

95p

Sinclair Programs

November/December

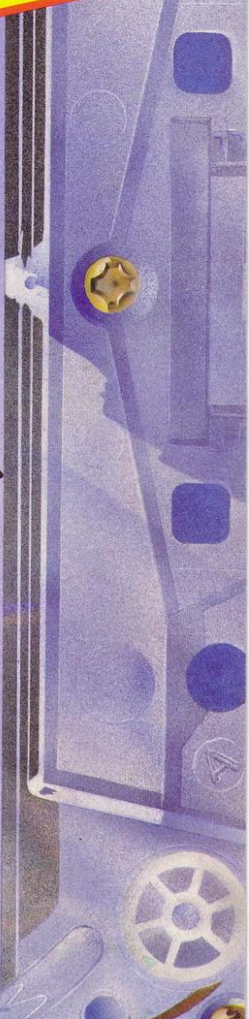
40 Programs for the Spectrum, ZX-81 and ZX-80

A *Spaceman, Detective, Ghost trekker
3-d hunt, Music machine, Spy plane
Sticks and stones, Binomial distribution*



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

sp C90



MICHAEL ORWIN'S ZX81 CASSETTES

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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. Rubythorn, 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

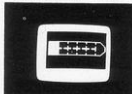
Cassette Two contains Reversi, Awari, Laser Bases, Word Mastermind, Rectangles, Crash, Roulette, Pontoon, Penny Shoot and Gun Command.

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 tulp 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.

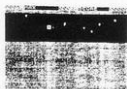
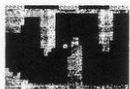
Cassette 3 costs £5.

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)

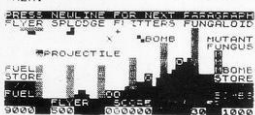


INVADERS

(machine code)



THE FUNGALOID ARE SPOILING AND WHEN THEY REACH THE SKY THEY PRODUCE DEADLY SPORES. YOU CONTROL A FLYER AND YOUR MISSION IS TO DESTROY THE FUNGALOID BY DROPPING ANTI-FUNGUS BOMBS ON THEM.



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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01-359 7481

If you would like to contribute to any of the Sinclair User group of publications please send programs, articles or ideas for hardware projects to:

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London N1 8BJ

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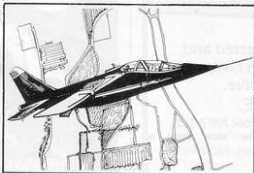
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Keith Duran

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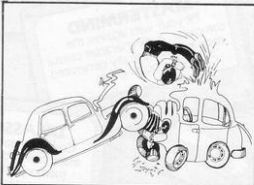


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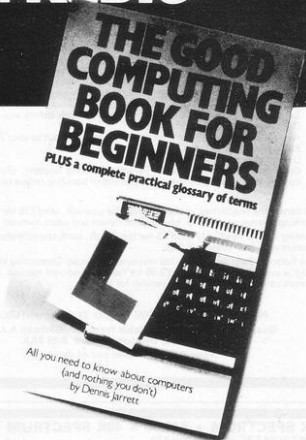
At long last, someone has written a book on computers that even Aunt Emily can understand.

That someone is none other than Dennis Jarrett: doyen of simple English and former Managing Editor of WHICH COMPUTER? and *Practical Computing*. And his book is called *The Good Computing Book for Beginners*.

If you're not a beginner, don't let the title put you off. Because this book provides a wonderful opportunity of clearing up any grey areas of your knowledge.

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computer-jargon mumbo-jumbo in a glossary of terms that's as comprehensive as you'll find anywhere.

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- 4** What's a personal computer? – new readers start here, because this is all you need to know: what can it do? What's available? And where do you buy a computer?
- 5** What to look for – how to buy a small computer, or at least how to avoid complete disappointment.
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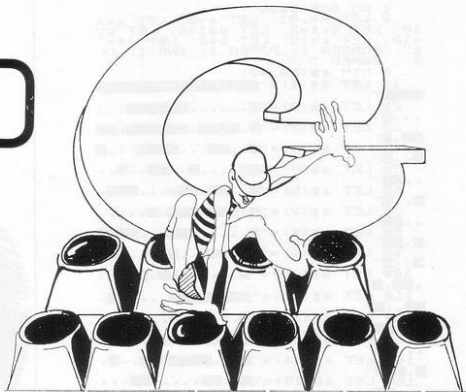
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19 WAYSIDE AVENUE, WORTHING, SUSSEX. BN13 3JU Telephone: (0903) 85691

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)"
INPUT A
10 IF A=1 THEN LET P=15
15 IF A=2 THEN LET P=22
16 CLS
17 LET S=0
18 LET N=0
20 LET M$=CHR$(INT (RND*25)+3)
8) 25 PRINT AT 11,0;"M"
30 FOR X=P TO 0 STEP -1
35 PRINT AT 11,X;M$;" "
37 IF INKEY$<>" " THEN GOTO 50
40 NEXT X
42 PRINT "NOT FAST ENOUGH"
45 GOTO 100
50 LET N$=INKEY$
55 IF N$=M$ THEN PRINT "YES"
60 IF N$<M$ THEN LET S=S+1
65 IF N$>M$ THEN PRINT "WRONG"
100 FOR Z=0 TO 50
105 NEXT Z
107 CLS
108 LET N=N+1
109 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 Pertersfield, 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
2 LET A=12
3 LET B=A
4 LET C=A
10 FOR D=1 TO 10
20 LET E=INT (RND*4)+12
30 FOR F=2 TO 12
40 PRINT AT 9,A;" " AT 10,
B;" " AT 11,C;" " AT F,E
50 LET A=A+(INKEY$="0")-(INKEY$="1")
60 LET B=B+(INKEY$="P")-(INKEY$="Q")
70 LET C=C+(INKEY$="A")-(INKEY$="NEWLINE")
104 FOR J=9 TO 11
105 IF F=J AND E=A+3 AND E=B+1
AND E=C+2 THEN LET G=G+1
106 NEXT J
110 PRINT AT F,E;" "
120 NEXT F
130 NEXT D
140 PRINT "SCORE=";INT (G/3)

```



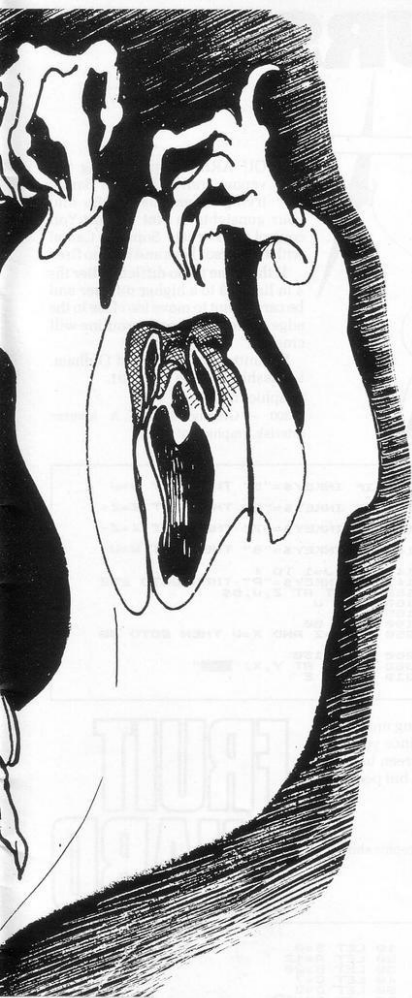
```

1 GO SUB 9000
2 LET R=0: LET S=0: LET SK=
10: LET SX1=0: LET SY1=0: LET SX
=10: LET X=10: LET Y=0: LET C$=""
3: BORDER 1: PAPER 1: INK 1: CL
S: PAPER 7
9 DIM A$(20,20)
10 LET A$(1)=""
11
12 LET A$(2)=""
13
14 LET A$(3)=""
15
16 LET A$(4)=""
17
18 LET A$(5)=""
19
20 LET A$(6)=""
21
22 LET A$(7)=""
23
24 LET A$(8)=""
25
26 LET A$(9)=""
27
28 LET A$(10)=""
29
30 LET A$(11)=""
31
32 LET A$(12)=""
33
34 LET A$(13)=""
35
36 LET A$(14)=""
37
38 LET A$(15)=""
39
40 LET A$(16)=""
41
42 LET A$(17)=""
43
44 LET A$(18)=""
45
46 LET A$(19)=""
47
48 LET A$(20)=""
49
50 PRINT "FOR F=1 TO 20: PRI
NT "A$(F): NEXT
1000 LET A$(X,Y)=" "
1001 IF S=180 OR S=450 OR S=740
THEN LET S=S+100: PAPER 1: CLS:
GO SUB 7000: PAPER 1: CLS: PAP
ER 7: GO TO 10
1010 IF INKEY$="" THEN GO TO 105
5
1020 IF INKEY$="E" THEN LET D$="
"
1030 IF INKEY$="6" THEN LET D$="
"
1040 IF INKEY$="7" THEN LET D$="
"
1050 IF INKEY$="8" THEN LET D$="
"
1055 PRINT AT X,Y: " "
1060 IF D$="W" AND A$(X-1,Y)(">
" THEN LET X=X-1
1061 IF D$="E" AND A$(X+1,Y)(">
" THEN LET X=X+1
1062 IF D$="A" AND A$(X+1,Y)(">
" THEN LET X=X+1
1063 IF D$="S" AND A$(X,Y-1)(">
" THEN LET Y=Y-1
1064 PRINT AT X,Y: INK 0; D$
1070 IF A$(X,Y)="" THEN LET S=S
+1: PRINT AT 0,0;S: DEEP -1,-10
1080 PRINT AT SX,SY: A$(SX,SY): I
F INT (RND*2)+(GX1,X) AND A$(SX-1
,SY)("> THEN LET SX=SX-1
1090 IF INT (RND*2)+(GX1,X) AND A
$(SX+1,SY)("> THEN LET SX=SX+1
2000 IF INT (RND*2)+(GY1,Y) AND A
$(SX,SY-1)("> THEN LET SY=SY-1
2010 IF INT (RND*2)+(GY1,Y) AND A
$(SX,SY+1)("> THEN LET SY=SY+1
2015 PRINT AT SX,SY: INK 5; A
2020 IF (GX=X AND GY=Y) OR (SX1=
X AND SY1=Y) THEN PRINT AT X,Y:
FLASH 1,3: STOP
3000 PRINT AT SX1,SY1: A$(SX1,SY1
): IF INT (RND*2)+(GX1,X) AND A$
$(SX1-1,SY1)("> THEN LET SX1=SX
1-1
3000 IF INT (RND*2)+(GX1,X) AND
A$(SX1+1,SY1)("> THEN LET SX1=
SX1+1
3100 IF INT (RND*2)+(GY1,Y) AND
A$(SX1,SY1-1)("> THEN LET SY1=
SY1-1
3110 IF INT (RND*2)+(GY1,Y) AND
A$(SX1,SY1+1)("> THEN LET SY1=
SY1+1
3120 PRINT AT SX1,SY1: INK 4; "
3130 GO TO 1000
7000 FOR F=0 TO 25
7001 PRINT AT 10,29: INK 7; "O"
7010 PRINT AT -10,F: INK 9; " "
: INK 6; "A"
7020 BEEP -1,-15
7030 NEXT F

```



SPA



```

7035 BEEP -2,-20
7040 FOR F=25 TO 0 STEP -1
7050 PRINT AT 10,F: INK 5;" ";
      INK 6;" "
7055 BEEP 2,10
7060 NEXT F:CLS:RETURN
9099 STOP
9000 DATA 0,BIN 1000010,BIN 1110
0111,255,255,BIN 1111110,BIN 111
100,BIN 11000
9010 DATA BIN 000011100,BIN 1111
10,BIN 1111100,BIN 1111000,BIN 1
111000,BIN 111100,BIN 111110,BI
N 11100
9020 DATA 0,BIN 00011000,BIN 001
11100,BIN 01111110,255,255,BIN 1
110011,BIN 01000010,0
9030 DATA BIN 001110000,BIN 0111
11000,BIN 001111100,BIN 00011111
0,BIN 000111110,BIN 001111100,01
N 01111000,BIN 001110000
9035 DATA 24,50,125,219,219,255,
219,145
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 "V"+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 "A"+F,A: NEXT F
9080 RETURN

```

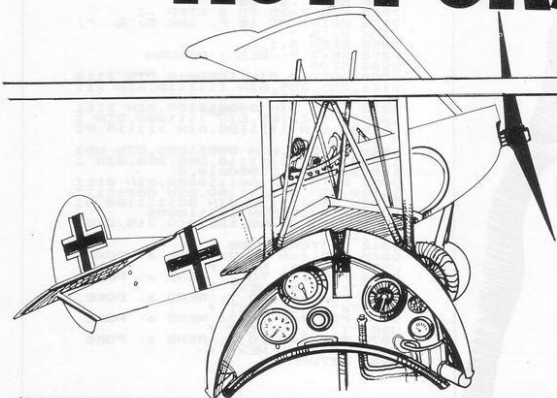
SPACMAN is a good version of the perennial Pacman from S J Stearn of Harpenden, Herts, for the 16K Spectrum.

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.

PACMAN

HOT PURSUIT



YOU ARE bumping along the vapour trail of the Red Baron, trying to manoeuvre him into your gunights in **Hot Pursuit**. You control your trusty Sopwith Camel with the cursor keys and hit P to fire.

If the game is too difficult alter the 4 in line 143 to a higher number and be careful not to move too close to the edge of the screen or the routine will crash.

Submitted by S Wild, of Oldham, Lancashire, for the 1k ZX-81.

Graphics notes:

300 - Graphic shifted A inverse asterisk, graphic shifted A.

```

5 LET A$=""
10 LET X=14
20 LET Y=11
25 LET B$="-+-"
30 LET Z=5
35 LET U=5
40 LET E=0
50 LET F=INT (RND*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 P=1 THEN LET X=X-1
75 IF Y=18 THEN GOTO 90
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$="S" THEN LET W=1-
120 IF INKEY$="6" THEN LET Z=Z+
130 IF INKEY$="7" THEN LET Z=Z-
140 IF INKEY$="8" THEN LET W=W+
143 FOR J=1 TO 4
145 IF INKEY$="P" THEN GOTO 250
150 PRINT AT Z,W;B$
160 NEXT J
165 CLS
190 GOTO 50
250 IF Y=Z AND X=W THEN GOTO 30
260 GOTO 150
300 PRINT AT Y,X;A$
310 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 A$=""
70 PRINT AT A,B;"M";AT C,D;"P"
;AT 12,20;"U";AT 7,3;A$
80 LET A$=(INKEY$="6")-(INKEY$="7")
90 LET B$=(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=20
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$="" THEN GOTO 210
180 IF A=C AND B=D THEN PRINT AT A,B;"MUNCH";AT 0,0;S;X
190 IF A=7 AND B=3 THEN LET A$=""
200 GOTO 70
210 LET S=S+1
220 GOTO 80

```



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$(8,8)
20-FOR A=1 TO 8
30-INPUT B$
40-LET A$(A,1 TO 8)=B$
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$(N,0)=CHR$(INT (RND*
2)+38)
30 LET A$(N,7)=CHR$(INT (RND
*2)+5)+51)
40 LET A$(N,8)=CHR$(INT (RND
*21+18)+42)
50 NEXT N
60 LET M=INT (RND*8)+1
69 FOR A=1 TO 12
70 PRINT AT 18,13;A$(M,6);" ";
A$(M,7);" ";A$(M,8)
90 INPUT C
95 IF C=9 THEN GOTO 155
110 PRINT AT 0,13;A$(C,1 TO 5)
120 INPUT B
130 PRINT AT 11,15;A$(C,B+5)
135 PAUSE 200
140 GOS
150 NEXT A
155 PRINT "WHO DO YOU ACCUSE"
160 INPUT A
165 PRINT AT 11,13;"CORRECT"
170 IF A=M THEN PRINT AT 11,13;
"CORRECT"
180 PRINT A$(M,1 TO 5);" DID IT
```

LONG OR SHORT

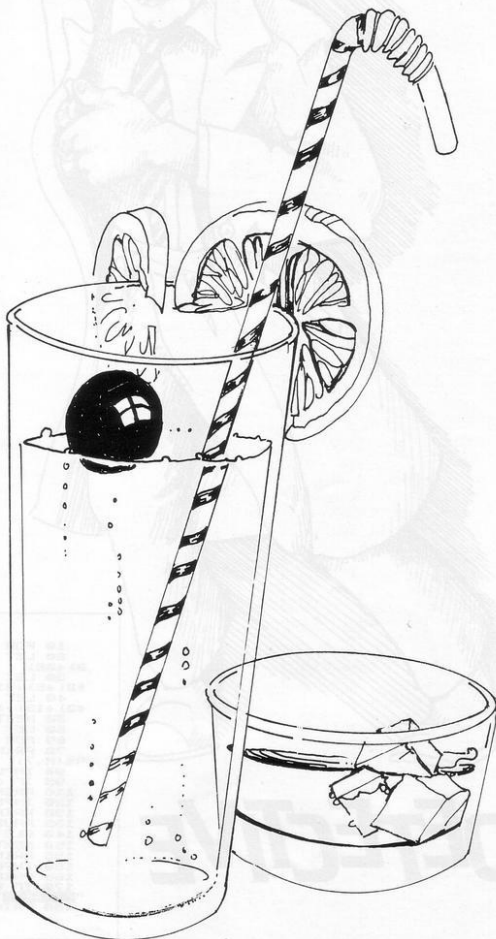
LONG OR SHORT is a game for the unexpanded ZX-80 and is a variation of the game Hi-Lo. The random number generator of the machine produces a number between 1 and 100. You have to guess that number but instead of telling you in figures how near your guess was to the answer, the ZX-80 will display a line.

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
    
```



SCREENWRITER

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.

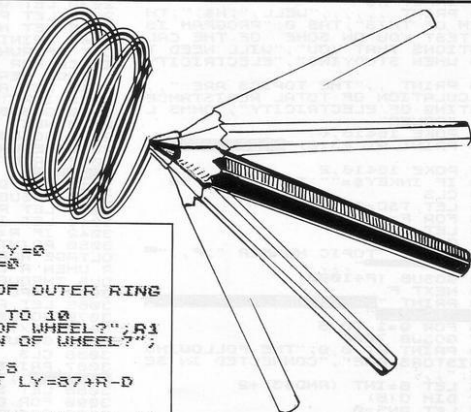
```

10 INPUT A$
20 FOR L=SGN PI TO LEN A$
30 LET X=VAL "7681"+CODE R$(L)
#CODE " "
40 FOR Y=NOT PI TO CODE " "
50 LET P=PEEK (X+Y)
60 FOR S=7 TO S STEP -1
70 IF P<2*%G THEN GOTO 100
80 PLOT S=L-G,S-Y
90 LET P=P-2*%G
100 NEXT G
110 PAUSE CODE " ";
120 NEXT Y
130 NEXT L
140 SCROLL
150 SCROLL
160 SCROLL
165 SCROLL
170 GOTO SGN PI

```

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.



```

5 LET LX=0: LET LY=0
7 LET X=0: LET Y=0
10 CLS
20 INPUT "RADIUS OF OUTER RING?" A
25 IF A=0 THEN GO TO 10
30 INPUT "RADIUS OF WHEEL?" R1
40 INPUT "POSITION OF WHEEL?" D
50 INPUT "SPEED?" S
55 LET LX=127: LET LY=87+A-D
57 PLOT LX,LY
58 LET A=0
100 LET X=(R-R1)*SIN (A)+(R1-D)*
#SIN (A)-(R/R1-1))*127
110 LET Y=(R-R1)*COS (A)+COS (A)
#(R/R1-1)*(R1-D)+87
120 DRAW X-LX,Y-LY
130 LET X=X
140 LET Y=Y
150 LET A=A+S
160 IF INKEY#="" THEN GO TO 100
180 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



```

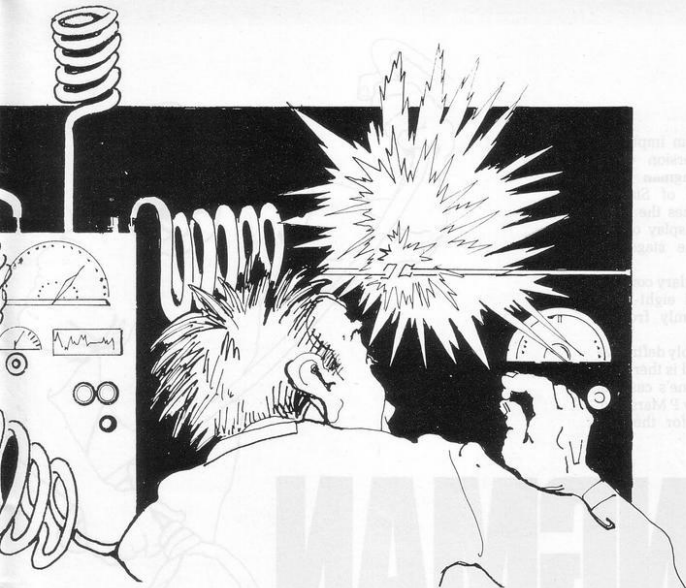
10 REM "PHYSICS"-M.COOMBES,AUG
1982
20 PRINT TAB 12;"PHYSICS"
30 PRINT "HELLO, WELCOME
TO "PHYSICS"";AT 6,0;"PLEASE T
YPE IN YOUR NAME"
40 INPUT N$
50 PRINT
60 PRINT "WELL, ";N$;" TH
E AIM OF THIS TAB 8, "PROGRAM IS
TO TEST YOU ON SOME OF THE CAL
CULATIONS THAT YOU", "WILL NEED T
O, "DO WHEN STUDYING", "ELECTRICITY"
70 PRINT "THE TOPICS ARE:"
80 PRINT "CALCULATION OF TOTAL RESISTANCE
COSTING OF ELECTRICITY", "OHMS L
AW", "POWER"
90 POKE 16416,0
100 PRINT AT 23,0;"PRESS NEW LINE
"
110 IF INKEY$="" THEN GOTO 90
120 CLS
130 LET TSC=0
140 FOR F=1 TO 5
150 LET SC=0
160 CLS
170 PRINT "TOPIC NUMBER ";F;" "
180
190 GOSUB (F*1000)
200 NEXT F
210 PRINT "CALCULATION OF TOTAL
RESISTANCE"
220 FOR Q=1 TO 5
230 GOSUB 7000
240 PRINT AT 8,0;"THE FOLLOWING
RESISTORS ARE", "CONNECTED IN SE
RIES:"
250 LET B=INT (RAND*3)+2
260 DIM O(B)
270 LET ANS=0
280 FOR G=1 TO B
290 LET O(G)=INT (RAND*5)+1
300 LET ANS=ANS+O(G)
310 NEXT G
320 FOR G=1 TO B
330 PRINT " ";O(G); " OHMS"
340 NEXT G
350 PRINT "WHAT IS THE TOTA
L RESISTANCE?"
360 INPUT T
370 GOSUB 8000

```

```

1130 NEXT Q
1140 GOSUB 9500
1200 RETURN
1300 PRINT TAB 4;"COSTING OF ELE
CTRICITY"
1400 FOR Q=1 TO 5
1500 GOSUB 7000
1600 LET WA=(INT (RAND*9)+10)+50
1700 LET P=INT (RAND*4)+2
1800 LET H=INT (RAND*5)+2
1900 PRINT AT 8,0;"WHAT IS THE C
OST OF RUNNING A", "WATT APPL
IANCE, FOR ";H;" HOURS", "AT ";P;"
PENCE PER UNIT?"
2000 LET ANS=(WA/1000)*H*P
2100 INPUT T
2200 GOSUB 8000
2300 NEXT Q
2400 GOSUB 9500
2500 RETURN
2600 PRINT TAB 5;"THE OHMS LAW E
QUATION"
2700 FOR Q=1 TO 5
2800 GOSUB 7000
2900 LET R=INT (RAND*9)+1
3000 LET I=INT (RAND*5)+1
3100 IF R=8 THEN GOTO 3030
3200 PRINT AT 8,0;"WHAT IS THE V
OLTAGE ACROSS A", "OHM RESISTO
R WHEN A CURRENT OF";I;" AMPS FL
OWS THROUGH IT?"
3300 INPUT T
3400 LET ANS=R*I
3500 GOSUB 8000
3600 NEXT Q
3700 GOSUB 9500
3800 CLS
3900 PRINT TAB 5;"THE OHMS LAW E
QUATION";TAB 5;"(PART 2)"
4000 LET SC=0
4100 FOR Q=1 TO 5
4200 GOSUB 7000
4300 LET R=INT (RAND*9)+1
4400 IF R=8 THEN GOTO 4110
4500 LET V=INT (RAND*19)+1
4600 IF R=4 THEN GOTO 4110
4700 PRINT AT 8,0;"WHAT CURRENT
FLOWS THROUGH A", "OHM RESISTO
R WITH ";V;" VOLTS", "ACROSS IT?"
4800 LET ANS=V/R
4900 INPUT T
5000 GOSUB 8000
5100 NEXT Q

```



```

3190 GOSUB 9500
3200 CLS
3210 PRINT TAB 5; "THE OHMS LAW E
3210 PRINT TAB 5; "QUATION"; 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=I/V
3270 PRINT AT 2,0;"WHAT VALUE OF
3270 PRINT AT 2,0;"RESISTOR GIVES A"; "CURRENT OF "
3270 PRINT AT 2,0;"I"; "AMPS WHEN "; "V"; "VOLTS ARE A
3270 PRINT AT 2,0;"P L I E D 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=I*V
4060 PRINT AT 2,0;"WHAT IS THE P
4060 PRINT AT 2,0;"OWER OF A LIGHT"; "BULB IF "; "I"; "
4060 PRINT AT 2,0;"AMPS FLOW THROUGH IT"; "WHEN THER
4060 PRINT AT 2,0;"E ARE "; "V"; "VOLTS"; "ACROSS IT?"
4070 INPUT T
4080 GOSUB 8000
4090 NEXT Q
4100 GOSUB 7000
4102 GOSUB 9500
4105 CLS
4110 PRINT TAB 13; "POWER"; TAB 12
4110 PRINT TAB 13; "(PART 2)"
4115 LET SC=0
4120 FOR P=1 TO 10
4125 NEXT P
4130 GOSUB 7000
4140 LET V=240
4150 LET I=INT ((RND*10)*10)+50
4160 LET ANS=I/V
4170 PRINT AT 2,0;"WHAT CURRENT
4170 PRINT AT 2,0;"FLOWS THROUGH A"; "I"; " WATT APPLIA
4170 PRINT AT 2,0;"NCE WHEN WITH A"; "240 VOLT SUPPL
4170 PRINT AT 2,0;"Y?"
4180 INPUT T
4190 GOSUB 8000
4200 NEXT Q
4210 GOSUB 7000
4215 FOR Q=1 TO 10
4220 NEXT Q
4222 GOSUB 9500
4225 CLS
4230 PRINT AT 2,0;"WELL"; "N$"; "Y
4230 PRINT AT 2,0;"OU HAVE NOW"; TAB 0;"TRIED ALL TH
4230 PRINT AT 2,0;"E CALCULATIONS"; "YOUR FINAL
4230 PRINT AT 2,0;"SCORE IS"; TSC
4240 PRINT "DO YOU WISH TO
4240 PRINT "START AGAIN?"
4250 IF INKEY$="Y" THEN GOTO 100
4260 IF INKEY$="N" THEN STOP
4270 GOTO 4250
7000 FOR A=0 TO 21
7010 PRINT AT A,0;"
7020 NEXT A
7030 RETURN
8000 IF T=ANS THEN PRINT "WE
8000 IF T=ANS THEN PRINT "LL DONE "; "N$"; " "; TAB 0;"THAT IS
8000 IF T=ANS THEN PRINT "CORRECT "
8005 IF T<>ANS AND INT ANS=INT T
8005 THEN PRINT "CLOSE ENOUGH";
8010 TAB 0; TAB 0; "THE EXACT ANSWER
8010 WAS "; ANS
8010 IF T=ANS OR INT ANS=INT T
8010 THEN LET SC=SC+1
8015 IF INT ANS=INT T THEN GOTO
8020
8020 IF T<>ANS THEN PRINT "NO
8020 IF T<>ANS THEN PRINT "N$"; " THAT IS WRONG"; "THE ANSW
8020 ER WAS "; ANS
8040 GOSUB 9500
8050 RETURN
9000 FOR P=1 TO 20
9010 NEXT P
9020 RETURN
9500 CLS
9505 PRINT "YOUR SCORE FOR THIS
9505 PRINT "SECTION IS"; SC; " OUT OF "; 0-1
9510 LET TSC=TSC+SC
9520 PRINT "YOUR TOTAL SCO
9520 PRINT "RE SO FAR IS"; TSC
9530 FOR Y=1 TO 3
9540 GOSUB 8000
9550 NEXT Y
9552 FOR P=1 TO 5
9554 SCROLL
9556 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

II

```

4 LET S=0
5 LET F=410
6 DIM A$(3,320)
8 LET B=INT (RAND*4)
10 LET A=INT ((RAND*40)-1)*(B+S)

13 LET A$(1)="ACROSSAROUNDALWA-
YSANIMALARRIVEBURROUBRANCHSCHOOL
BRIDGECAUGHTMOTHEREFERNUTPLEASEDE
SERTDRAGONDERIVESECRETSORARQUINSC
THOLLOWAVENGUEWARPONDETACHDEVISE
ESIGHTONATOSCRAPQUERYSYSQUERLDS
TILMURDERLETTERNORMALBATTLEVISID
NHUTINYBARRELVOYAGERRETURNDEVOID"

14 LET A$(2)="DEGRADEANXIUSTH
ROUGHBELIEVEBENATHRELIEVEBTOYCL
EORICKETEXCITEDKITCHENSNOWMANBRD
THERCHICKENTONIGHTVINEGARRELEASE
INSTANTUHIISTLEUNHAPPYALREADYOUTS
IDESOMEONESTOPPEDFEATHERDRIZZLEC
ABBAGEBECAUSEDIALECTBLANKETAGAIN
STHINSELFRACTCDONTROUBLEBLOSSOMPA
RADOXPOPULARBAPFLEMASSIVETRAFFIC
TRACTOR"

16 LET A$(3)="FOLLICLEACCIDENT
ALTHOUGHIRTHRAYBUSINESSCHEERFUL
COMPLETECONTINUEDPAKNESSDAYDREAM
DISCOVERDISTANCEELECTRICRESPONSE
PERIODICORNAMENTPUEHENTSOMETIME
ENOROUSMOUNTAINMOTORISTLEHONADE
ENDANGERUITLENCEREVESENTTAPSTRY
RMBERSURPRISETOMORROWYOURSELFHA
NDOMEHEJECTIONTOGETHERFRIGHTENPA
TENDLYFOUNTAINELECTIONDESTRUCTSO
UIRRELGOODNESS"

18 IF B<1 THEN GOTO 8
20 LET B=A$(B)
30 LET B$=B$(A+1 TO A+(B+S))
34 PRINT AT 0,10;"XXXXXXXXXXXX"

35 PRINT AT 2,0;"ENTER YOUR GU
ESS LIVES LEFT 10"
37 FOR N=10 TO B+14
39 PRINT AT 12,N;"-"
39 NEXT N

```

```

40 FOR Z=1 TO 10
45 LET K=0
50 INPUT H$
55 PRINT AT 2,30;" "
60 PRINT AT 2,30,10-Z
70 FOR D=1 TO B+S
75 IF H$=B$(D) THEN LET K=K+1
80 IF H$=B$(D) THEN LET S=S+1
85 IF H$=B$(D) THEN PRINT AT 1
2,9+LEN B$( TO D);H$
90 NEXT D
95 IF K>0 THEN GOTO 105
96 GOSUB F
100 LET F=F+10
105 IF K>0 THEN LET Z=Z-1
106 IF S=B+S THEN GOTO 150
110 NEXT Z
120 GOTO 500
150 PRINT AT 19,0;"YOU GUESSED
IT IN "Z
150 STOP
410 PRINT AT 10,11;"-----"
415 RETURN
420 FOR N=9 TO 4 STEP -1
424 PRINT AT N,11;"I"
425 NEXT N
426 RETURN
430 PRINT AT 3,11;"-----"
435 RETURN
440 PRINT AT 4,11;" I"
445 RETURN
450 PRINT AT 5,11;" Q"
455 RETURN
460 PRINT AT 6,11;" ■"
465 RETURN
470 PRINT AT 6,11;" ■"
475 RETURN
480 PRINT AT 6,11;"■"
485 RETURN
490 PRINT AT 7,11;" ■"
495 RETURN
500 PRINT AT 7,11;"■"
510 PRINT AT 4,10;"YOU ARE HANG
ED";AT 6,10;"IT WAS";AT 8,10;B$

```


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 "50"
60 LET A=A+(A*VAL "19" AND AND
  VAL ".4")-(A*VAL "13" AND AND (V
  AL ".5")
70 FOR C=VAL "13" TO A
80 PLOT B,C
90 NEXT C
100 IF AND (VAL ".8" AND B*VAL "
12" THEN PLOT B,A+VAL "AND*6"
110 NEXT B
120 FOR A=VAL "4" TO VAL "25"
130 LET X=X+(INKEY$="6")-(INKEY
  $="7")
140 PRINT AT X,A;
150 GOSUB VAL "250"
160 IF M*VAL "0" AND M*VAL "3"
  OR M*VAL "127" AND M*VAL "135" T
  HEN PRINT S;0
170 PRINT AT X,A;"1"
180 PRINT AT X,A+VAL "2";
190 GOSUB VAL "250"
200 IF M*VAL "0" AND M*VAL "3"
  OR M*VAL "127" AND M*VAL "135" 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+
  106*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.

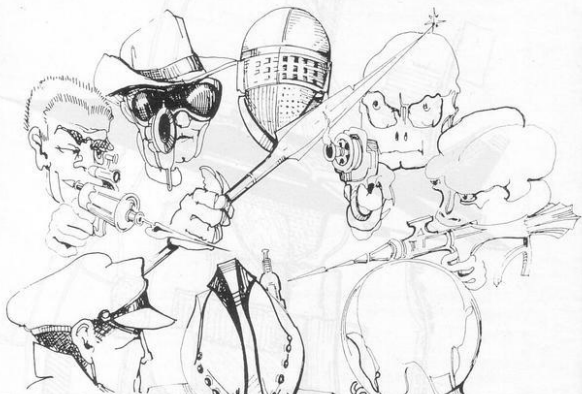
CLOCKMAN

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 SC=0: LET SC=0
40 LET J=144: LET J=144
50 LET J=0: LET C=0
60 PRINT AT d,c;CHR$ 32: LET J
  =J+1
70 LET K=INT (RND*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
  =8
160 PRINT INK 1;AT d,c;CHR$ 152
170 FOR X=1 TO 4
180 BEEP 0.180: LET J=144
190 PRINT INK 2;AT 10,15;CHR$ J
200 IF INKEY$="8" THEN LET J=J+
  1: IF J=152 THEN LET J=144
210 IF INKEY$="5" THEN LET J=J-
  1: IF J=143 THEN LET J=151
220 IF INKEY$="1" THEN GO SUB 1
  000
230 NEXT X
240 IF SC=50 THEN GO TO 260
250 GO TO 60
260 PRINT AT 10,0;"YOU HAVE SC
  red ".SC;" OUT OF 50"
270 PRINT AT 20,0;"Hit ""y"" fo
  r another go, or ""n"" to stop"
280 IF INKEY$="y" AND INKEY$<10
  "n" THEN GO TO 260
290 IF INKEY$="n" THEN STOP
300 RUN
1000 IF J=144 THEN LET a=-34: LE
  T b=0
1010 IF J=145 THEN LET a=-50: LE
  T b=60
1020 IF J=146 THEN LET a=0: LET
  b=83
1030 IF J=147 THEN LET a=50: LET
  b=58
1040 IF J=148 THEN LET a=34: LET
  b=0
1050 IF J=149 THEN LET a=50: LET
  b=-60
1060 IF J=150 THEN LET a=0: LET
  b=-84
1070 IF J=151 THEN LET a=-50: LE
  T b=-60
1080 PLOT 124,92: DRAW INK 4;8,b
1090 IF K=J-143 THEN PRINT AT d,
  c;"BEEP 0.1,8*2: PLOT 124,92
  : DRAW OVER 1;8,b: LET SC=SC+1:
  LET q=q-2: GO TO 60
1100 PAUSE K*2: PLOT 124,92: DRA
  W OVER 1;8,b
1110 RETURN
9000 FOR J=144 TO 152: FOR K=0 T
  O 7
9010 READ Udg: POKE Udg CHR$ J+K
  ,Udg
9020 NEXT K: NEXT J
9030 DATA 2,13,50,196,196,50,13,
  5,192
9040 DATA 192,176,76,67,44,40,16
  ,15
9050 DATA 24,24,36,36,66,90,165,
  195
9060 DATA 3,13,50,194,52,20,8,8
  ,9070 DATA 192,176,76,34,34,76,17
  ,192
9080 DATA 8,8,20,52,194,50,13,3
  ,192
9090 DATA 195,155,86,66,36,26,24
  ,24
9100 DATA 16,16,40,44,67,76,176,
  192
9110 DATA 24,50,90,125,24,36,55
  ,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.

```

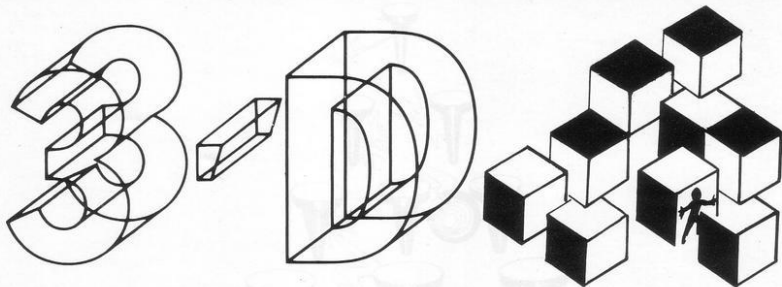
10 DIM A(7)
20 FOR X=1 TO 7
30 LET A(X)=0
40 NEXT X
50 PRINT AT 0.5;"BINOMIAL DIST
RIBUTION"
60 PRINT AT 5.15;" "
70 PRINT AT 7.14;" "
80 PRINT AT 9.15;" "
90 PRINT AT 11.12;" "
100 PRINT AT 13.11;" "
110 PRINT AT 15.10;" "
120 PRINT AT 17.9;" "
130 PRINT AT 19.11;" "
140 PRINT AT 21.15;" "
150 LET X=15
160 LET Y=3
170 LET XP=X
180 GOSUB 400

```

```

250 IF Y=15 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,XP;" "
410 LET Y=Y+1
420 PRINT AT Y,X;" "
430 RETURN
490 PRINT AT 15,X;" "
500 LET Z=(X-7)/2
510 LET A(Z)=A(Z)+1
520 LET P=17
530 IF Z/2=INT (Z/2) THEN LET P
=16
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

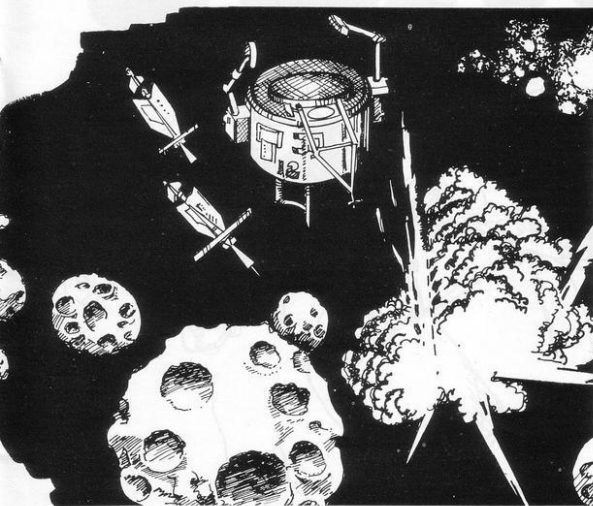
180—Inverse space

```

1 LET J=CODE "="
2 LET K=PI-PI
3 LET S=PI/PI
4 LET T=K
5 LET R=S
6 LET P=CODE "F"
7 LET W=" "
8 LET G=CODE "m"
10 PRINT
15 FOR I=0 TO 9
20 PRINT G:W$
25 LET G=G+R
30 NEXT I
35 PRINT N: "123456789":G:W$
45 GOSUB P
50 LET L=D
55 GOSUB P
60 LET C=D
65 GOSUB P
70 INPUT M
75 INPUT N
80 INPUT F
95 LET K=K+R
96 LET A$=" "
97 LET B$=A$
98 LET C$=A$
100 IF M=L AND N=C AND F=C THEN
GOTO CODE "D"
105 IF M<L THEN LET A$="L"
110 IF M>L THEN LET A$="G"
115 IF N<C THEN LET B$="L"
120 IF N>C THEN LET B$="G"
125 IF F=D THEN LET C$="F"
130 IF F<D THEN LET C$="B"
135 PRINT AT T:J,A$:B$:C$:AT M,
N:CHR$(T):AT 11,F:K
140 GOTO 80
150 LET D=INT (RND*J)
155 IF D=C OR D>G THEN GOTO P
160 RETURN
180 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=0
10 DIM A(40,40)
15 FAST
20 FOR F=0 TO 21
30 PRINT "
40 NEXT F
50 FOR N=0 TO 30
60 LET X=INT (RND*30)+1
70 LET Y=INT (RND*20)+1
80 LET A(X,Y)=1
90 PRINT AT X,Y:CHR# 130
100 NEXT N
110 GOSUB 5000
111 SLOW
120 LET Y=0
130 LET R=30
140 LET E=15
200 LET A=CODE INKEY$
205 IF INKEY$="" THEN LET A=Y
210 LET Y=R
215 PRINT AT R,E:
220 IF A=33 AND E>0 AND E<30 TH
EN LET E=E-1
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:
270 IF S=1 THEN GOSUB 1000
280 IF S=10 THEN GOSUB 2000
290 GOTO 200
1000 PRINT AT 0,0:
1010 LET U=U-10
1020 PRINT AT R,E:
1030 PAUSE 50
1040 PRINT AT R,E:
1050 GOTO 170

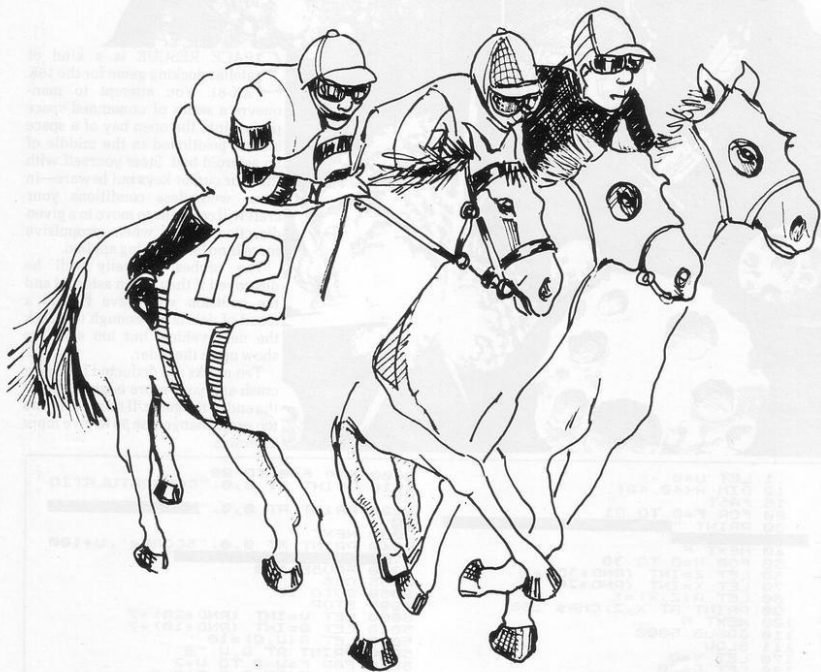
```

```

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*20)+7
5010 LET Q=INT (RND*10)+7
5020 LET A(Q,U)=10
5030 PRINT AT Q,U:
5040 FOR F=U-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 Q+2
5090 PRINT AT F,U-2:
5095 LET A(F,U-2)=1
5100 PRINT AT F,U+2:
5105 LET A(F,U+2)=1
5110 NEXT F
5120 LET T=INT (RND*41)
5130 IF T=0 THEN PRINT AT 0,U+2:
5140 IF T=0 THEN LET A(Q,U+2)=0
5150 IF T=1 THEN PRINT AT 0,U-2:
5160 IF T=1 THEN LET A(Q,U-2)=0
5170 IF T=2 THEN PRINT AT Q+2,U:
5180 IF T=2 THEN LET A(Q+2,U)=0
5190 IF T=3 THEN PRINT AT Q-2,U:
5200 IF T=3 THEN LET A(Q-2,U)=0
5210 RETURN

```

HORSE



```

1 DIM R(5)
2 DIM P(5)
3 LET P=0
4 FOR N=1 TO 5
5   LET R(N)=10.00
6 NEXT N
7 LET S=0
8 LET Y=1
9 DIM A$(5,15)
100 FOR N=1 TO 5
1000 PRINT "TYPE NAME OR INITIAL
101
110 PRINT "OF PLAYER NO.,"N
120 PRINT "OR IF NONE TYPE #:"
130 INPUT A$(N)
135 CLS
140 IF A$(N)(1)="*" THEN GOTO 2
150 NEXT N
200 PRINT AT 1,1:"HORSE NO. 0
205 RACE NO. "Y
285 LET Y=Y+1

```

NOW YOU can watch a horse race without having to listen to Peter O'Sullivan 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

```

210 LET P$=" 1 2 3 5 7101216"
220 FOR N=1 TO 5
230 LET B=N*2
240 LET A=B-1
250 LET X=N+1
260 PRINT AT X,5;N;" "P$
270 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
2W FOR NO.2 TO WIN"
310 PRINT AT 15,1;"OR 5E FOR NO
5 EACH WAY"
320 DIM B$(5,6)
330 DIM H(6)
340 DIM E$(6)
350 FOR N=1 TO 5
355 IF A$(N,1)="" THEN GOTO 5
360 PRINT AT 17,5;A$(N,1);"
365 PRINT AT 19,6;"TYPE IN NOW"
370 INPUT B$(N,1)
380 LET H(N)=VAL B$(N,1)
385 IF B$(N,2)="E" THEN LET P=2
390 NEXT N
400 DIM D(8)
410 CLS
420 LET D$="=====
430 PRINT D$
440 PRINT D$
450 FOR N=1 TO 8
455 LET D(N)=29
460 PRINT TAB 29;"N;"
465 PRINT
470 NEXT N
480 PRINT D$
490 PRINT D$
500 LET F=INT (RND*16)+1
510 IF F<5 THEN GOTO 700
520 IF F=5 THEN GOTO 710
530 IF F<11 THEN GOTO 720
540 IF F=11 THEN GOTO 730
550 LET G=F-5
560 GOTO 800
570 LET G=800
580 GOTO 800
590 LET G=2
600 GOTO 800
610 LET G=800
620 LET G=5
630 GOTO 800
640 LET G=4
650 LET F=2*G-1
660 IF D(G)=500 THEN GOTO 500
670 LET K=INT (RND*3)+1
680 LET K=INT 1+2
690 PRINT AT F,D(G);
700 LET D(G)=D(G)+K
710 IF D(G)<1 THEN GOTO 570
720 PRINT AT F,D(G);
730 IF D(G)<0 THEN GOTO 500
740 GOTO 600
750 PRINT AT F,0;"G;"
760 GOTO 550
770 IF F<2 THEN LET W(G)=1
780 LET D(G)=500
790 PRINT AT F,0;G;"
800 IF W(G)=1 THEN PRINT AT 17
10;"FIRST NO. ";G
810 IF P=0 THEN GOTO 1000
820 LET P=P+1
830 IF P=2 THEN GOTO 500
840 LET W(G)=P-1
850 IF W(G)=2 THEN PRINT AT 18,
10;"SECOND NO. ";G
860 IF W(G)=3 THEN PRINT AT 19,
10;"THIRD NO. ";G
870 PAUSE 100
880 IF P=4 THEN GOTO 1000
890 GOTO 500
900 CLS
910 IF P=0 THEN GOTO 1200
920 FOR N=1 TO 5
930 IF B$(N,2)="E" THEN GOTO 10
940 GOTO 1090
950 FOR G=1 TO 5
960 IF W(G)>0 AND H(N)=G THEN C
970 GOTO 1090
980 NEXT G
990 LET R(N)=R(N)-1
1000 GOTO 1090
1010 GOSUB 1201
1020 LET R(N)=R(N)+0.2*5
1030 NEXT N
1040 PRINT AT 1,1;"PLAYERS SCORE
S ARE"
1050 FOR N=1 TO 5
1060 IF A$(N,1)="" THEN GOTO 13
1070 FOR G=1 TO 5
1080 IF H(N)=G AND W(G)=1 THEN G
1090 GOTO 1200
1100 NEXT G
1110 LET R(N)=R(N)-1
1120 PRINT AT N+N*1,1;A$(N,1);
R(N)
1130 NEXT N
1140 GOTO 1300
1150 IF G=5 THEN LET S=16
1160 IF G=7 THEN LET S=12
1170 IF G=6 THEN LET S=10
1180 IF G=5 THEN LET S=7
1190 IF G=4 THEN LET S=5
1200 IF G=4 THEN LET S=6
1210 RETURN
1220 GOSUB 1201
1230 LET R(N)=R(N)+5
1240 GOTO 1240
1250 LET P=0
1260 PAUSE 400
1270 FOR N=1 TO 5
1280 LET W(N)=0
1290 NEXT N
1300 FOR N=1 TO 5
1310 IF R(N)<0.01 THEN GOTO 1400
1320 NEXT N
1330 CLS
1340 GOTO 200
1350 PRINT AT 14,1;"PLAYER NO. ";
N;" IS OUT OF MONEY"
1360 PAUSE 400
1370 FOR N=1 TO 5
1380 LET R(N)=10
1390 NEXT N
1400 PRINT AT 15,1;"END OF GAME"
1410 PAUSE 500
1420 CLS
1430 GOTO 90

```

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.

```

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
25 CLS
30 LET t=INT ((e-c)*365.25)+(
  (d-b)*30.35)-a)
400 FOR r=0 TO 255
510 PLOT r,10
515 IF r=INT (r/B)*8 THEN FOR u
  =10 TO 20: PLOT r,u: NEXT u
520 NEXT r
530 PRINT AT 21,0;"1st      10th
      20th      30th"
540 PRINT AT 0,0: INK 1;"physic
  al"; INK 2;"mental"; INK 4;"
  emotional"
550 FOR r=1 TO 3
565 READ U
570 LET l=2*PI*(t-INT (t/U)*U)
  )/U
580 LET k=2*PI*(33-U)*.03
1000 FOR a=l TO k+(2*PI) STEP
  .1
1010 PLOT INK ((1 AND U=25)+(2 A
  ND U=28)+(4 AND U=33));(a-l)*(35
  -25+U),90+SIN a*60
1020 NEXT a
1030 NEXT r
1040 DATA 23,28,33
1050 INPUT "Another Go ? ";a$: I
  F a$(1)="y" THEN GO TO 1

```

BIO~ RHYTHMS



DOODLE

```

10 LET A=30
20 LET B=20
30 LET C=1
40 PLOT A,B
50 IF C=2 THEN UNPLOT A,B
60 LET A=INKEY$
70 LET A=A+1:IF A=53 THEN A=1
OR A=1 OR A=10 OR A=15 OR A=20
OR A=25 OR A=30 OR A=35 OR A=40
OR A=45 OR A=50 OR A=55 OR A=60
OR A=65 OR A=70 OR A=75 OR A=80
OR A=85 OR A=90 OR A=95 OR A=100
80 LET B=B+1:IF B=35 THEN B=5
OR B=10 OR B=20 OR B=30 OR B=40
OR B=50 OR B=60 OR B=70 OR B=80
OR B=90 OR B=100 OR B=110 OR B=120
OR B=130 OR B=140 OR B=150 OR B=160
OR B=170 OR B=180 OR B=190 OR B=200
90 IF A="Z" THEN COPY
100 IF A="C" THEN LET C=1
110 IF A="L" THEN LET C=2
120 UNPLOT A,B
130 GOTO 40

```



DOODLE is one of the most useful programs we have received for the ZX-81 tinkerer.

It provides a way of drawing in eight directions under cursor control. Keys 5 to 8 give the usual four points of the compass, while I, O, K and L give the points between.

Key W gives UNPLOT and you can return to PLOT with Q. If you have a printer you can input Z for an instant COPY; if not, omit line 85. Key Ø clears the screen.

As listed, the routine is set up for the 1K machine and will let you draw only over a part of the screen. If a RAM pack is used you can work on the whole screen by changing the listing as follows:

In line 70, where "A is less than 53" and "A is greater than 10", change to "A is less than 63" and "A is greater than Ø respectively. In line 80, "B is less than 35" and "B is greater than 8" become "B is less than 43" and "B is greater than Ø".

Thanks to Peter Wyllie, of Christchurch, Dorset, for this very worthwhile routine.



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.

GHOST TREKKER

```

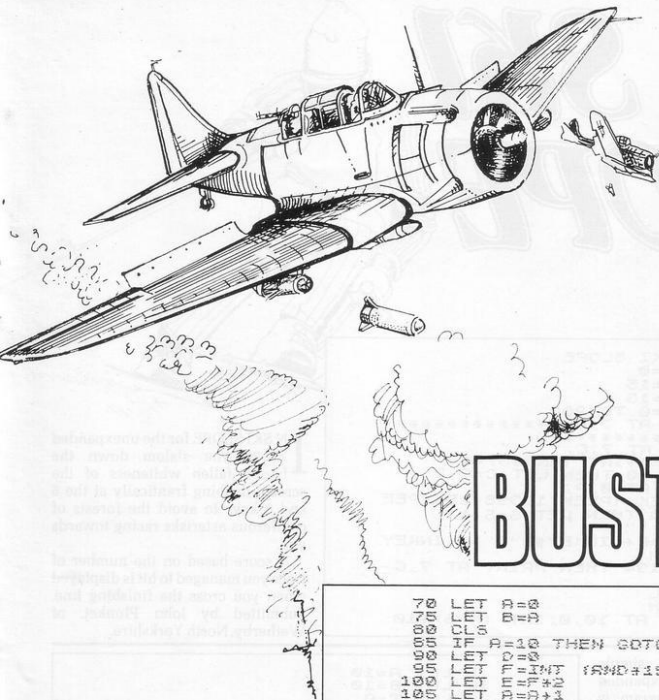
10 FOR A=0 TO 21
110 PRINT AT A,0;"
120 NEXT A
130 LET A$="
140 LET X=1
150 LET Y=1
160 LET Y=1
170 LET P=INT (RND*18)+2
180 LET Q=P
190 LET DIR=INT (RND*4)+1
200 LET T=0
210 GOTO 370
220 LET A=A+(INKEY$="0")-(INKEY$="1")
10 FOR A=0 TO 31
110 PRINT AT A,0;"
120 NEXT A
130 LET A$="
140 LET X=1
150 LET Y=1
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")
230 IF A<1 THEN LET A=1
240 IF A>4 THEN LET A=1
250 LET X=X+(A=3)-(A=1)
260 LET Y=Y+(A=2)-(A=4)
270 IF X=0 THEN LET X=1
280 IF X=1 THEN LET X=0
290 IF Y=0 THEN LET Y=1

```

```

300 IF Y<1 THEN LET Y=30
310 PRINT AT XX,YY;"
320 PRINT AT XX,YY;"
330 LET C=PEEK (PEEK 15395+255*
PEEK 15399)
340 IF C=11 THEN GOTO 530
350 IF C<>CODE " THEN GOTO 55
360 PRINT AT X,Y:A$(A)
370 LET XX=X
380 LET T=T+1
390 LET YY=Y
400 PRINT AT INT (RND*22),INT (
RND*32);"
410 PRINT AT P,0;"
420 LET P=P+(DIR=1)-(DIR=2)
430 LET Q=Q+(DIR=3)-(DIR=4)
440 IF P<1 THEN LET P=20
450 IF P>20 THEN LET P=1
460 IF Q<1 THEN LET Q=30
470 IF Q>30 THEN LET Q=1
480 PRINT AT P,0;"
490 IF RND<1.5 THEN GOTO 220
500 LET ZEE=INT (RND*4)+1
510 LET DIR=ZEE
520 GOTO 220
530 PRINT AT 0,0;"CONGRATULATIONS
YOU HAVE CAUGHT THE GHOST. IT TOOK YOU
..... TIME UNITS."
540 GOTO 560
550 PRINT AT 0,0;"YOU HIT A TRAIL
AND HAVE BEEN KILLED.
560 PRINT "PRESS ANOTHER 02 TO PRESS
ANY KEY."
570 PAUSE 100
580 IF INKEY$="" THEN GOTO 560
590 GOTO 1

```



DAM BUSTERS

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.

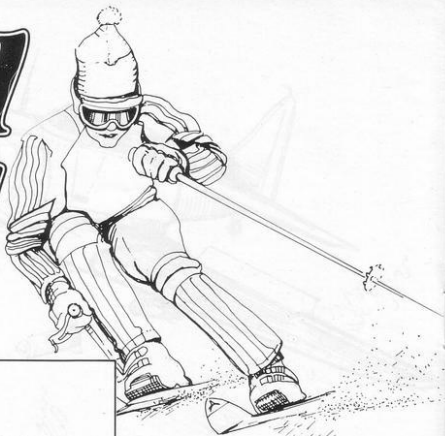
Submitted by R Larham, of Chatteris, Cambridgeshire. The reviewer managed to account for only seven. Graphics notes: 600—Graphic shifted A inverse asterisk, graphic shifted A.

```

70 LET A=0
75 LET B=A
80 CLS
85 IF A=10 THEN GOTO 500
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
120 PRINT AT 20,0;"
130 PRINT AT 19,F;CHR$ 130
140 GOSUB 400
150 FOR Z=1 TO 12
160 NEXT Z
200 IF INKEY$="" THEN GOTO 120
205 LET G=D+10
300 FOR H=INT G TO 53 STEP 2
310 IF H>53 THEN GOTO 80
320 LET I=INT (8+4*COS (H/16-4)*PI)
330 PLOT H,I
340 IF I=4 OR I=5 THEN GOSUB 80
350 GOSUB 400
370 UNPLOT H,I
380 NEXT H
390 GOTO 80
400 PRINT AT 12,0;"BUL"
410 LET D=D+1
420 IF D>23 THEN GOTO 80
430 RETURN
510 PRINT AT 4,4;"TOTAL DAMS DESTROYED ";B
520 PRINT AT 8,0;"PRESS NEWLINE FOR NEXT GAME"
530 IF INKEY$="" THEN GOTO 530
540 RUN
500 PRINT AT 19,F;"
610 LET B=B+1
620 FOR Z=1 TO 24
630 NEXT Z
700 GOTO 80
800 IF H=E OR H=E+1 THEN GOTO 6
810 RETURN

```

SKI SLOPE



```

1 REM SKI SLOPE
2 LET S=0
3 LET P=15
4 LET C=15
10 FOR N=0 TO 200
20 PRINT AT 7,0: "*****"
30 PRINT AT 7,C: " "
40 LET C=C-INT (RAND*3)-1
45 IF C<=0 THEN LET C=C+2
50 PRINT AT 0,P:
55 IF PEEK (PEEK 16398+256*PEEK
K 16399)=23 THEN LET S=S+1
60 PRINT " "
65 LET P=P+(INKEY#="S")-(INKEY
#="5")
65 IF N=194 THEN PRINT AT 7,0-
1:
65 SCROLL
70 NEXT N
80 PRINT AT 10,0: INT (N/S)*10

```

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.

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.

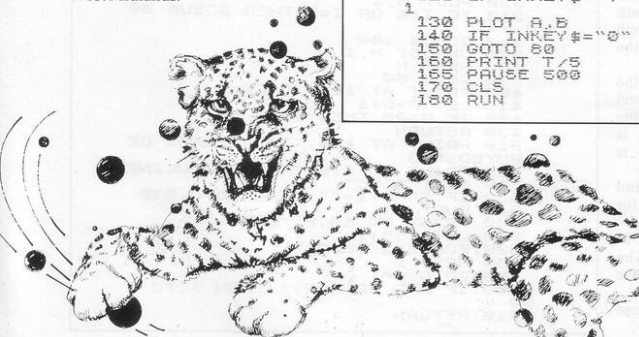
When the screen has been cleared, press 0 and your time will be displayed. After a few moments a new game will begin.

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 (RAND*10)+1
50 LET D=INT (RAND*10)+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#="8" 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 150
150 GOTO 80
160 PRINT T/5
165 PAUSE 500
170 CLS
180 RUN

```



SPOTSWAT

CITY BOMBER

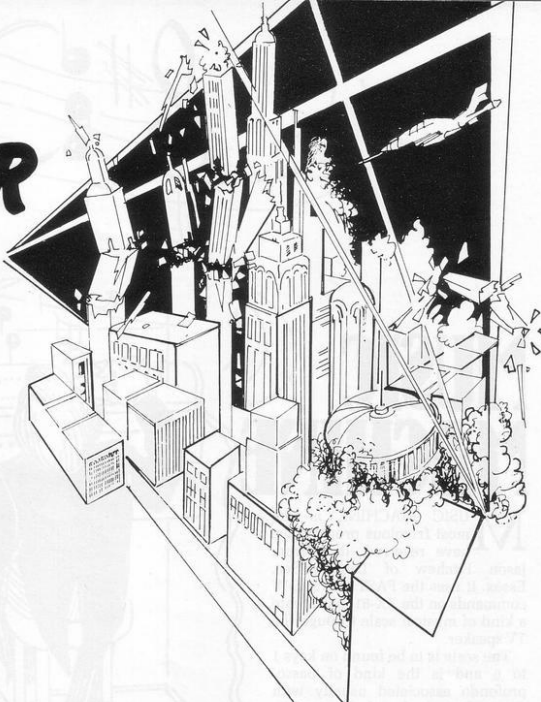
CITY BOMBER this is a version of the well-known arcade game, written by E Wrigley of Bury, Lancashire, for the Spectrum. As you would expect, it is in glorious colour and complete with all relevant explosions.

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 8.



```

1 PAPER 0: BORDER 0: CLS
2 DATA 0,0,BIN 00010010,BIN 0
001110,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 00011000,0
IN 00111000,BIN 01111110,BIN 111
11111
6 DATA 255,255,BIN 01100110,0
55,255,BIN 01100110,255,255
12 FOR i=111 TO 115: FOR n=0 TO 7
14 READ X: POKE USR CHR$ i+n,k
16 NEXT n: NEXT i
19 LET SC=0
22 PRINT AT 9,5: INK 4:"CITY B
OMB - F DROPS BOMB. AT 11,7: BE
IGHT 1: INK 3:"DIFFICULTY ? (1 T
O 5)": INPUT D: LET D=D-D
28 PAPER 0: CLS: BORDER 0
29 LET S=-1
30 FOR J=5 TO 25
32 INK J+INT (RAND*7): PAPER 1+
INT (RAND*7): LET Q=11+INT (RAND*5
)
34 PRINT AT Q,J: PAPER 0:" "
FOR K=Q+1 TO 21: PRINT AT K,J:" "
NEXT K
35 NEXT J
50 FOR J=1 TO 21
52 PAPER 0: INK 1+INT (RAND*7)
54 LET N=(21-J)
55 FOR K=26 TO 1 STEP -1
58 PRINT AT J,K:" " : BEEP ,0
1,0
60 FOR I=0 TO D
62 LET S=S+2*(INKEY$="f")+ (S=1
): GO SUB 100
64 NEXT I
66 IF SCREEN$ (J,K-1) <> " " 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
EAD X: BEEP ,25*(1+(J*(J=4))),K: N
EXT J
80 PRINT AT 21,0: FLASH 1: INK
3: PAPER 5:"SCORE:";SC";Standb
y for take-off": PAUSE 300
81 PAPER 0: FOR J=20 TO 0 STEP
-1
82 PRINT AT J+1,J+1:" " : AT J,
J: INK 1+INT (RAND*5)
84 NEXT J: 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=1 THEN LET H=K+2: IF S
=1 THEN LET D=D/2
103 IF S<0 THEN RETURN
104 PRINT AT M-1,H:" " : AT M,H:"
": BEEP ,000,21-M: LET M=M+1
105 IF SCREEN$ (M,H) <> " " THEN
GO TO 110
106 IF M<21 THEN RETURN: IF M=
21 THEN LET M=21: GO TO 120
110 LET SC=SC+10
120 IF M=21 THEN LET D=21
121 PRINT AT M-1,H:" " : PAPER 0:"
": FOR N=7 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 0,0,0,-5,-5,-5,0
144 RESTORE 142: INK 2
145 FOR N=1 TO 7: READ X: CIRCL
E K*5+4,(21-J)*5,N: BEEP ,25*(1+
5*(N=7)),X: NEXT N
146 PRINT AT 11,10: PAPER 6: IN
K 1:"SCORE:";SC
9995 STOP
9996 REM Citybomb
9998 REM © E.WRIGLEY 29/7/82
9999 SAVE "citybomb": 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 basso-profondo 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.



```

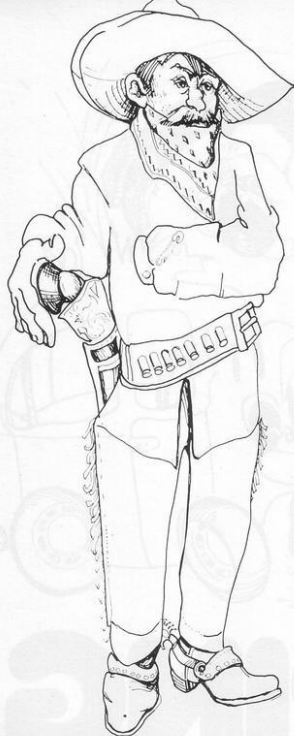
5 FAST
6 SLOW
7 FAST
E 25 IF INKEY$="3" THEN GOTO COD
27 IF INKEY$="4" THEN GOTO VAL
28 IF INKEY$="5" THEN GOTO COD
E 29 IF INKEY$="6" THEN GOTO VAL
200
30 GOTO CODE "A"
40 FAST
41 SLOW
50 SLOW
58 FAST
65 IF INKEY$="2" THEN GOTO COD
E 67 IF INKEY$="4" THEN GOTO VAL
68 IF INKEY$="5" THEN GOTO COD
E 69 IF INKEY$="6" THEN GOTO VAL
200
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 122 IF INKEY$="4" THEN GOTO VAL
E 123 IF INKEY$="5" THEN GOTO COD
E 124 IF INKEY$="6" THEN GOTO COD

```

```

127 IF INKEY$="6" THEN GOTO VAL
200
130 GOTO VAL "50"
140 FAST
150 SLOW
152 SLOW
153 SLOW
154 SLOW
156 FAST
170 IF INKEY$="4" THEN GOTO VAL
80
171 IF INKEY$="2" THEN GOTO COD
E 172 IF INKEY$="3" THEN GOTO COD
E 173 IF INKEY$="5" THEN GOTO VAL
200
180 GOTO CODE "B"
200 FAST
200 FAST
200 SLOW
201 SLOW
202 SLOW
203 SLOW
204 SLOW
205 FAST
240 IF INKEY$="2" THEN GOTO COD
E 241 IF INKEY$="3" THEN GOTO COD
E 242 IF INKEY$="4" THEN GOTO VAL
243 IF INKEY$="5" THEN GOTO COD
E 244 IF INKEY$="6" THEN GOTO VAL
250 GOTO VAL "200"

```



ONE-ARMED BANDIT

```

1 REM "ONE ARMED BANDIT"
2 PRINT "1 ARMED BANDIT BY A. JACKSON"
3 PAUSE 100
4 CLS
5 LET S=0
6 LET N=10
7 LET A=INT (RND*5)+6
8 IF INKEY#"" THEN GOTO 55
9 GOTO 51
10 LET B=INT (RND*5)+6
11 LET C=INT (RND*5)+6
12 GOSUB 1000
13 LET G=INT (RND*5)
14 IF G=1 THEN GOSUB 600
15 IF A*(A-1)=A*(B) AND A*(B)=A*(C) THEN GOSUB 600
16 IF A*(A+1)=A*(B) AND A*(B)=A*(C-1) THEN GOSUB 200
17 IF A*(A-1)=A*(B) AND A*(B)=A*(C+1) THEN GOSUB 200
18 LET N=N-1
19 IF N=-1 THEN PRINT AT 0,0;S
20 IF N=-1 THEN STOP
21 GOTO 50
22 REM HINDOR WIN
23 LET S=S+5
24 PRINT "WIN 5 P"
25 PAUSE 100
26 CLS
27 RETURN
28 REM JACKPOT
29 PRINT AT 0,0;"JACKPOT"
30 LET K=10
31 PRINT AT 0,30;K
32 PAUSE 200
33 PRINT AT 0,0;"GAMBLE ?"
34 PRINT AT 0,30;K
35 IF INKEY#="N" THEN LET S=S+K
36 IF INKEY#="N" THEN RETURN
37 IF INKEY#="Y" THEN GOTO 350
38 GOTO 330
39 LET L=INT (RND*2)
40 IF L=1 THEN LET N=K+5
41 IF L=0 THEN LET N=K-10
42 IF L=0 THEN LET S=S+K
43 IF L=0 THEN RETURN
44 IF K=50 THEN LET S=S+K
45 GOTO 330
46 REM START OF NUDGE
47 LET H=0
48 PRINT AT 0,0;"NUDGE ?"
49 IF INKEY#="N" THEN CLS
50 IF INKEY#="N" THEN RETURN
51 IF INKEY#="1" THEN LET A=A+1
52 IF INKEY#="2" THEN LET A=A-1
53 IF INKEY#="4" THEN LET B=B+1
54 IF INKEY#="E" THEN LET C=C-1
55 IF INKEY#="2" THEN LET B=B+1
56 IF INKEY#="3" THEN LET C=C+1
57 IF INKEY#="" THEN LET H=H+1
58 IF INKEY#<">" THEN GOSUB 10
59 IF H=3 THEN RETURN
60 GOTO 504
61 IF K=50 THEN RETURN
62 LET A$="XXXXXXXXXXXX"
63 CLS
64 PRINT AT 7,10;"1 2 3"
65 A$(A-1)="" A$(B-1)="" A$(C-1)=""
66 A$(A)="" A$(B)="" A$(C)=""
67 A$(A+1)="" A$(B+1)="" A$(C+1)=""
68 PRINT AT 0,0;N,S
69 RETURN

```

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:

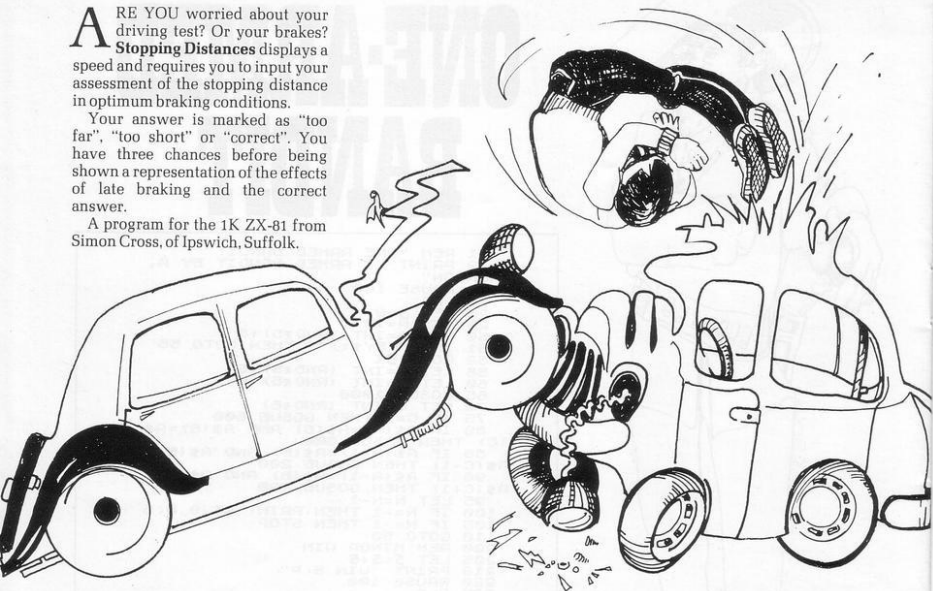
1000—Inverse ABCDEABCDEABCD.

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

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 D<C THEN GOTO 300
150 PRINT AT 7,0;"WRONG"
160 IF D>C 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 60

```

```

210 LET A$=""
220 LET B$=""
230 PRINT AT 9,17;A$;AT 10,15;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$;AT 9,7;A$;A
T 10,6;B$;AT 9,9;A$;AT 10,8;B$;A
T 9,11;A$;AT 10,10;B$;AT 9,13;A$
;AT 10,12;B$;AT 9,15;A$;AT 10,14
;B$;AT 9,17;"
270 PRINT
280 PRINT "CORRECT ANSWER = ";C
" FEET"
290 GOTO 330
300 IF A>1 THEN LET A$=" 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 A$
350 RUN

```



STAR BATTLE

```

1 PRINT AT 21,0;"
2 PRINT AT 20,0;"AAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAA
3 LET Q=161
4 LET W=161
10 REM "STAR BATTLE"
20 LET A=10
30 LET B=INT (RND*21)
35 PRINT AT A-1,5;"
40 PRINT AT A,5;CHR# 6;CHR# 6;
CHR# 134
45 PRINT AT A+1,5;"
49 PRINT AT B-1,23;"
50 PRINT AT B,23;CHR# 6;CHR# W
;CHR# 134
55 PRINT AT B+1,23;"
56 LET C=INT (RND*3)
57 IF C=2 THEN GOSUB 260
60 IF INKEY#="" THEN GOSUB 19
0
90 IF INKEY#="7" THEN LET A=A-
1
100 IF INKEY#="6" THEN LET A=A+
1
110 IF C=0 THEN LET B=B-1

```

FIGHT 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.

RE-NUMBER



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 123456789012345678901234567890123
456789012345678
10 LET A$="217D40110A00046234E2
B3E278820043E00B9C8722373234E234
62389873E0A8B3001145F18E0"
20 FOR A=0 TO 37
30 POKE 16514+A,16*CODE A$(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
```

U.K. MAP



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$="5WSR5M      NUNRNHNGN
BSXSSSSNSHSCNXXNSNNHNGS7ST5OSJSDN
YNTNNDJSDZSUSPSKSENZNU NK TVT
QTITFTA      TRTMTG"
20 INPUT B$
30 LET C$=B$(CODE "=" TO CODE
"=")
40 GOSUB CODE "COS "
50 LET M=N
60 LET D=C
70 LET C$=B$(CODE " " TO CODE
" ")
80 GOSUB CODE "COS "
90 LET V=ABS ((M-N)*CODE "="+V
AL B$(CODE " ")-VAL B$(CODE " "
))
100 LET H=ABS ((C-D)*CODE " "
AL B$(CODE " ")-VAL B$(CODE " "
))
110 PRINT INT (50R (V**2+H**2))
*6.21;" M ";B$(1 TO 4);" TO ";
B$(5 TO 8)
120 STOP
200 FOR N=CODE "=" TO 107 STEP
CODE " "
210 IF C$=A$(N TO N+CODE "=") T
HEN GOTO 230
220 NEXT N
230 FOR C=CODE "=" TO CODE " "
240 IF N=CODE "=" THEN GOTO 27
0
250 LET N=N-CODE "="
260 NEXT C
270 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

```

```

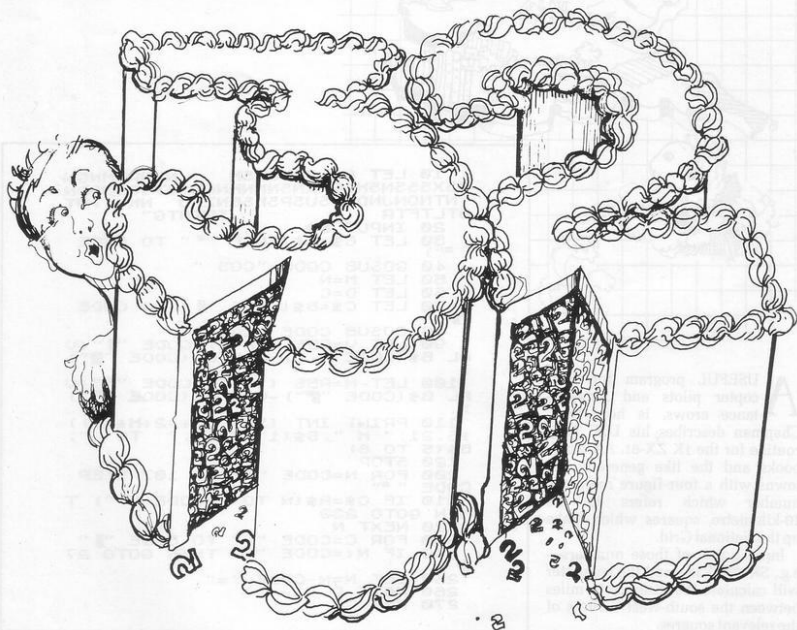
60 IF (N/Z1) * Z1=N THEN GOT 80
65 IF N=1 THEN GOTO 95
70 NEXT Z
75 GOTO 95
80 PRINT Z1; "▲"
85 LET N=N/Z1
90 GOTO 60
95 IF N=M THEN PRINT "PRIME"
100 IF M=N THEN PRINT "▲"; N
    ▲=1 SPACE

```

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 "O POSTMAN"
20 PRINT "U DOG"
30 PRINT "U DOG"
40 PAUSE 100
50 LET S=0
60 LET A=INT (RND*10)*2
70 LET B=1
80 LET C=0
90 LET D=0
100 PRINT AT 11,15:"U"
110 PRINT AT 11,15:"U"
120 PRINT AT 11,15:"U"
130 PRINT AT 11,15:"U"
140 PRINT AT 11,15:"U"
150 PRINT AT 11,15:"U"
160 IF A=10 AND B=15 THEN LET S
=S+1
170 IF A=0 AND B=0 THEN PRINT "
BROWL...YOU DELIVERED "S" LETT
ERS"
180 PRINT AT 11,15:"U"
190 LET B=B+2*(INKEY#="8")-2*(I
NKEY#="5")
200 LET A=A+2*(INKEY#="6")-2*(I
NKEY#="7")
210 IF C<A THEN LET C=C+1
220 IF C>A THEN LET C=C-1
230 IF D>B THEN LET D=D-1
240 IF D<B THEN LET D=D+1
250 CLS
260 GOTO 110

```

SOME 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 villains 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 $\times(F)+I, Y; A \& (I)$.

OUTLAW

```

1 RAND
5 LET F=0
6 LET N=0
7 DIM X(5)
8 DIM A(5)
10 DIM A$(4,5)
12 LET A$(1,1)="  "
14 LET A$(3,3)="  "
15 LET A$(4,4)="  "
20 FOR Y=2 TO 25 STEP 5
22 LET F=F+1
25 LET X(F)=INT (RAND*17)
30 LET A$(2,1)="  "+(CHR$(F+155)
33)+""
40 GOSUB 1000
50 NEXT Y
51 LET U=INT (RAND*71)+20
52 FOR S=1 TO U
54 NEXT S
55 LET T=INT (RAND*5)+1
56 FOR A=1 TO 5
58 IF A(A)=S THEN GOTO 55
59 NEXT A
60 GOTO 162
61 IF A(T)=1 THEN GOTO 50
70 LET A(T)=1
80 LET Q=2+(5*(T-1))
90 PRINT AT X(T)+2,0;"  ";TAB
Q+3;"  "
100 LET L=INT (RAND*5)+3
105 LET T$=STR$ T
110 FOR A=1 TO L
120 IF INKEY$=T$ THEN GOTO 200
130 NEXT A
132 FOR U=1 TO 5
135 PRINT AT X(T)+2,0-2;"  ";TAB
Q+5;"  "
138 PRINT AT X(T)+2,0-2;"  ";TAB
Q+5;"  "
139 NEXT U
140 FOR U=1 TO 25
141 NEXT U
145 PRINT AT X(T)+2,0;"  ";TAB
Q+3;"  "
150 PRINT AT X(T)+3,0;"  ";TAB
Q+3;"  "
160 PRINT AT Q,10;"YOUR DEAD"
162 LET P$=""
163 IF N>1 OR N=0 THEN LET P$=""
166 PRINT AT 21,5;"YOU KILLED "
;N;" OUTLAW";P$
170 STOP
200 LET D=INT (RAND*4)+3
202 LET N=N+1
205 LET F=F+1
208 LET Y=2+(5*(T-1))
210 GOSUB D+100
220 GOTO 51
300 LET A$(2,1)="  "
301 LET A$(3,3)="  "
302 LET A$(4,4)="  "
303 LET A$(4,4)="  "
310 GOSUB 1000

```



AW



```

315 LET A$(1) = "A"
316 LET A$(2) = "A"
318 LET A$(4) = "A"
322 GOSUB 1000
325 LET A$(1) = "A"
335 LET A$(2) = "A"
337 LET A$(3) = "A"
340 GOSUB 1000
345 LET A$(4) = "A"
350 GOSUB 1000
355 LET X(I) = X(I) + 1
357 LET A$(3) = "A"
359 LET A$(4) = "A"
360 PRINT AT X(I), Y, "A"
365 GOSUB 1000
370 LET A$(1) = "A"
372 LET A$(2) = "A"
374 LET A$(3) = "A"
376 LET A$(4) = "A"
380 GOSUB 1000
385 LET A$(2) = "A"
387 LET A$(3) = "A"
389 LET A$(4) = "A"
395 GOSUB 1000
396 RETURN
400 LET A$(2) = "A"
401 LET A$(3) = "A"
402 LET A$(4) = "A"
403 LET A$(4) = "A"
410 GOSUB 1000
415 LET A$(2) = "A"
418 LET A$(3) = "A"
420 LET A$(4) = "A"
425 GOSUB 1000
428 LET A$(1) = "A"
430 LET A$(2) = "A"
432 LET A$(3) = "A"
434 LET A$(4) = "A"
435 FOR U=1 TO 6
436 NEXT U
440 GOSUB 1000
450 LET A$(1) = "A"
452 LET A$(2) = "A"
454 LET A$(3) = "A"
456 LET A$(4) = "A"
457 PRINT AT X(I), Y, "A"
458 FOR U=1 TO 6
459 NEXT U
460 GOSUB 1000
470 RETURN
500 LET A$(1) = "A"
502 LET A$(3) = "A"
504 LET A$(4) = "A"
510 LET A$(2) = "A"
515 GOSUB 1000
520 LET A$(1) = "A"
522 LET A$(2) = "A"
524 LET A$(3) = "A"
526 LET A$(4) = "A"
527 FOR U=1 TO 6
528 NEXT U
530 GOSUB 1000
540 LET A$(2) = "A"
542 LET A$(3) = "A"
544 LET A$(4) = "A"
550 PRINT AT X(I), Y-1, "A"
550 GOTO 1000
550 RETURN
600 LET A$(2) = "A"
601 LET A$(3) = "A"
602 LET A$(4) = "A"
603 LET A$(4) = "A"
610 GOSUB 1000
615 LET A$(2) = "A"
618 LET A$(3) = "A"
620 LET A$(4) = "A"
621 FOR U=1 TO 6
622 NEXT U
625 GOSUB 1000
630 LET A$(2) = "A"
632 LET A$(3) = "A"
634 LET A$(4) = "A"
636 LET A$(3) = "A"
638 FOR U=1 TO 6
639 NEXT U
640 GOSUB 1000
650 LET A$(1) = "A"
652 LET A$(2) = "A"
654 LET A$(3) = "A"
656 LET A$(4) = "A"
658 PRINT AT X(I), Y+3, "A"
660 GOSUB 1000
670 RETURN
1000 FOR I=1 TO 4
1010 PRINT AT X(I) + I, Y, A$(I)
1020 NEXT I
1030 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.

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.

```

1 CLS : BORDER 4: BEEP .25.5:
BEEP .5.4: BEEP .25.5: PRINT IN
K 2: "
2 AT 1.0: "SHOOT"
3 PRINT AT 8.0: INK 0: "Use 0
to move right" 4 Use 1 to move le
ft" 5 Use 0 to fire"
3 PRINT AT 15.1: "PRESS ANY KE
Y TO START"
4 PAUSE 0
5 CLS
9 BORDER 1
10 LET s=10: LET q=0: LET a=1
30 LET b=q: LET c=5: LET d=3
50 LET e=d+d: LET f=e+e: LET g
=f+f: LET h=f+f
70 LET i=17: LET j=q: LET s=a
190 CLS
195 PRINT AT 4.0: INK 2: "
200 PRINT AT 4.0: "AT c.e. * AT c.f. "+"
AT c.g. "+" AT c.h. "+"
210 PRINT AT 9.0: INK 3: "
220 PRINT AT 9.0: "
230 PRINT AT 1.0: BEEP .25.1
240 PRINT AT 1.0: BEEP .25.1
242 LET y=b+1
244 IF i=c AND s=a OR i=c AND
s+a=f OR i=c AND s+a=g OR i=c A
ND s+a=h THEN LET j=j+1
245 IF i=c AND s=a THEN PRINT
INK 1: AT c.g. "BEEP .25.1
246 IF i=c AND s+a=f THEN PRINT
INK 1: AT c.f. "BEEP .25.1
247 IF i=c AND s+a=g THEN PRINT
INK 1: AT c.e. "BEEP .25.1
248 IF i=c AND s+a=h THEN PRINT
INK 1: AT c.d. "BEEP .25.1
250 IF i=c THEN GO TO 350

```

```

255 IF j=4 THEN GO TO 1000
256 IF s=27 THEN LET s=27
257 IF s<=0 THEN LET s=0
260 IF INKEY$="q" THEN LET s=s-
a
270 IF INKEY$="1" THEN LET s=s+
a
280 IF INKEY$="0" THEN LET i=i-
a
290 IF y=95 THEN GO TO 2000
300 GO TO 210
350 LET s=s+1
400 PRINT AT 21.0: "You have tak
en "g:"shots"
402 PRINT AT 2.0: INK 0: "Time
10000-95 Time Left 10000-95
404 LET i=17
405 FOR w=1 TO 20
406 NEXT w
407 GO TO 210
1000 BORDER 2: PAPER 7: CLS
1001 PRINT AT 1.0: INK 1: "
1005 PRINT AT 5.0: INK 2: "
1010 PRINT AT 5.0: INK 1: "
1015 PRINT AT 5.0: INK 0: "
1020 INPUT s
1030 IF s="s" OR s="y" THEN GO
TO 5
1035 STOP
2000 PAUSE 100: CLS
2002 PRINT AT 2.0: INK 1: "
2003 PRINT AT 2.0: INK 0: "
2004 PRINT AT 7.0: INK 0: "
2005 PRINT AT 15.0: INK 1: "
2010 INPUT s
2020 IF s="s" OR s="y" THEN GO
TO 5

```



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
2 LET L=VAL "12"
3 LET B=VAL "2"
4 LET S=B-B
5 FOR F=S TO L
6 PRINT " "
7 NEXT F
8 DIM X(A)
9 DIM Y(A)
10 FOR F=B/B TO B
11 LET X(F)=INT (RND*L)
12 LET Y(F)=INT (RND*L)
13 NEXT F
14 FOR F=B/B TO B
15 PRINT AT X(F),Y(F);CHR$ 128
16 LET Y(F)=Y(F)+SGN (Y(A)-Y(F))
17 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$ 132
20 IF X(F)=X(A) AND Y(F)=Y(A)
21 THEN GOTO A**A
22 NEXT F
23 PRINT AT X(A),Y(A);CHR$ 128
24 LET X(A)=X(A)+(INKEY$="6" A
ND X(A)<L)-(INKEY$="7" AND X(A)>
=L/L)
25 LET Y(A)=Y(A)+(INKEY$="8" A
ND Y(A)<L)-(INKEY$="5" AND Y(A)>
=L/L)
26 IF INKEY$="" THEN LET S=S+
A
27 GOTO VAL "14"
28 PRINT S
29 PRUSE L**A
30 CLS
31 RUN
  
```



```

1 REM SURROUND BY J.WINCHESTER
R
5 LET SX=0
5 LET SB=0
7 LET Q=PEEK 16396+256*PEEK 16421
5397
10 POKE 16418,Q
20 PRINT AT 8,8,"*****"
30 FOR P=1 TO 22
40 PRINT " "
50 NEXT P
60 PRINT "*****"
70 PRINT AT 2,2;STR$ SX;AT 2,2
8;STR$ SB
80 LET X=12
90 LET Y=0
100 LET B=12
110 LET C=23
120 LET X1=0
130 LET Y1=1
140 LET B1=0
145 LET C1=-1
150 IF PEEK (0+1+Y+33*X) <> 0 THEN
N GOTO 400
160 IF PEEK (0+1+C+33*B) <> 0 THEN
N GOTO 300
170 PRINT AT X,Y;"X";AT B,C;"B"

```

```

180 LET A=PEEK 16421
185 IF A=238 OR A=222 OR A=198
OR A=254 OR A=125 THEN LET X1=1
190 IF A=247 OR A=231 OR A=215
OR A=183 OR A=119 THEN LET X1=-1
200 IF X1<>0 THEN LET Y1=0
210 IF A=235 OR A=221 OR A=213
OR A=187 OR A=125 THEN LET Y1=1
215 IF A=237 OR A=221 OR A=253
OR A=189 OR A=125 THEN LET Y1=-1
220 IF Y1<>0 THEN LET X1=0
230 IF A=231 OR A=239 OR A=235
OR A=237 OR A=238 THEN LET B1=-1
235 IF A=119 OR A=123 OR A=125
OR A=126 OR A=127 THEN LET B1=1
240 IF B1<>0 THEN LET C1=0
245 IF A=215 OR A=219 OR A=223
OR A=221 OR A=222 THEN LET C1=1
250 IF A=183 OR A=187 OR A=189
OR A=191 OR A=198 THEN LET C1=-1
255 IF C1<>0 THEN LET B1=0
270 LET X=X+X1
280 LET Y=Y+Y1
290 LET B=B+B1
295 LET C=C+C1
295 GOTO 150
300 LET SX=SX+1
310 IF SX<15 THEN GOTO 7
320 STOP
330 LET SB=SB+1
400
410 IF SB<15 THEN GOTO 7

```

SURROUND

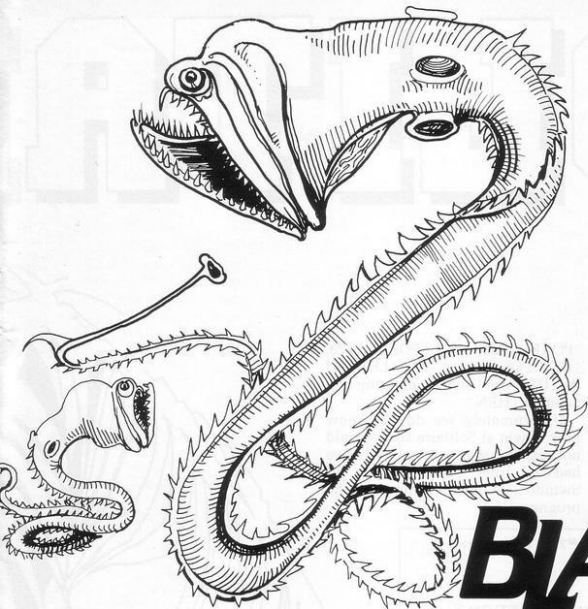


YOU WILL probably recognise **Surround** as soon as you RUN it. It is a version of a fairly standard routine in which you are required to surround your adversary before he can surround you. Both players are in continuous motion and are not allowed to cross their tracks or those of their opponent, or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

```

1 LET w=1: LET v=1
2 LET i=1: LET q=1
3 REM instructions
10 INPUT "Instructions?";b$
IF b$="n" THEN GO TO 300
20 BORDER 0: PAPER 0: INK 7
30 PRINT AT 0,4: "Welcome to Za
  g-blasters";AT 2,2: "By J. Bedwar
  e and J. Yeomans";AT 5,0: "Zags
  are invading, now defend";AT 8
  ,10: "your rights";AT 14,8: "1
  for up";AT 15,8: "2 for down";AT
  16,8: "0 to blast the Zags"
60 FOR n=-40 TO 30: BEEP 0.1,n
: BEEP 0.1,n-10: NEXT n
70 CLS
90 REM Draw board
100 PRINT AT 0,0: INK 2: "
  S,0; INK 6: "
110 PRINT AT 0,8: INK 2: "COMPUT
  ER SCORE";AT 10,8: INK 6: "PLAYER
  SCORE"
120 REM SET UP HI RES GRAPHICS
130 FOR n=0 TO 7
140 READ g
150 POKE USR "b"+n,e
160 NEXT n
170 FOR n=0 TO 7
180 READ f
190 POKE USR "d"+n,f
200 NEXT n
210 FOR n=0 TO 7
220 READ g
230 POKE USR "g"+n,g
240 REM Game working
250 BORDER 0: PAPER 0: INK 7
260 LET x=10: LET y=0: LET z=0
270 FOR n=172 TO 0: PLOT 0,n: N
  EXT n
310 LET a=8: LET b=92: LET c=10
324 LET e=INT (RND*11)+4
325 FOR p=INT (RND*20)+10 TO 0
330 STEP 1
400 PRINT AT x,y: "F": BEEP .000
100 PRINT AT x,y: "n"
430 PLOT 0,b: PLOT INVERSE 1,a,
  b
435 LET a=INKEY$
440 IF a$="1" AND x>4 THEN LET
  x=x-1

```

```

415 IF a$="1" AND b<136 THEN LE
  T b=b+3
420 IF a$="2" AND x<17 THEN LET
  x=x+3
425 IF a$="2" AND b>36 THEN LET
  b=b-3
430 LET u=150
440 IF a$="0" THEN DRAW INVERSE 1,a,u,0
445 IF e=x AND a$="0" THEN GO T
  O 5000
455 IF p<2 THEN GO TO 6000
470 PRINT AT 5,p: INK 4: "Z
  EP 0,001,20: PRINT AT e,s: "
  BE
480 NEXT p
490 GO TO 391
1000 REM Data for graphics
1040 DATA $IN 11000000,$IN 11100
  000,$IN 11100000,$IN 11011100,$I
  N 11100000,$IN 11100000,$IN 1100
  0000,$IN 00000000
1050 DATA $IN 00000001,$IN 000001
  111,$IN 00110010,$IN 01000010,$I
  N 01000011,$IN 00000011,$IN 0010
  0110,$IN 00111110
1060 DATA $IN 11000000,$IN 11111
  000,$IN 10100010,$IN 10100001,$I
  N 11100001,$IN 00111110
1070 REM you hit a Zag
1080 FOR n=0 TO 5: FOR n=0 TO 20
  STEP 5: BEEP .01,n: NEXT n: NEX
  T n
5010 PRINT AT 21,9: INK 6: "d": L
  ET q=q+2
5015 LET w=w+1: IF w=10 THEN GO
  TO 6100
5020 GO TO 391
5030 REM you've won
5100 PRINT AT 10,5: INK 6: "Zags
  defeated": FOR n=0 TO 250: NEX
  T n
5090 REM Zags landed
6000 FOR a=0 TO 2: FOR n=30 TO 0
  STEP -3: BEEP .01,n: NEXT n: NE
  XT a
6010 PRINT AT 21,1: INK 2: "U": L
  ET i=i+3
6020 LET v=v+1: IF v=10 THEN GO
  TO 6100
6030 GO TO 391
6040 REM Zags won
6100 PRINT AT 10,5: INK 2: "Zags
  have landed": FOR n=0 TO 250: NE
  XT n: RUN

```

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 E&RND=CHR$ #7? RETURN ?
2 C=Y?;"?ECOS / LET
3 GOSUB 9000
4 GOTO 1000
5 SLOW
10 PRINT AT 20,0;"MOVE FROM?"
15 INPUT F$
17 IF F$="" THEN GOTO 15
20 PRINT AT 20,9;" ";F$(1);","
F$(2);
25 PRINT " TO?"
30 INPUT T$
32 IF T$="" THEN GOTO 30
34 PRINT AT 20,16;" ";T$(1);","
T$(2);
36 LET F=VAL F$(1)
37 LET G=VAL F$(2)
38 LET T=VAL T$(1)
39 LET U=VAL T$(2)
40 IF S(F,G)=-1 THEN GOTO 10
50 IF S(T,U)=-1 THEN GOTO 10
60 IF F=G AND T=U THEN GOTO 10
70 IF VAL F$>77 OR VAL T$>77 OR
R VAL F$<11 OR VAL T$<11 THEN GO
TO 10
80 IF ABS (T-F)<>2 AND ABS (U-
G)<>2 THEN GOTO 10
85 IF F<>T AND G<>U THEN GOTO
10
86 LET X$=STR$ ((VAL F$+VAL T$
)/2)
87 IF S(F,G)=0 THEN GOTO 10
88 IF S(T,U)=1 THEN GOTO 10
89 IF S(VAL X$(1),VAL X$(2))=0
THEN GOTO 10
90 FAST
92 LET S(F,G)=0
100 LET S(T,U)=1
110 LET S(VAL X$(1),VAL X$(2))=
0
120 LET C=C+1
127 IF C=32 AND S(4,4)=1 THEN G
OTO 8000
1001 FAST
1002 CLS
1003 PRINT " 1 2 3 4 5 6 7"
1004 PRINT
1010 FOR A=1 TO 7
1020 PRINT A;" "
1030 FOR B=1 TO 7
1040 IF S(A,B)=-1 THEN PRINT "

```



ARE

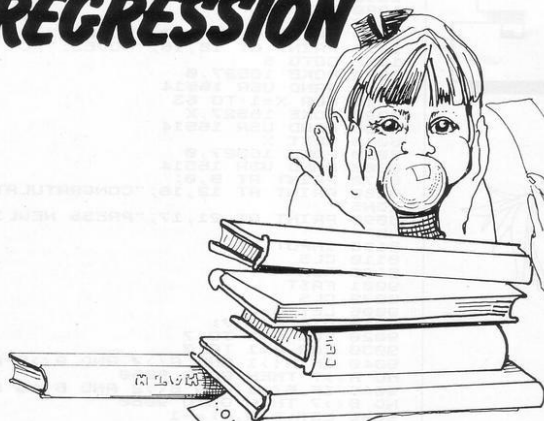


```

1050 IF S(A,B)=1 THEN PRINT "X "
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 8
8005 POKE 16527,0
8007 RAND USR 16514
8010 FOR X=1 TO 63
8020 POKE 16527,X
8030 RAND USR 16514
8040 NEXT X
8050 POKE 16527,0
8060 RAND USR 16514
8070 PRINT AT 0,0;
8080 PRINT AT 12,16;"CONGRATULAT
IGNS"
8090 PRINT AT 21,17;"PRESS NEWL I
NE"
8100 INPUT N$
8110 CLS
8120 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<>2 AND A<>6 A
ND A<>7 THEN GOTO 9060
9045 IF B<>1 AND B<>2 AND B<>6 A
ND 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 10,10;"INSTRUCTION
S? Y/N"
9110 INPUT Z$
9120 IF Z$="N" THEN RETURN
9130 SLOW
9140 CLS
9150 PRINT "
9160 PRINT " THE OBJECT OF TH
E GAME IS "
9170 PRINT " TO REMOVE ALL THE
PEGS "
9180 PRINT " EXCEPT THE LAST WH
ICH
9190 PRINT " MUST FINISH IN THE
CENTRE "
9200 PRINT " SPACE.
9210 PRINT " SPACES ARE (X).
9220 PRINT " YOU TAKE PIECES B
Y HOPPING "
9230 PRINT " OVER THEM INTO AN E
MPTY SPACE"
9240 PRINT " BEYOND REMOVING FRO
M PLAY THE
9250 PRINT " PIECE YOU HAVE HOP
ED OVER.
9270 PRINT " EACH MOVE MUST B
E MADE IN A
9280 PRINT " STRAIGHT LINE.
9310 PRINT " THE COMPUTER WILL
NOT
9320 PRINT " ACCEPT ILEGAL MOV
ES.
9330 PRINT "
9340 PRINT AT 21,17;"PRESS NEWL I
NE"
9350 INPUT N$
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"
10 LET A=0
20 LET B=0
30 LET C=0
40 LET D=0
50 LET E=0
60 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
160 LET C=C+X*X
170 LET D=D+Y*Y
180 LET E=E+X*Y
190 LET F=A/N
200 LET G=B/N
210 LET H=H+1
220 IF H<N THEN GOTO 110
270 LET I=(N*E-A*B)/(N*C-A*A)
280 LET J=G-I*F
290 PRINT "Y=";J;"+";I;"X"
300 LET K=(N*E-A*B)/(N*D-B*B)
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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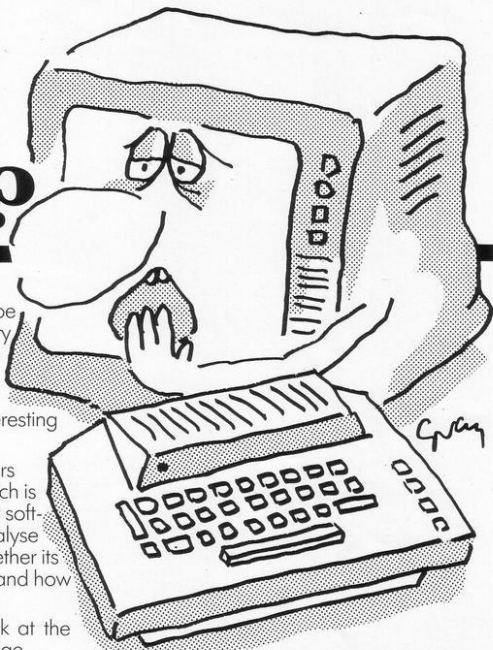
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