN GO  

TO 5 STOP
1035 PAUSE 100: CLS
10002 PRINT AT 5,0; INK 2;"  

10003 /4,0; SHOT"  

2004 PRINT AT 7,0; INK 0;"  

2005 PRINT AT 11,0; INK 1;"  

2006 PRINT AT 15,0; INK 1;"  

2007 INPUT a$  

2030 IF a$="Y" OR a$="Y" THEN GO  

TO 5

```

Move left with 1, right with q and fire with 0.

A challenging game from David Price of Glenfields, Caerphilly, which proved too difficult for your fast-fingered reviewer.



SCOFFER

SCOFFER is a version of the Pac-Man game for the unexpanded ZX-81 and it is difficult. Move yourself around with the usual cursor keys to avoid the intelligent spooks which try their best to

corner you. Their best is always good enough.

Sometimes they approach from opposite sides, sometimes they corner you, and sometimes they will merge and chase you in tandem. A

final score is displayed and any key will re-start.

From Mark Blackwood, of Essington, West Midlands. Graphics notes:

6—Thirteen inverse full-stops.

```

1 LET A=INT PI
20 LET B=VAL "12"
30 LET C=VAL "2"
40 LET S=S-B
50 FOR F=S TO L
60 PRINT "-----"
70 NEXT F
80 DIM X(A)
90 LET Y(A)=A
100 FOR F=B/8 TO B
110 LET X(F)=INT (RND+L)
120 LET Y(F)=INT (RND+L)
130 NEXT F
140 FOR F=B/8 TO B
150 PRINT AT X(F),Y(F);CHR$ 128
160 LET Y(F)=Y(F)+SGN (Y(A))-Y(F)
170 LET X(F)=X(F)+SGN (X(A))-X(F)
  
```

```

18 PRINT AT X(A),Y(A);CHR$ 147
19 PRINT AT X(F),Y(F);CHR$ 192
20 LET X(F)=X(A) AND Y(F)=Y(A)
THEN GOTO A+1
21 NEXT F
22 PRINT AT X(A),Y(A);CHR$ 128
23 LET X(A)=X(A)+(INKEY$="5") A
ND Y(A)=L)-(INKEY$="6") AND X(A)=
L\,L)
24 LET Y(A)=Y(A)+(INKEY$="8") A
ND Y(A)=L)-(INKEY$="5") AND Y(A)=
L\,L)
25 IF INKEY$="" THEN LET S=S+
A
26 GOTO VAL "14"
27 PRINT S
28 PAUSE L*#A
29 CLS
30 RUN
  
```

```

R 1 REM SURROUND BY J.WINCHESTE
5 LET SX=0
6 LET SB=0
7 LET D=PEEK 16398+256+PEEK 11
5397
18 POKE 16418,8
20 PRINT AT 0,0,"*****"
21 FOR P=1 TO 22
22 PRINT " "
23 NEXT P
24 PRINT "/*****"
25 PRINT AT 2,2;STR$ SX;AT 2,2
26 STR$ SB
27 LET X=12
28 LET Y=3
29 LET C1=2
30 LET C2=23
31 LET X1=8
32 LET Y1=1
33 LET B1=8
34 LET C1=-1
35 IF PEEK 10+1+Y+33+X) <> 0 THE
N GOTO 480
36 IF PEEK 10+1+C+23+B) <> 0 THE
N GOTO 300
37 PRINT AT X,Y;"#";AT 8,C;"##"

```

```

180 LET A=PEEK 16421
185 IF A=2038 OR A=2222 OR A=190
OR A=254 OR A=126 THEN LET X1=1
190 IF A=247 OR A=231 OR A=218
OR A=182 OR A=1118 THEN LET X1=-1
195 IF X1<>0 THEN LET Y1=1
200 IF A=238 OR A=218 THEN LET Y1=-1
205 IF A=167 OR A=125 THEN LET Y1=1
210 IF A=237 OR A=221 OR A=253
OR A=180 OR A=125 THEN LET Y1=-1
215 IF Y1<>0 THEN LET X1=1
220 IF A=37 OR A=33 OR A=39 OR A=35
OR A=37 OR A=38 THEN LET S1=1
225 IF A=118 OR A=123 OR A=126
OR A=125 OR A=127 THEN LET S1=1
230 IF B1<>0 THEN LET C1=0
235 IF A=215 OR A=219 OR A=223
OR A=221 OR A=227 OR A=245
240 IF A=183 OR A=187 OR A=189
OR A=191 OR A=190 THEN LET C1=-1
245 IF C1<>0 THEN LET S1=0
250 LET X=XX+1
255 LET Y=YY+1
260 LET C=C+C1
265 GOTO 150
270 LET SX=SX+1
275 IF SX>15 THEN GOTO 7
280 STOP
285 LET SB=SB+1
290 IF SB>15 THEN GOTO 7
300 IF SB=SB+1
310 IF SX>15 THEN GOTO 7
320 STOP
330 LET SB=SB+1
340 IF SB>15 THEN GOTO 7

```

SURROUND

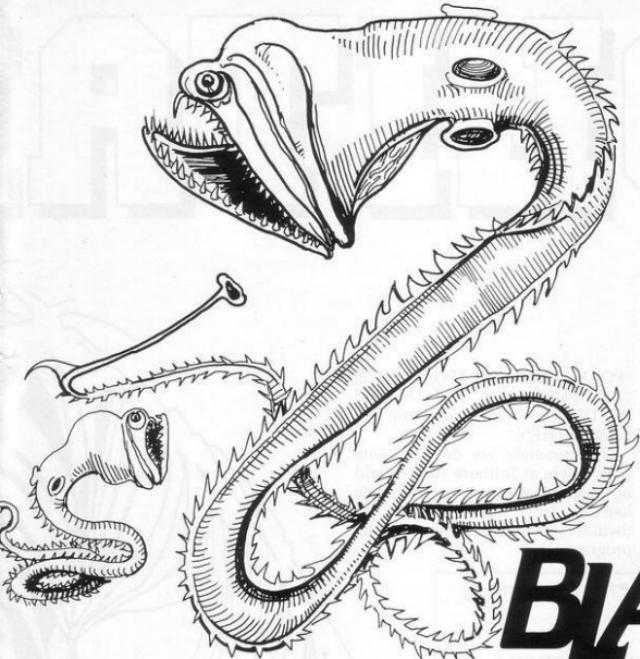


YOU WILL probably recognise **Surround** as soon as you RUN it. It is a version of a fairly standard routine in which you are required to surround your adversary before he can surround you. Both players are in continuous motion and are not allowed to cross their tracks or those of their opponent, or to hit the boundary or the score display.

What will surprise you is the way in which the ZX-81 can recognise two keys when pressed simultaneously. That is not possible using INKEY\$ and is achieved by utilising address 16421. This contains a number which changes as groups of keys are pressed. Lines 185 to 260 translate the number into a series of possible moves.

Black uses keys 1-5 to move up, Z-V to move down, Q-T for right and A-G for left. Grey uses the keys 6-0 for up, Y-P for right, B-M for down, and H-NEWLINE for left. After a crash the other player scores one; the winner is the first to reach 15.

The routine enabling two players to participate can obviously be used in many graphics games. J Winchester of London W13, submitted the program for the 16K ZX-81.



PUT YOUR finger on the laser fire button and get ready to fire because the Zags are on the way. They are nasty little creatures whose aim is to land on earth and colonise it.

Instructions are contained within the **Zag-blasters** program along with REM statements to show how the game works. As well as being fun to play, the game could also teach you how to write invader-type programs in Basic.

Zag-blasters was written by J Bedware and J Yeomans, of Solihull, West Midlands. The game will run on a 16K Spectrum.



ZAG BLASTERS

SOLITAIRE

HERE IS a version of **Solitaire** for the 16K ZX-81. The listing is very well done but so many checks are required for illegal moves that there is a lengthy pause between the display for each new position. See if you can condense it.

Line 1 contains the REM statement for the win routine. Enter it as listed, then type "POKE 16521, 126";

"POKE 16523, 118"; "POKE 16528, 119"; "POKE 16530, 120". LET and RETURN are listed by entering and deleting THEN.

Unfortunately we do not know how to win at Solitaire so we could not test the win routine. We have had to trust Mark Harper, of Swindon, Wiltshire, who sent the program.

```

1 REM EERNDS CHR$ *?? RETURN ?
2 Y$?;"?COS / LET
3 GOSUB 9000
4 GOTO 1000
5 SLOW
6 PRINT AT 20,0;"MOVE FROM?
7 ;
8 INPUT F$;
9 IF F$="" THEN GOTO 15
10 PRINT AT 20,9;" ",F$(1);","
11 F$(2);
12 PRINT " TO?";
13 INPUT T$;
14 IF T$="" THEN GOTO 30
15 PRINT AT 20,16;" ",T$(1);",
16 ;T$(2);
17 LET F=VAL F$(1)
18 LET G=VAL F$(2)
19 LET T=VAL T$(1)
20 LET U=VAL T$(2)
21 IF S(F,G)=-1 THEN GOTO 10
22 IF S(T,U)=-1 THEN GOTO 10
23 IF F=G AND T=U THEN GOTO 10
24 IF VAL F$>77 OR VAL T$>77 OR
25 VAL F$<11 OR VAL T$<11 THEN GO
26 TO 10
27 IF ABS (T-F)<>2 AND ABS (U-
28 )<>2 THEN GOTO 10
29 IF F<>T AND G<>U THEN GOTO
30
31 LET X$=STR$ ((VAL F$+VAL T$)
32 /2)
33 IF S(F,G)=0 THEN GOTO 10
34 IF S(T,U)=1 THEN GOTO 10
35 IF S(VAL X$(1),VAL X$(2))=0
36 THEN GOTO 10
37 FAST
38 LET S(F,G)=0
39 LET S(T,U)=1
40 LET S(VAL X$(1),VAL X$(2))=
41
42 LET C=C+1
43 IF C=32 AND S(4,4)=1 THEN G
44 GOTO 6000
45 GOTO 1000
46 FAST
47 CLS
48 PRINT " 1 2 3 4 5 6 7"
49 PRINT
50 FOR A=1 TO 7
51 PRINT A;" ";
52 FOR B=1 TO 7
53 PRINT B;" ";
54 IF S(A,B)=-1 THEN PRINT "
55 ";
56 
```



GRE

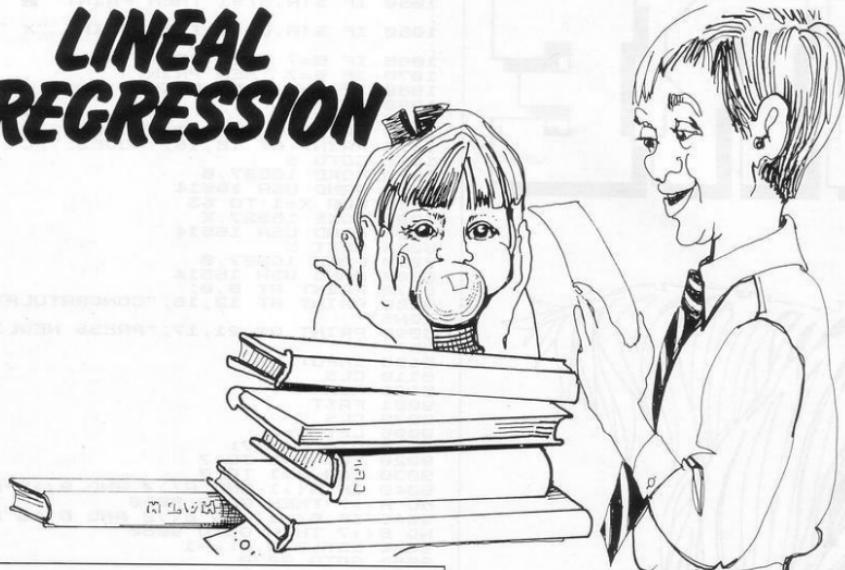


```

1050 IF S(A,B)=1 THEN PRINT " "
1060 IF S(A,B)=0 THEN PRINT "X "
1065 IF B=7 THEN PRINT A;
1070 IF B=7 THEN PRINT
1080 IF B=7 THEN PRINT
1090 NEXT B
1100 NEXT A
1110 PRINT " 1 2 3 4 5 6 7"
1111 PRINT AT 18,16;"MOVES: ";C
1112 GOTO 6
6005 POKE 16527,0
6007 RAND USR 16514
6010 FOR X=1 TO 63
6020 POKE 16527,X
6030 RAND USR 16514
6040 NEXT X
6050 POKE 16527,0
6060 RAND USR 16514
6070 PRINT AT 0,0;
6080 PRINT AT 12,16;"CONGRATULAT
IONS"
6090 PRINT AT 21,17;"PRESS NEWL I
NE"
6100 INPUT N$
6110 CLS
6120 RUN
9001 FAST
9002 CLS
9005 LET C=0
9010 DIM S(7,7)
9020 FOR A=1 TO 7
9030 FOR B=1 TO 7
9040 IF A<>1 AND A<>6 AND
A<>7 THEN GOTO 9050
9045 IF B<>1 AND B<>2 AND B<>6 AND
B<>7 THEN GOTO 9060
9050 LET S(A,B)=-1
9055 GOTO 9070
9060 LET S(A,B)=1
9070 NEXT B
9080 NEXT A
9090 LET S(4,4)=0
9100 PRINT AT 18,10;"INSTRUCTION
S? Y/N"
9110 INPUT Z$
9120 IF Z$="N" THEN RETURN
9135 SLOW
9140 CLS
9150 PRINT " "
9160 PRINT "THE OBJECT OF TH
E GAME IS"
9170 PRINT "TO REMOVE ALL THE
PEGS"
9180 PRINT "EXCEPT THE LAST WH
ICH"
9190 PRINT "MUST FINISH IN THE
CENTRE"
9200 PRINT "SPACE."
9210 PRINT "SPACES ARE (X)."
9220 PRINT "YOU TAKE PIECES B
Y HOPPING"
9230 PRINT "OVER THEM INTO AN E
MPTY SPACE."
9240 PRINT "BEYOND, REMOVING FRO
M PLAY THE"
9250 PRINT "PIECE YOU HAVE HOP
ED OVER."
9270 PRINT "EACH MOVE MUST B
E MADE IN A"
9280 PRINT "STRAIGHT LINE."
9310 PRINT "THE COMPUTER WILL
NOT"
9320 PRINT "ACCEPT ILEGAL MOV
ES."
9330 PRINT " "
9340 PRINT AT 21,17;"PRESS NEWL I
NE"
9350 INPUT N#
9360 RETURN
9410 SAVE "SOLITAIRE"
9420 PRINT AT 10,10;"SOLITAIRE"
9430 FOR X=1 TO 100
9440 NEXT X
9450 CLS
9460 RUN

```

LINEAL REGRESSION



```

1 REM "LR"
2 LET A=0
3 LET B=0
4 LET C=0
5 LET D=0
6 LET E=0
7 LET H=0
90 PRINT "HOW MANY PAIRS OF NUMBERS?"
100 INPUT N
105 CLS
110 PRINT "INPUT X THEN Y."
120 INPUT X
130 INPUT Y
135 CLS
140 LET A=A+X
150 LET B=B+Y
155 LET C=C+X*X
170 LET D=D+Y*Y
180 LET E=E+X*Y
190 LET F=R/N
200 LET G=B/N
210 LET H=H+1
220 IF H>N THEN GOTO 110
225 LET I=(N*E-A*B) / (N*C-A*B)
230 LET J=G-I*F
290 PRINT "Y=";J;"+";I;"X"
300 LET K=(N*E-A*B) / (N*D-B*C)
310 LET L=F-K*G
320 PRINT "X=";L;"+";K;"Y"
330 LET P=SQR (D/(N-1) - (B*B)/(N*(N-1)))
340 LET Q=SQR (C/(N-1) - (A*A)/(N*(N-1)))
350 PRINT "X SIGMA (N-1) = ";Q
360 PRINT "Y SIGMA (N-1) = ";P
370 LET U=SQR (((1/N)*C) - F*F)
380 LET R=SQR (((1/N)*D) - G*G)
390 PRINT "X SIGMA (N) = ";Q
400 PRINT "Y SIGMA (N) = ";R
410 LET S = ((1/N)*E - (F*G)) / (Q*R)
420 PRINT "CORRELATION COEFFICIENT (R) = "
430 PRINT "R=";S
440 PRINT "STANDARD ERROR OF ESTIMATE"
450 PRINT "S(Y) = ";R+SQR (1-S*S)
460 PRINT "S(X) = ";Q+SQR (1-S*S)

```

IF YOU are struggling with mathematics homework, **Lineal regression** calculates those tricky problems using the ZX-81. It relates both x to y and y to x, as well as giving the probable errors involved.

From Martyn Whitwood, of Rotherham, South Yorkshire.

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The world of Sinclair computers is fast-moving, with new developments almost daily. During the months since its launch in April, *Sinclair User* has attempted to keep you up-to-date with all that has been happening.

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The First Sinclair User Annual will be available from all the usual newsagents, price £1.50, from the beginning of December.

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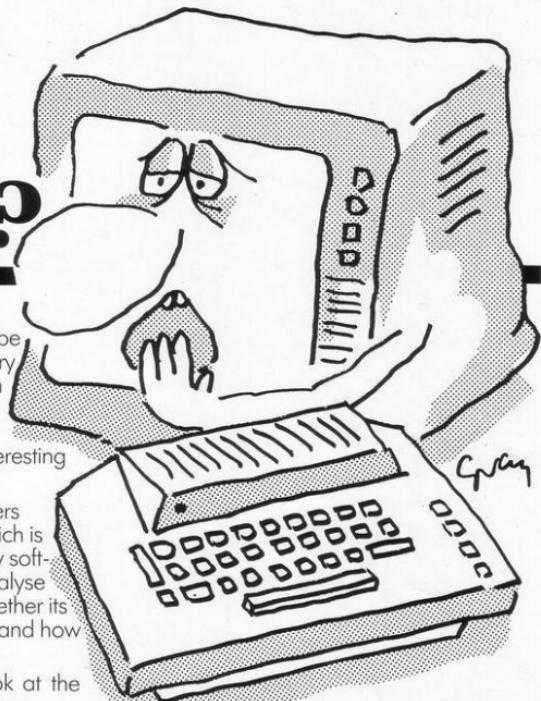
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We also take a long look at the new cash flow forecasting package CASHFAX. Every month we tell you what's available, what's in the pipeline and what's right for you—over a range of software for home, business and school users.

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we put two British micros under the microscope—the new 64K MIMI 802, which made us wonder whether British could be best again. And the £89.95 JUPITER ACE which is not only very cheap, it's also the world's first micro to use FORTH. Does that make for speed, versatility and ease of programming—or should it have been left with the mainframes?

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THE A TO Z OF MICROS





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