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September/October

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ZX Spectrum



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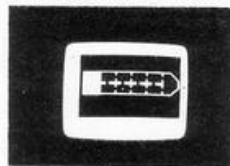
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CASSETTE 3

8 programs for 16k ZX81

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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.

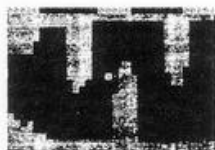
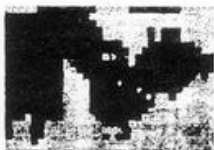
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8 games for 16k ZX81

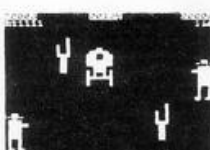
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(machine code)



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

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3D TIC-TAC-TOE (Basic)

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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.

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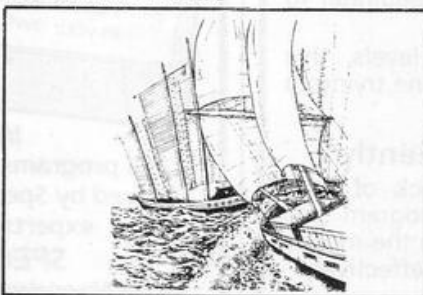
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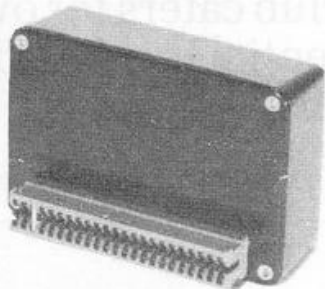
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EARTH DEFENCE

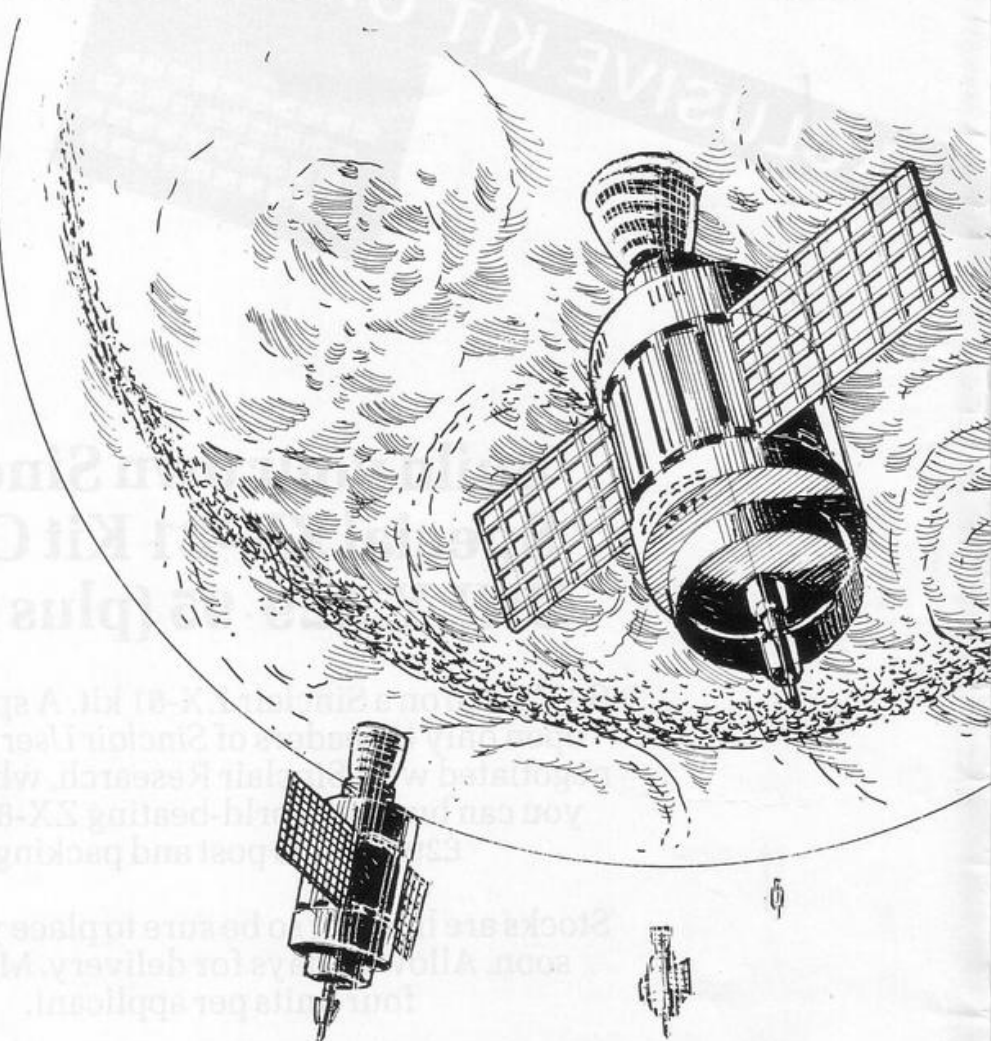
EARTH DEFENCE is an excellent arcade-quality game for the 16K Spectrum. Adrian Tucker of Fareham, Hampshire, says he designed it to be equally comfortable for both left- and right-handed operators. He has done so by using the multi-key INKEYS via the IN command in lines 110 and 160.

The effect is that your spacecraft can be manoeuvred left with any of the keys from 1 to 5, right with anything from 6 to 0, and all the bottom row keys will operate your laser.

A series of alien missiles moves up the screen towards earth. You are stationed in orbit to destroy the attackers. Each time you fire your laser points are reduced by one; if you hit a missile, you have time to recharge and you laser points are therefore incremented by one.

You receive 100 points for each missile destroyed but lose 50 if one passes you. In the bottom left of the screen is displayed the number of alien projectiles yet to hit the earth before the limit of five is reached and the game ends.

The capital letters A, B and C in inverted commas are user-defined graphics. Adrian recommends blue for line 95, yellow for 115, cyan for 125, green for 140, flashing cyan in 145, red then cyan in 320 and green in 505.



```

1 RUN 6
2 FOR "f"=0 TO 7: READ n,m,o: P
OKE USR "b"+f,n: POKE USR "a"+f,
m: POKE USR "c"+f,o
3 NEXT f
4 DATA 16,165,165,16,189,24,5
5,255,165,124,255,20,186,126,90,
254,36,165,254,60,24,170,24,165
5 STOP
10 PAPER 0: INK 7: BORDER 1: C
LS
20 LET hp=0
50 CLS : FOR f=1 TO 50: PLOT 1
NK RND*3+4,255,5*RND,175,5*RND:
NEXT f
60 LET la=50: LET l=1: PRINT A
T 21,0:"Aliens",TAB 12:"Player",
TAB 24:"Laser"
70 LET p=0: LET c=16: LET co=5
80 GO SUB 504: LET l=0
92 LET i=20: LET st=INT (RND*2
0)+5
93 IF co=0 THEN GO TO 210
95 PRINT AT i,st:"B"
100 PRINT AT i,c:""
110 LET c=c+(IN 61438<>255 AND
c<31)-(IN 63486<>255 AND c>0)
115 PRINT AT i,c:"A"
122 BEEP .005,c
125 PRINT OVER 1:AT i,st:"B"
131 LET i=i-1
133 IF i=-1 THEN GO TO 500
138 LET st=st+INT (RND*3)-1+(3
AND st<-30)-(3 AND st>30)
140 PRINT OVER 1:AT i,st:"B"
143 PRINT AT 21,19:p,""
145 IF i=1 AND st=c THEN PRINT
AT i,c:"C": GO TO 200
160 IF (IN 65276<>255 OR IN 327

```

```

66<>255) AND la>0 THEN LET la=la
-1: PRINT AT 21,30:la: GO SUB 30
0
165 IF la<10 THEN PRINT AT 21,3
1,""
170 GO TO 100
200 FOR g=1 TO 30
205 OUT 254,RND*255
206 BEEP RND*.05,RND*24-12
208 NEXT g
210 IF p>hp THEN LET hp=p
221 PRINT AT 21,0
222 INPUT "Your score=":(p)""
Hi"score="(hp)
"another go ? (y or n)": LINE
a$: IF a$="y" THEN GO TO 50
224 STOP
300 PLOT INVERSE 1,c*8+3,159
305 DRAW INK 5,0,-117
308 BEEP .05,12
309 PLOT INVERSE 1,c*8+3,159
310 DRAW OVER 1,0,-117
320 IF (i<17 AND i>1) AND st=c
THEN LET p=p+100: LET la=la+1: P
RINT AT 21,30:la: BEEP .1,2: PRI
NT OVER 1:AT i,c:"C": BEEP .2,3:
PRINT OVER 1:AT i,c:"C": BEEP .
1,4: PRINT AT i,c:"": GO TO 85
340 RETURN
500 LET p=p-50: LET co=co-1
503 PRINT AT 21,19:p,""
504 FOR f=1 TO 5
505 IF f<co THEN PRINT AT 21,6+
f,"B"
508 IF f>co THEN PRINT AT 21,5+
f,""
510 NEXT f: IF l=1 THEN RETURN
520 GO TO 90

```

BEAN CUP



SOMETIMES, when the cursor finger is worn to the knuckle and we are blinking at 50 cycles per second, nothing pleases us like a game where thinking is not just something between you and a high score. When the game works on a ZX-80, we are really happy.

Beancup is a fine brain-game from Nigeria. You sit cross-legged with a row of seven cups in front of you. Each cup contains four beans—except the store-cup on the right-hand end of the row, which is empty. Your opponent faces you with exactly the same equipment in front of him.

The display will show you two rows of numbers, representing the beans. The bottom row is yours and the top one is operated by the suddenly-cunning ZX-80.

You move by taking all the beans from one of your cups and dropping one into the cup on its right, one into the cup on the right of that, and so on, anti-clockwise round all 14 cups until you finish. You cannot empty the store-cups. The game ends when all the beans are out of circulation and the winner is the player with the most beans in his store cup.

Input the number of the cup you wish to empty and the computer will display the position of the beans after your move and its own response. If you have no beans on your side to move, then enter any number from 1 to 6.

If you can beat the machine you are better than we are. Submitted by Paul Morriss of Alford, Lincs.

```

10 DIM A(14)
100 FOR J=1 TO 14
110 IF J=7 OR J=14 THEN GOTO 130
120 LET A(J)=4
130 NEXT J
200 FOR J=1 TO 7
210 PRINT A(15-J); "2 spaces";
220 NEXT J
230 PRINT
240 PRINT
250 PRINT "4 spaces";
260 FOR J=1 TO 7
270 PRINT A(J); "2 spaces";
280 NEXT J
290 PRINT
300 PRINT
310 PRINT "ENTER CUP NO."
320 INPUT C
330 CLS
340 GOSUB 1000
400 FOR J=1 TO 6
410 IF NOT A(14-J)=0 THEN
GOTO 440
420 NEXT J
430 GOTO 460
440 LET C=14-J
450 GOSUB 1000
460 IF A(7)+A(14) < 48 THEN GOTO
200
470 IF A(7)=A(14) THEN PRINT "A
DRAW"
480 IF A(7) > A(14) THEN PRINT
"YOU WIN"
490 IF A(7) < A(14) THEN PRINT "I
WIN"
500 STOP
1000 IF A(C)=0 THEN RETURN
1010 FOR J=C+1 TO A(C)+C
1020 LET K=J
1030 IF J > 14 THEN LET K=J-14
1040 LET A(K)=A(K)+1
1050 NEXT J
1060 LET A(C)=0
1070 IF NOT A(K)=1 OR NOT K=7 OR
NOT K=14 THEN RETURN
1080 LET A(K)=A(K)+A(14-K)
1090 LET A(14-K)=0
2000 RETURN

```



PAINTPAD

```

10 REM "paintpad"
20 LET c=0: DIM g(99): DIM x(9
9): DIM y(99): LET x=1: LET y=1
30 LET v=255: FOR n=1 TO 99
40 PRINT AT 0,0: "ARROWKEYS MOV
E MARKER": PRINT "ALSO S=SU 4=NU
9=NE 0=SE": PRINT "P TO FIX A P
OINT": PRINT "H TO HOME IN ON 1s
t POINT": PRINT "x,y Point No."
50 PLOT OVER 1,x,y: LET j=CODE
INKEY$-48: IF j=56 THEN LET x=x
(1): LET y=y(1): GO TO 100
60 IF INKEY$="" THEN PRINT AT
5,0:x: "y:" "n-1:"
70 LET y=y+(j=7 OR j=9 OR j=4)
-(j=6 OR j=8 OR j=0): LET x=x+(j
=8 OR j=0 OR j=9)-(j=5 OR j=3 OR
j=4): LET x=x-(x=u+1)+(x=c-1):
LET y=y-(y=175)+(y=-1): PLOT x,y
80 IF j=64 THEN GO TO 100
90 GO TO 50
100 LET x(n)=x: LET y(n)=y
110 PLOT x+(n=1),y: IF n=1 THEN
LET s=0: LET c=x: GO TO 150
120 LET a=x(n-1): LET b=y(n-1)
130 IF s=0 AND x(n) THEN LET z=a
: LET s=1
140 IF s=1 THEN LET u=x
150 DRAW a-x,b-y: IF x-a=0 THEN
GO TO 170
160 LET g(n-1)=(y-b)/(x-a)
170 IF x=x(1) AND y=y(1) THEN L
ET d=n-1: LET n=99: LET h=1
180 IF INKEY$="p" THEN GO TO 15
0
190 NEXT n: LET L=z-x(1): CLS
200 FOR n=0 TO L: LET t=x(1)+n
210 IF t=x(d) THEN LET d=d-1: G
O TO 210
220 IF t=x(h+1) THEN LET h=h+1:
GO TO 220
230 LET r=INT (g(h)*(t-x(h))):
PLOT t,y(h)+r: DRAW 0,y(d)+INT (
-g(d)*(x(d)-t))-y(h)-r: NEXT n:
PAUSE 0: GO TO 20

```

THE AUTHOR of **Paintpad** was prompted to compose it when he noticed that the Spectrum had no PAINT—or FILL—command. The user can draw the outline of a shape and then cause that outline to be filled-in. As it stands, the program can handle a shape with up to 99 vertices but that limit can be changed by altering the number 99 in lines 20, 30 and 170.

The cursor can be moved in any of eight directions; its position is recorded on-screen and fixed with P. A line is then drawn to the last P. When the shape is complete it is filled with H.

If CLS in line 190 and PAUSE 0 in line 230 are omitted a cumulative shape can be built-up in successive runs, as it re-sets itself at the end of each run.

With the two commands in, the instructions at the top of the screen will be removed before the shape is filled. That is convenient if the filled shape is to be stored as a SCREENS.

Submitted by John McKeown of Upminster, Essex.

SHOOTING RANGE



A VERY frustrating game has been sent by Christopher Wysocki, of Swindon, Wiltshire. It is called **Shooting Range** and involves firing at a range of constantly-changing letters.

The letters have values ranging from one for A to 26 for Z and the aim is to achieve as high a score as possible. A time-limit is imposed by a grey square which travels along the row of letters and the game ends if it is not shot down before reaching the end of the rows.

It is a simple program and because of that the movement of the bullets from the gun is slow and only one shot can be fired at a time. That makes it difficult to hit the grey square, as you have to anticipate its position in good time.

Throughout testing, our reviewer found it impossible to hit the grey square but still managed a high score of 314.

The gun is moved to the right and left by the cursor keys and the upward cursor, key 7, is used for firing. Graphics notes:

Line 70, a shifted Q with a space on either side and shifted 3 with a space on either side; the grey square is a shifted H and the double quotes throughout have a space between them except for line 580.

```

1 REM "GUNNER"
2 GOTO 500
3 LET HS=0
4 LET H=19
5 DIM A$(1,6000)
6 LET X=0
7 FOR N=1 TO 65 STEP 2
8 LET A$(1,N)=CHR$(INT (RND*
9 26)+166)
10 NEXT N
11 LET N=2
12 LET Z=0
13 LET S=0
14 PRINT AT 0,0;"SCORE","HIGH-
15 SCORE";AT 1,0;S,HS
16 PRINT AT 3,0;A$(1,N TO N+31
17 );AT 5,0;A$(1,N+33 TO N+65);AT 2
18 1,Z;" ";AT 20,Z;" ";
19 LET A$(1,N+65)=CHR$(INT (R
20 ND*26)+166)
21 IF INT (RND*40)=10 THEN LET
22 A$(1,N+65)="H"
23 IF A$(1,N+1)="H" THEN GOTO
24 350
25 LET N=N+2
26 IF X<>0 THEN GOTO 140
27 IF INKEY$="S" AND Z<28 THEN
28 LET Z=Z+1
29 IF INKEY$="5" AND Z>1 THEN
30 LET Z=Z-1
31 IF INKEY$="7" THEN GOTO 140
32 GOTO 70
33 LET H=H-2
34 PRINT AT H,Z+1;
35 LET A=PEEK (PEEK 16398+256*
36 PEEK 16399)
37 PRINT " "
38 PRINT AT H+2,Z+1;" "
39 LET X=X+1
40 IF X<>0 THEN GOTO 250
41 IF H<3 THEN PRINT AT H,Z+1;
42
43 IF H<3 THEN LET X=0
44 GOTO 70
45 IF R-165<0 THEN LET R=165
46 LET S=S+(R-165)
47 LET X=0

```

```

270 PRINT AT 1,0;S
280 IF H=3 THEN LET A$(1,N+(Z-1
29 )=" "
290 IF H=5 THEN LET A$(1,N+(32+
30 Z))=" "
310 LET H=19
320 GOTO 70
330 CLS
340 PRINT "SCORE","HIGH-SCORE"
350 IF S>HS THEN LET HS=S
360 PRINT S,HS
370 PRINT
380 PRINT "THE ""H"" GOT AWAY."
390 PRINT
400 PRINT "DO YOU WANT TO TRY A
41 GAIN(Y/N)?"
420 INPUT Z$
430 IF Z$<>"YES" AND Z$<>"Y" AN
44 D Z$<>"NO" AND Z$<>"N" THEN GOTO
45 430
460 CLS
470 IF Z$="YES" OR Z$="Y" THEN
48 GOTO 5
490 STOP
500 PRINT TAB 12;"GUNNER"
510 PRINT TAB 12;"-----"
520 PRINT
530 PRINT "THE POINT OF THIS GA
54 ME IS TO GET AS MANY POINTS AS PO
55 SSIBLE BY SHOOTING THE LETTERS
56 BUT YOU MUST NOT LET THE ""H""
57 "" GET AWAY."
580 PRINT "THE FURTHER THE LETT
59 ER IS IN THE ALPHABET THE MORE IT
60 S WORTH FOR EXAMPLE ""H"" IS WOR
61 TH MORE THAN ""A"". TO MOVE THE
62 GUN YOU USE THE
63 UPWARD POINTING CURSOR KEY
64 TO FIRE."
650 PRINT "GOOD LUCK"
660 PRINT
670 PRINT "HIT ANY KEY TO CONTI
68 NUE."
690 IF INKEY$="" THEN GOTO 580
700 CLS
710 GOTO 5

```

Press any letter and the little man in the middle distance will give the appropriate semaphore signal, while FUNCTION induces something which looks like an attempt at vertical take-off, but is really the signal for Attention. 16K ZX-81.

```

4,13;" ";AT 5,14;"0";AT 6,
13;" ";AT 7,13;"0";AT 6,
230 IF A$=CHR$ 53 THEN PRINT AT
4,13;" ";AT 5,14;"0";AT 6,
13;" ";AT 7,13;"0";AT 6,
240 IF A$=CHR$ 54 THEN PRINT AT
4,13;" ";AT 5,14;"0";AT 6,
13;" ";AT 7,13;"0";AT 6,
250 IF A$=CHR$ 55 THEN PRINT AT
4,13;" ";AT 5,14;"0";AT 6,
13;" ";AT 7,13;"0";AT 6,
260 IF A$=CHR$ 56 THEN PRINT AT
4,13;" ";AT 5,14;"0";AT 6,
13;" ";AT 7,13;"0";AT 6,
270 IF A$=CHR$ 57 THEN PRINT AT
4,13;" ";AT 5,14;"0";AT 6,
13;" ";AT 7,13;"0";AT 6,
280 IF A$=CHR$ 58 THEN PRINT AT
4,13;" ";AT 5,14;"0";AT 6,
13;" ";AT 7,13;"0";AT 6,
290 IF A$=CHR$ 59 THEN PRINT AT
4,13;" ";AT 5,14;"0";AT 6,
13;" ";AT 7,13;"0";AT 6,
300 IF A$=CHR$ 60 THEN PRINT AT
4,13;" ";AT 5,14;"0";AT 6,
13;" ";AT 7,13;"0";AT 6,
310 IF A$=CHR$ 61 THEN PRINT AT
4,13;" ";AT 5,14;"0";AT 6,
13;" ";AT 7,13;"0";AT 6,
320 IF A$=CHR$ 62 THEN PRINT AT
4,13;" ";AT 5,14;"0";AT 6,
13;" ";AT 7,13;"0";AT 6,
330 IF A$=CHR$ 63 THEN PRINT AT
4,13;" ";AT 5,14;"0";AT 6,
13;" ";AT 7,13;"0";AT 6,
340 IF A$=CHR$ 64 THEN PRINT AT
4,13;" ";AT 5,14;"0";AT 6,
13;" ";AT 7,13;"0";AT 6,
350 IF A$=CHR$ 121 THEN GOTO 51
0
500 GOTO 50
510 FOR X=1 TO 5
520 PRINT AT 4,13;" ";AT 5,
14;"0";AT 6,13;" ";AT 7,13
;
525 FOR N=1 TO 5
530 NEXT N
550 PRINT AT 4,13;" ";AT 5,
14;"0";AT 6,13;" ";AT 7,1
3;"
560 NEXT X
570 GOTO 40

```

AIR SEA RESCUE



```

10 LET L=VAL "10"
20 LET C=VAL "20"
30 LET A$=""
40 FOR T=VAL "0" TO VAL "60"
50 CLS
55 LET D=INT (AND#4)+12
60 PRINT AT 10,5;"-----"
  ; AT L-1,C-1;"---"; AT L,C;
  ; AT L+1,C+1;"J"; AT L+2,C+
1;A$
70 IF A$="" THEN PRINT AT 10,D
;"0"
90 IF INKEY$="7" AND L=VAL "10"
  AND C=D-1 THEN LET A$="0"
100 IF A$="0" AND L=VAL "9" THE
N GOTO 180
110 IF L=VAL "10" THEN GOTO 160
120 LET C=C+(INKEY$="8")-(INKEY
$="5")
130 LET L=L+(INKEY$="6")-(INKEY
$="7")
140 NEXT T
150 PRINT "OUT OF FUEL"
160 PRINT "CRASH"
170 STOP
180 PRINT "SAVED: ";T

```

THE OBJECT of **Air Sea Rescue** is to rescue a sailor bobbing around below your helicopter. You must hook him to safety before you run out of fuel. You steer the whirly-bird with the usual cursor keys and you will crash if you get too close to the water.

A time is given for completing the rescue. Andrew Blackburn of North Hykeham, Lincoln, who submitted the program, reports his fastest time as 15. We did not manage anything better than 30. (1K ZX-81). Graphic notes:

60—Graphic F, inverse space, two graphics 7s.

TREASURE HUNT is a game of almost arcade quality. You are in a system of 21 underground caves filled with monsters and poisonous fungoids. The aim is to collect treasure, by running over the asterisks, and deposit it in Cave O. You cannot carry more than five bags of treasure at a time and even one will slow your progress.

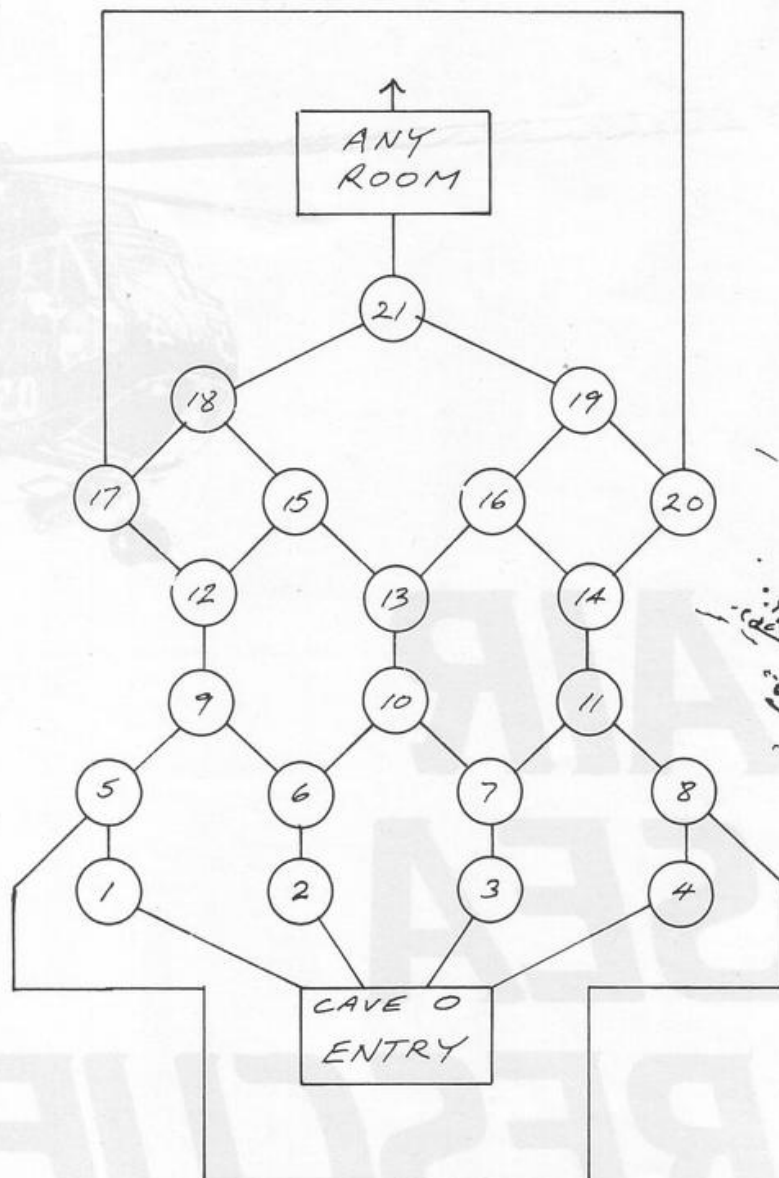
The display is of the current cave—see the illustration. You are able to move around with the cursor keys and the exits are represented by the areas of graphic A at the top and bottom of the screen. It is not possible to return to the previous cavern.

To protect yourself against monsters and to clear a path through the fungoids you can loose an arrow, with F followed by the appropriate cursor key. Remember, though, that new arrows are obtainable only in the entrance cave in exchange for captured treasure.

In Cave 21 there is a hoard of treasure guarded by a growing serpent which will attempt to seal-off exits. Shooting a hole in it is usually only a temporary measure, unless you also shoot at something else, in which case the serpent will attach itself to the other target.

The score is calculated by Monsters killed $\times 5$; + treasure captured $\times 10$; = arrows bought $\times 4$. Reincarnation is granted if you score more than 50 between deaths.

A fine program, to be typed and taped, from Paul Sherwood of Hartlepool, Cleveland. 16K ZX-81.



```

5 DIM D(3,2)
7 DIM T(20)
8 LET Z$="YOU ARE IN THE ENTRA
ANCE HALL"
10 LET LR=0
11 LET C$=" "
13 LET C$=C$+" "
15 LET C$=C$+" "
20 LET ARR=5
25 FOR I=1 TO 20
30 LET T(I)=1
35 NEXT I
37 LET PS=0
40 LET S=0
55 LET Q=PEEK 16396+256*PEEK 1
6397+1
60 LET TR=0
65 RAND
66 LET NOW=INT (RAND*5000)
70 LET B$="9B99AF9D99CHAHIBIJ"
72 LET B$=B$+"CUKDEKEFLFGMHGN"
74 LET B$=B$+"IQOJOPKPTLMRNS"
76 LET B$=B$+"LROQUPTUNQ9S9RS"
80 LET R1=0
82 LET R2=0
84 LET R3=0
95 GOTO 1300
150 CLS
160 REM CAVE PLAY
162 RAND (PR*10+NOW)
165 FOR I=0 TO 20
170 LET IY=NOW*16+2
175 LET IX=NOW*27+2
180 PRINT AT IY,IX;" "
185 IF RAND>.5 THEN PRINT AT IY-
1,IX-1;CHR$(128+RAND*2)
190 PRINT AT IY,IX+1;" "
195 PRINT AT IY+1,IX;CHR$(128+
RAND*2);

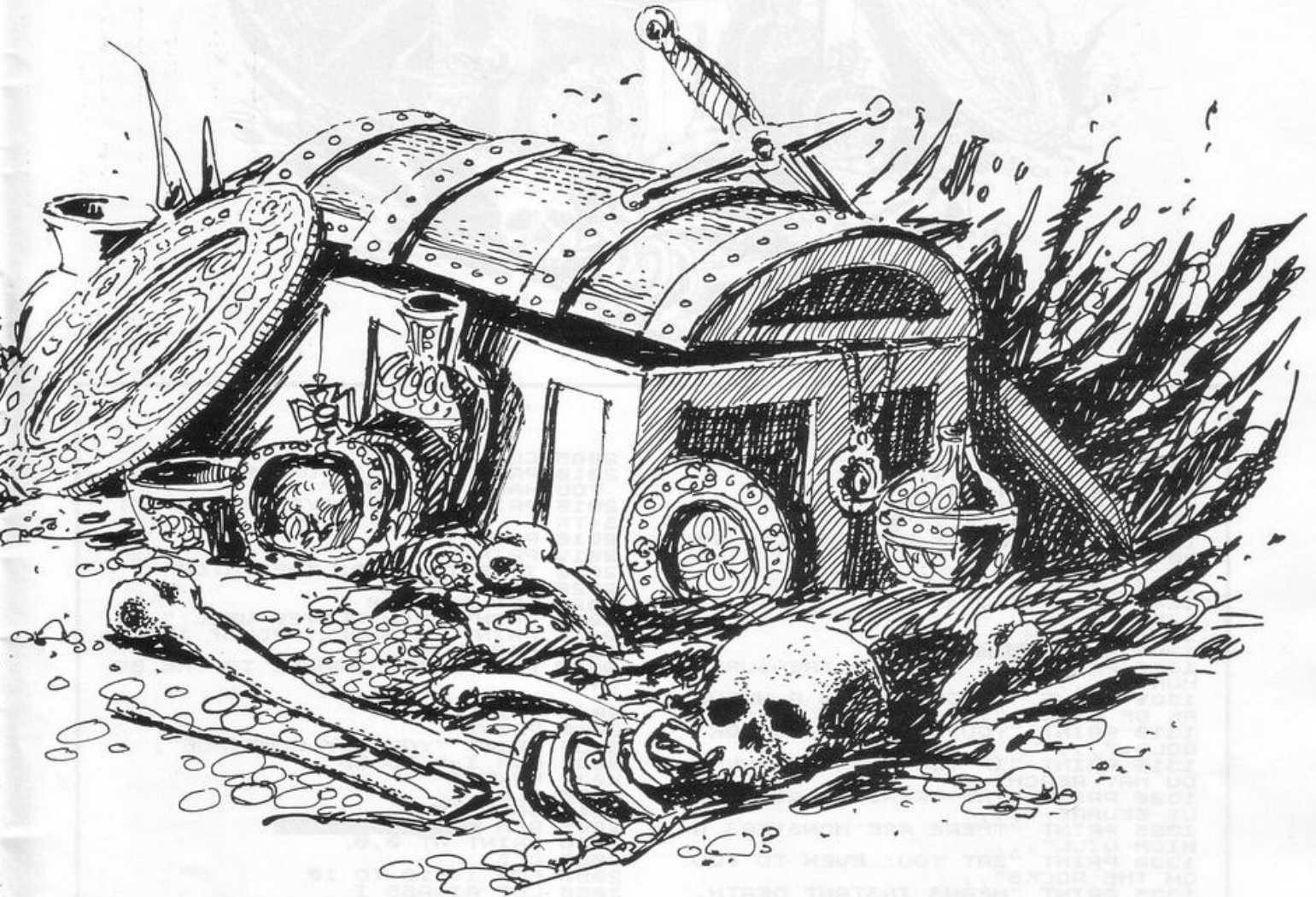
```

```

300 IF RAND>.6 THEN PRINT AT IY+
1,IX+1;CHR$(130);
205 PRINT AT I,0;" " ; AT I,31;" "
210 NEXT I
212 PRINT AT 0,1;C$; AT 20,1;C$;
214 PRINT AT 0,17;A1; AT 20,17;A
2;
215 LET N=11
220 LET M=1
222 IF T(PR)=1 THEN PRINT AT IY
,IX+1;" "
224 LET T(PR)=0
225 REM DEMON PART
230 LET DEM=INT (RAND*4)
235 FOR I=1 TO DEM
240 LET D(I,1)=INT (RAND*19+1)
245 LET D(I,2)=INT (RAND*30+1)
250 PRINT AT D(I,1),D(I,2);" "
255 NEXT I
265 REM HERO RUN
275 PRINT AT N,M;"X"
280 IF INKEY$<>"F" THEN GOTO 30
285 IF ARR=0 THEN GOTO 300
290 LET ARR=ARR-1
295 GOSUB 1000
298 PRINT AT 21,0;"ARROWS:";ARR
300 LET N1=N
305 LET M1=M
310 LET M=M+(1 AND INKEY$="S") -
(1 AND INKEY$="5")
315 LET N=N+(1 AND INKEY$="5") -
(1 AND INKEY$="7")
320 LET Q1=PEEK (Q+33*N+M)
325 IF Q1>62 THEN GOTO 2000
330 IF Q1=23 AND TR<50 THEN LET
TR=TR+10
335 IF Q1=0 THEN GOTO 300

```

Treasure Hunt



```

338 IF ABS (10-N)=10 THEN GOTO
2000
339 IF PR=21 THEN GOTO 355
340 IF DEM=0 AND AND<.23 THEN L
ET DEM=1
342 IF AND<.3+TR/200 THEN GOSUB
1200
345 PRINT AT N1,M1;" ";
350 GOTO 265
355 GOSUB 3000
360 GOTO 345
800 REM ROOM-SUBROUT
805 CLS
810 LET LR=PR
812 IF PR<>21 THEN GOTO 815
813 LET PR=INT (AND*19+1)
814 GOTO 825
815 IF N=0 THEN LET PR=R1
820 IF N=20 THEN LET PR=R2
822 IF PR=0 THEN GOTO 1505
825 PRINT AT 3,2;"YOU ARE IN TH
E TUNNEL"
830 PRINT AT 5,2;"BETWEEN ";LR;
" AND ";PR
835 PRINT AT 8,2;"YOU HAVE ";AR
R;" ARROWS"
840 PRINT AT 11,2;"YOUR SCORE I
S ";TR+S
915 IF PR=21 THEN GOTO 2050
920 LET R$=R$(PR+3-2)
925 LET R1=CODE (R$)-37
930 LET R$=R$(PR+3-1)
935 LET R2=CODE (R$)-37
940 LET R$=R$(PR+3)
945 LET R3=CODE (R$)-37
950 IF R1=LR THEN LET R1=R3
955 IF R2=LR THEN LET R2=R3
970 GOTO 150
1000 REM FIRE

```

```

1003 IF PR=21 THEN GOSUB 3000
1005 IF AND<.5 THEN GOSUB 1200
1010 LET F$=INKEY$
1015 IF F$="" OR F$="F" THEN GOT
O 1000
1020 LET Y1=N
1025 LET X1=M
1030 LET MY=0+(1 AND F$="5")-(1
AND F$="7")
1035 LET MX=0+(1 AND F$="8")-(1
AND F$="5")
1040 LET X1=X1+MX
1045 LET Y1=Y1+MY
1050 IF ABS (15-X1)=15 OR ABS (1
0-Y1)=10 THEN GOTO 1125
1053 IF PEEK (0+33+Y1+X1)<>0 THE
N GOTO 1070
1055 PRINT AT Y1,X1;"+"
1060 PRINT AT Y1,X1;" ";
1065 GOTO 1040
1070 LET DHIT=DEM
1075 FOR I=1 TO DHIT
1080 LET Y=D(I,1)
1085 LET X=D(I,2)
1090 IF X<>X1 OR Y<>Y1 THEN GOTO
1115
1095 PRINT AT Y1,X1;"#";
1098 LET S=S+5
1100 LET D(I,1)=D(DEM,1)
1105 LET D(I,2)=D(DEM,2)
1110 LET DEM=DEM-1
1115 NEXT I
1117 IF PR=21 THEN LET FX=X1
1118 IF PR=21 THEN LET FY=Y1
1120 PRINT AT Y1,X1;" ";
1125 RETURN
1200 REM DEMAN-RUN
1201 FOR I=1 TO DEM
1205 LET X=D(I,2)

```



```

1210 LET Y=D(I,1)
1215 PRINT AT Y,X;" ";
1220 LET Y=Y+SGN (M-Y)
1225 LET X=X+SGN (M-X)
1235 PRINT AT Y,X;" ";
1238 IF X=M AND Y=M THEN GOTO 2000
1240 LET D(I,1)=Y
1245 LET D(I,2)=X
1250 NEXT I
1255 RETURN
1295 REM START
1300 PRINT "THIS IS TREASURE-
HUNT"
1305 PRINT "YOU ARE IN A NETWO
RK OF CAVES."
1310 PRINT "YOU ARE LOOKING FOR
GOLD."
1315 PRINT "IF YOU ARE CAREFUL Y
OU MAY REACH"
1320 PRINT "THE TREASURE ROOM, B
UT BEWARE:"
1325 PRINT "THERE ARE MONSTERS W
HICH WILL"
1330 PRINT "EAT YOU: EVEN TO TOU
CH THE ROCKS"
1335 PRINT "MEANS INSTANT DEATH."
1340 PRINT Z$;
1342 PRINT "CHOOSE CAVE 1,2,3 OR
4?"
1345 INPUT PR
1350 IF PR<1 OR PR>4 THEN GOTO 1
345
1360 LET LR=0
1500 GOTO 915
1505 PRINT Z$
1510 PRINT "YOUR TREASURE IS SAF
E HERE."
1515 PRINT "YOUR SCORE IS ";S+TR
1518 PRINT TAB 0;"YOU HAVE ";ARR
;" ARROWS."
1520 PRINT TAB 0;"ARE YOU GOING
BACK IN?"
1525 INPUT F$
1530 IF F$="NO" THEN PRINT "YOU
SCORED ";S+TR
1535 IF F$="NO" THEN STOP
1540 LET S=S+TR
1545 LET TR=0
1550 PRINT "HOW MANY ARROWS DO Y
OU WANT?"
1560 PRINT "THEY ARE 4 POINTS EA
CH"
1570 INPUT F
1580 IF F<4>5 THEN GOTO 1650
1590 LET S=S-F+4
1600 LET ARR=ARR+F
1610 GOTO 1342
1650 CLS
1655 PRINT "YOU CANT AFFORD TH
EM"
1660 GOTO 1550
2000 REM DEATH OF A HERO

```

```

2005 CLS
2010 PRINT AT 5,1;"UNFORTUNATELY
YOU HAVE PERISHED"
2015 PRINT AT 8,1;"YOU SCORED:";
S+TR
2018 PRINT
2019 PRINT
2020 IF S+TR<50+PS THEN STOP
2025 LET S=S-15
2028 LET PS=S+TR
2029 PRINT "YOU PLAYED WELL:"
2030 PRINT "I SHALL DEDUCT 15"
2031 PRINT
2032 PRINT "FOR DAMAGE TO THE BO
DY";
2033 PRINT
2034 PRINT
2035 PRINT "YOU MAY CONTINUE";
2036 FOR I=1 TO 50
2037 NEXT I
2038 CLS
2040 GOTO 1505
2045 REM TREASURE ROOM
2050 PRINT AT 0,0;
2052 CLS
2055 FOR I=-10 TO 10
2058 LET AI=ABS I
2060 PRINT TAB 0;C$( TO AI);
2065 PRINT TAB (30-AI);C$( TO AI
)
2070 NEXT I
2075 PRINT AT 0,10;C$( TO 10)
2080 PRINT AT 20,10;C$( TO 10)
2085 PRINT AT 10,0;" ";TAB 29;" "
2086 LET DEM=1
2087 LET QU=INT (AND*4)
2090 FOR I=1 TO QU+1
2095 PRINT AT 12+I,12+(AND*2);"*
**";
2100 NEXT I
2105 LET N=10
2106 LET MY=-1
2107 LET MX=0
2108 LET K=18
2109 LET J=7
2110 LET M=2
2111 LET FX=J
2112 LET FY=K
2115 GOTO 265
2999 REM TRAP
3000 IF PEEK (0+33*(K+MY)+J+MX) =
0 THEN GOTO 3015
3002 LET AD=MY
3005 IF AD=0 THEN LET MY=MX
3006 IF AD=0 THEN LET MX=0
3007 IF AD<>0 THEN LET MY=0
3008 IF AD<>0 THEN LET MX=0-AD
3015 LET J=J+MX
3020 LET K=K+MY
3025 PRINT AT K,J;" ";
3030 IF AND<.5 THEN PRINT AT FY,
FX;" ";
3032 IF AND<.25 THEN GOSUB 1200
3035 RETURN

```

SQUASHED



SQUASHED is an intriguing version of the **Break Out** game for an expanded ZX-81. Imagine a squash court full of milk bottles and a ball made of solid steel. Your job is to break the bottles by moving the bat with keys S and Z.

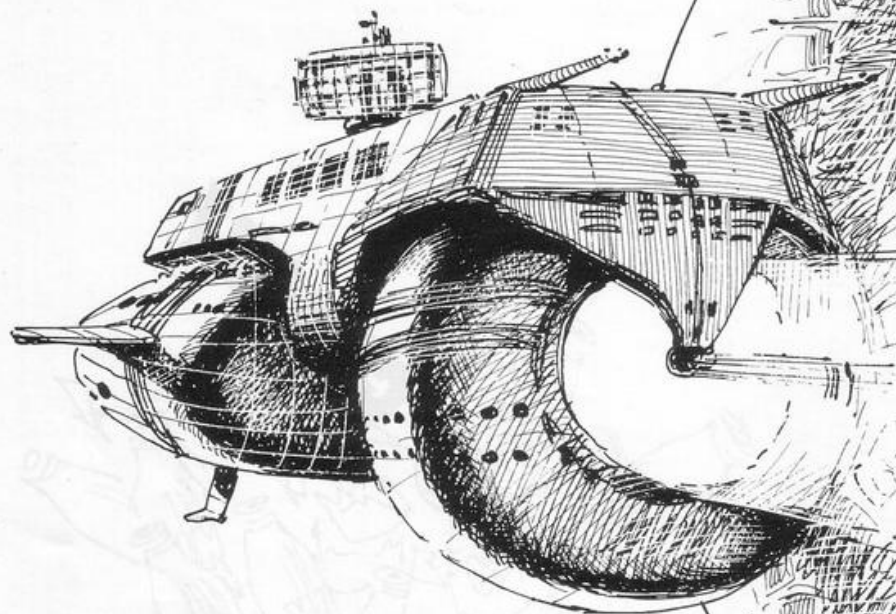
A running score is kept and the game ends when you destroy all the targets or lose your allocated three balls.

```

20 REM (C) PER GRONBORG, 1982
30 REM RESET HI-SCORE BY EN-
   TERING "POKE 16514,0"
40 LET BALLS=3
45 LET HI=PEEK 16514
50 LET BT=0
55 LET BB=11
75 LET Y1=SGN (RND-0.5)
80 LET K=0
85 LET B=0
90 LET P=PEEK 16396+256*PEEK 1
   6397+1
100 FAST
105 CLS
110 FOR T=0 TO 30
120 PRINT AT 0,T;" "
130 PRINT AT 20,T;" "
140 IF T<20 THEN PRINT AT T,0;"
   "
150 NEXT T
160 FOR T=2 TO 18 STEP 2
170 FOR I=1 TO 21 STEP 2
180 PRINT AT T,I;" "
190 NEXT I
200 NEXT T
210 FOR T=BT TO BB
220 PRINT AT T,31;" "
230 NEXT T
240 PRINT AT 21,0;"SCORE:0  HI
   -SCORE:";HI
245 SLOW
250 FOR T=1 TO BALLS
260 LET X=30
265 LET Y=0
270 LET X1=-1
280 PRINT AT 21,24;"BALLS:";T
300 IF (INKEY$<>"I")+ (BB=19) TH
   EN GOTO 350
310 PRINT AT BT,31;" "
320 LET BB=BB+1
330 LET BT=BT+1
340 PRINT AT BB,31;" "
350 IF (INKEY$<>"S")+ (BT=1) THE
   N GOTO 400
360 PRINT AT BB,31;" "
370 LET BB=BB-1
380 LET BT=BT-1
390 PRINT AT BT,31;" "
405 IF X=1 THEN LET X1=1
410 LET X=X+X1
415 IF (Y=19)+(Y=1) THEN LET Y1
   =Y1*(-1)
420 LET Y=Y+Y1
425 LET B1=B
430 LET B=P+33*Y+X
440 IF PEEK B<>133 THEN GOTO 50
   0
450 LET K=K+1
460 LET X1=X1*-1
470 PRINT AT 21,B;K
500 POKE B,CODE "0"
505 POKE B1,0
510 IF X=1 THEN LET X1=X1*-1
520 GOTO 600-(X=30)*70
530 GOTO 1000-(Y<=BB)*(Y>=BT)*4
   60
540 LET X1=-1
550 IF NOT (Y1<0)*(Y=BT)+(Y1<0)
   *(Y=BB) THEN GOTO 570
560 LET Y1=0
565 GOTO 560
570 IF Y1=0 THEN LET Y1=Y1+(Y=B
   B)-(Y=BT)
998 GOTO 300
1000 PRINT AT Y,X;" "
1010 NEXT T
1020 PAUSE 200
1100 IF HI>K THEN GOTO 1200
1110 POKE 16514,K
1120 SCROLL
1130 SCROLL
1140 PRINT "CONGRATULATIONS. NEW
   HI-SCORE"
1200 SCROLL
1210 SCROLL
1220 PRINT "DO YOU WANT TO PLAY
   AGAIN (Y/N)?"
1230 PAUSE 50
1240 IF INKEY$="Y" THEN RUN
1250 CLS

```

SPACE MISSION



```

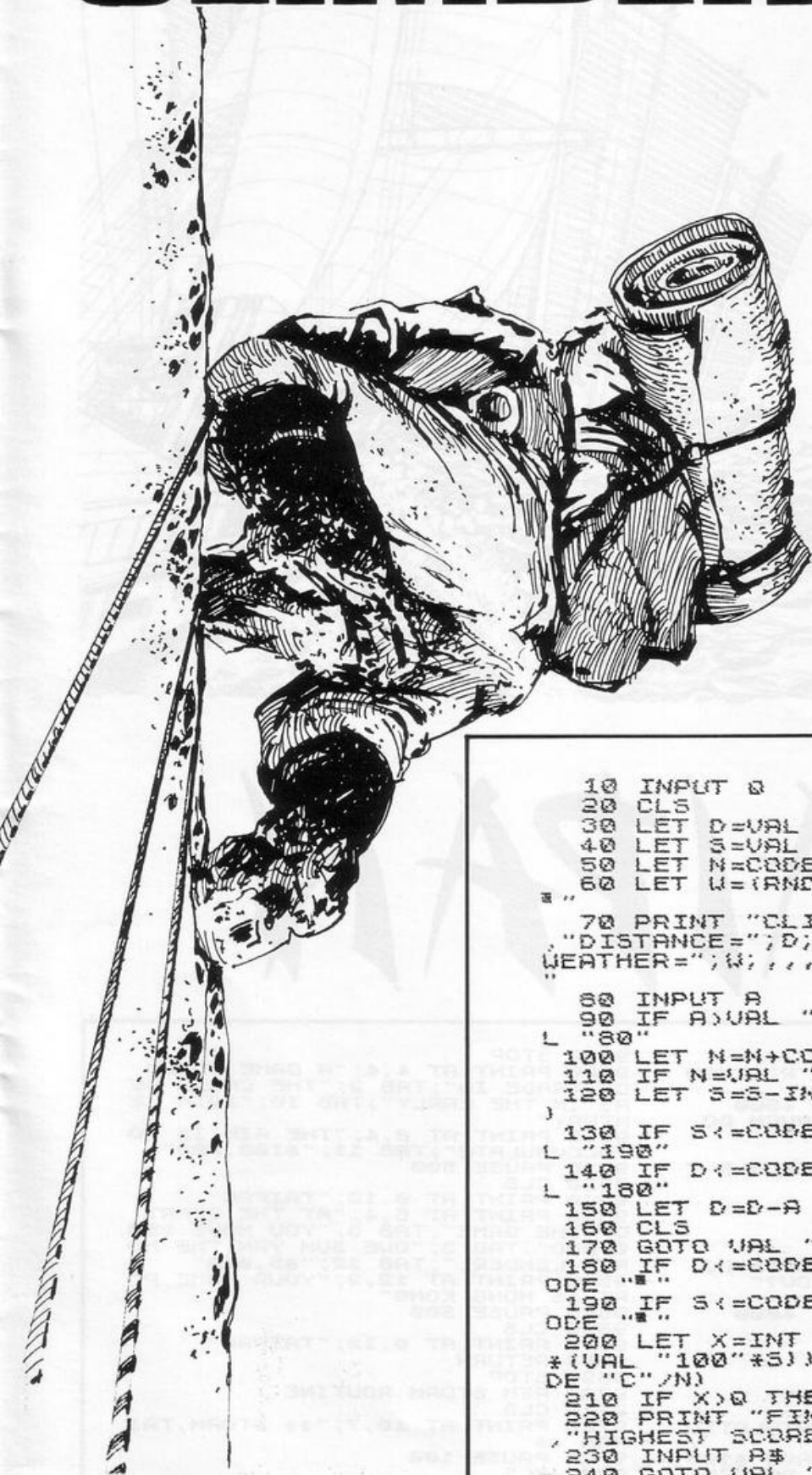
10 RAND
20 GOSUB 240
30 FOR M=99 TO 0 STEP -1
40 PRINT AT 10,C: " * * * * "
* *
50 PRINT AT 12,C-1: " * * * "
* *
60 PRINT AT 14,C: " * * * * "
*
70 IF C<4 OR C>7 THEN LET C1=-
C1
80 LET C=C+C1
90 LET X=X+(INKEY$="0" AND X<1
9)- (INKEY$="1" AND X>10)
100 PRINT AT Y,X-1: "
110 LET Y=Y-RND-.3
120 IF Y<9 THEN LET Y=21
130 PRINT AT Y,X:
140 LET P=PEEK (PEEK 16398+256*
PEEK 16399)
150 PRINT "A"
160 IF P=23 THEN LET S=S-10
170 PRINT AT 2,19:M
180 PRINT AT 0,19:STR$ S+" **"
190 LET S=S+1
200 NEXT M
210 CLS
220 PRINT AT 10,10: "GAME OVER"
230 STOP
240 LET C=4
250 LET S=0
260 LET C1=1
270 LET X=15
280 LET Y=21
290 FOR I=15 TO 20
300 PRINT AT 1,5: " "; AT 1,21: " "
310 NEXT I
320 PRINT AT 0,5: " ** SCORE= "
330 PRINT AT 2,5: " ** TIME = "; A
T 2,20: " ** "
340 RETURN

```

SPACE MISSION was written by Mark Philips of Streatham, London, for an expanded ZX-81. The object is to guide your star ship "A" through a cloud of roaming aliens. If you succeed you will be repositioned on the surface of Planet X, ready to try again. That continues for as long as the program does.

Points are scored for staying alive and are reduced by 10 for hitting an alien. Both the score and the elapsed time are displayed. Key 1 moves you left and key 0 moves your right. You can increase the difficulty of the game by changing line 80 to "LET C = C + C1 + (RND*2-1)". That randomises the movements of the aliens.

CLIMBER



YOUR AIM is to climb a 1,000-metre mountain in 10 days. If you fail to finish in the allotted time or run out of supplies, the trip is cancelled and abandoned. Bad weather may hinder your progress.

When the program is run, an input mode will await the highest previous score—enter 0 on your first run. The display will then show the climbing day, distance to the summit, number of supply units from 75 to zero, and the weather on a scale of awfulness up to 10.

As group leader you must enter the distance you wish to travel on that day, the maximum being 300 metres. Remember that you will use more supplies in bad-weather climbing and that in the worst conditions it may be advisable to stay in the tent.

When the distance reaches 0, enter zero to obtain your final score. That is dependent on the number of supply units and days expended; David Stewart of Darlington, who submitted the program, reports that his best result is 251. The program runs on a 1K ZX-81. Graphics notes: 50,100,180 & 190—graphic shifted 1. 60—graphic shifted 2, graphic shifted 1.

```

10 INPUT 0
20 CLS
30 LET D=VAL "1000"
40 LET S=VAL "75"
50 LET N=CODE "*"
60 LET U=(AND#CODE "0") + CODE "
"
70 PRINT "CLIMBING DAY ";N;,,,
"DISTANCE=";D;,,, "SUPPLY=";S;,,,
"WEATHER=";U;,,, "ENTER DISTANCE?"
80 INPUT A
90 IF A>VAL "300" THEN GOTO UA
L "80"
100 LET N=N+CODE "*"
110 IF N=VAL "11" THEN STOP
120 LET S=S-INT ((A+U)/CODE "C")
130 IF S<CODE " " THEN GOTO UA
L "190"
140 IF D<CODE " " THEN GOTO UA
L "180"
150 LET D=D-A
160 CLS
170 GOTO VAL "60"
180 IF D<CODE " " THEN LET D=C
ODE "*"
190 IF S<CODE " " THEN LET S=C
ODE "*"
200 LET X=INT (((VAL "1000"/D)
*(VAL "100"*S))/VAL "100000")*CO
DE "C"/N)
210 IF X>0 THEN LET D=X
220 PRINT "FINAL SCORE=";X;,,,
"HIGHEST SCORE=";0
230 INPUT A$
240 GOTO VAL "20"

```

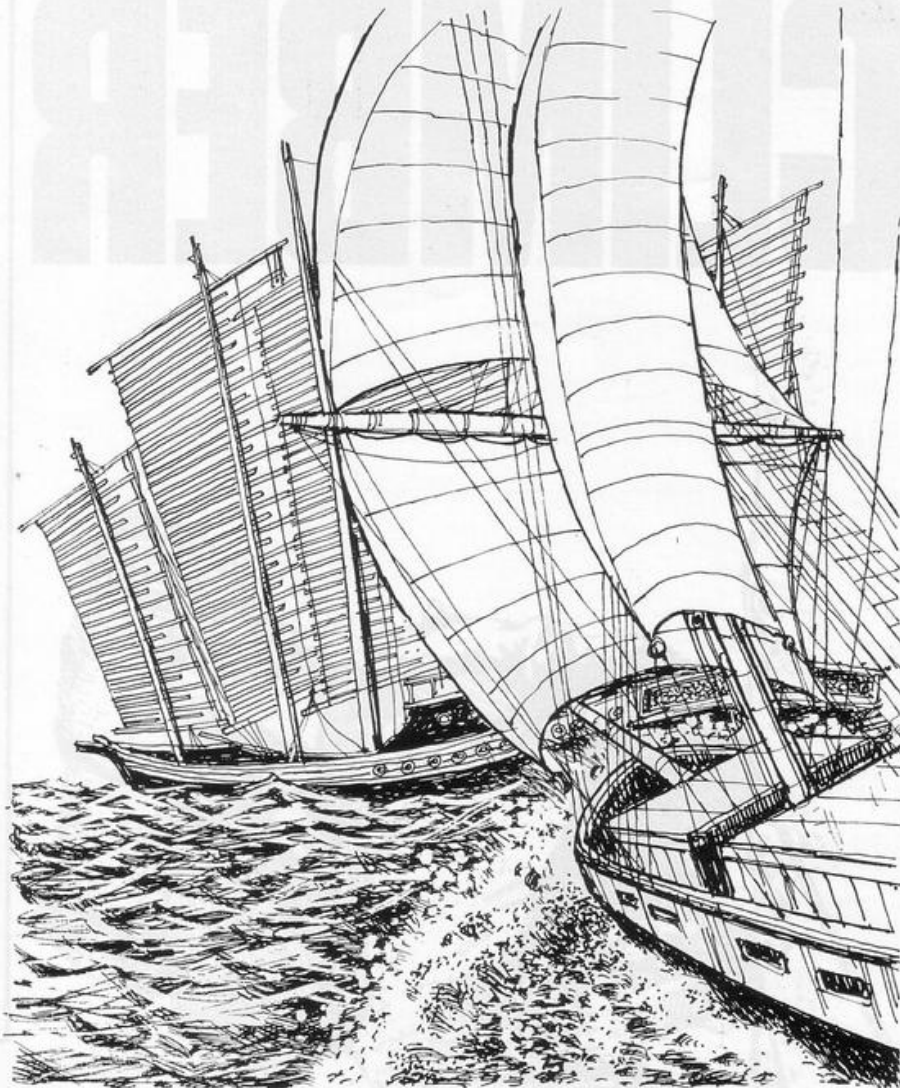
TAIPAN is a kind of Onedin Line of the South China Seas. You are the owner of a junk trading in general cargo, arms, silk, whisky and opium. You are a tellible ferrow.

The purpose of the game is to accumulate \$100,000 by astute buying and selling, in accordance with fluctuating market prices.

The junk has a capacity of 50 units and you start the game with only \$500 in the bank. An additional problem is that you owe \$5,000 to Sum Yam, the moneylender, a sum which increases 12 percent on every trip between ports; you can, if you wish, return to the rascal to repay or borrow more.

Input 1, 2 or 4 until you have traded as much as your nerve and resources allow and then hit 3 to leave for another port. Good ruck—and by the way, watch for storms.

An 8K ZX-81 program, devised by J K Moody and submitted by James Greenall of Bishop's Stortford.



TAIPAN

```

4030 INPUT C$
4035 IF C$="B" AND C$="A" THEN
  GOTO 4030
4040 IF C$="B" THEN GOTO 4500
4050 PRINT AT 18,0;"HOW MUCH DO
YOU";TAB 0;"WISH TO REPAY?"
4060 INPUT M
4070 IF M<0 THEN M=0 OR M>Y OR M>B T
HEN GOTO 4060
4080 LET Y=Y-M
4085 LET B=B-M
4090 GOSUB 9980
4100 GOTO 100
4500 PRINT AT 18,0;"HOW MUCH DO
YOU";TAB 0;"WISH TO BORROW?"
4510 INPUT M
4520 IF M>2*Y THEN GOSUB 4600
4530 LET Y=Y+M
4535 LET B=B+M
4540 GOSUB 9980
4550 GOTO 100
9000 REM WIN ROUTINE
9005 CLS
9010 PRINT AT 6,5;"CONGRATULATIO
NS,TAIPAN"
9020 PRINT AT 8,3;"YOU HAVE $100
000 AND CAN";TAB 11;"NOW RETIRE"
9030 PRINT AT 12,7;"YOU TOOK ";T
;"MOVES."

```

```

9499 STOP
9500 PRINT AT 4,4;"A GAME BASED
ON TRADE IN";TAB 2;"THE CHINA SE
AS IN THE EARLY";TAB 10;"19TH CE
NTURY"
9510 PRINT AT 8,4;"THE AIM IS TO
ACCUMULATE";TAB 11;"$100,000"
9515 PAUSE 500
9520 CLS
9530 PRINT AT 8,12;"TAIPAN"
9540 PRINT AT 6,4;"AT THE START
OF THE GAME";TAB 6;"YOU HAVE $50
0 AND";TAB 3;"OWE SUM YAM,THE MO
NEY LENDER,";TAB 12;"$5,000"
9550 PRINT AT 12,2;"YOUR HOME PO
RT IS HONG KONG"
9555 PAUSE 500
9560 CLS
9570 PRINT AT 8,12;"TAIPAN"
9580 RETURN
9599 STOP
9700 REM STORM ROUTINE
9710 CLS
9720 PRINT AT 10,7;"** STORM,TAI
PAN **"
9725 PAUSE 100
9730 CLS
9735 IF RND<.5 THEN GOTO 9780
9740 PRINT AT 10,4;"WE WILL HAVE

```

```

TO JETTISON";AT 12,8;"HALF THE
CARGO"
9743 PAUSE 150
9745 LET U=U+(INT (50-U))/2
9750 LET G=INT (G/2)
9752 LET A=INT (A/2)
9754 LET S=INT (S/2)
9756 LET W=INT (W/2)
9758 LET O=INT (O/2)
9760 CLS
9770 RETURN
9780 PRINT AT 10,11;"STORM OVER"
;AT 12,13;"ALL OK"
9785 RETURN
9790 STOP
9800 REM PRICE FIXING ROUTINE
9810 DIM P(5)
9820 LET P(1)=INT (AND*16)
9830 IF P(1)<1 THEN GOTO 9820
9835 LET P(2)=10*INT (AND*19)
9840 IF P(2)<50 THEN GOTO 9835
9845 LET P(3)=10*INT (AND*100)
9850 IF P(3)<300 THEN GOTO 9845
9855 LET P(4)=100*INT (AND*31)
9860 IF P(4)<500 THEN GOTO 9855
9865 LET P(5)=100*INT (AND*101)
9870 IF P(5)<1000 THEN GOTO 9865
9880 RETURN
9890 STOP
9900 REM LOCATION TABLE
9905 IF L=1 THEN LET L$="HONG KO
NG"
9910 IF L=2 THEN LET L$="SINGAPO
RE"
9915 IF L=3 THEN LET L$="MACAO"
9920 IF L=4 THEN LET L$="BANGKOK"
9925 IF L=5 THEN LET L$="SHANGHA
I"
9930 RETURN
9940 FOR X=14 TO 21
9945 PRINT AT X,0;"
9990 NEXT X
9995 RETURN
1150 IF Q>U THEN GOSUB 1900
1155 LET U=U-Q
1160 LET B=B-(Q*P)
1170 IF P$="G" THEN LET G=G+Q
1180 IF P$="A" THEN LET A=A+Q
1190 IF P$="S" THEN LET S=S+Q
1200 IF P$="W" THEN LET W=W+Q
1210 IF P$="O" THEN LET O=O+Q
1240 GOSUB 9980
1250 GOTO 100
1899 STOP
1900 PRINT AT 20,0;"YOU ONLY HAV
E";TAB 0;"SPACE FOR ";U
1910 GOTO 1140
1920 RETURN
1999 STOP
2000 REM SELL ROUTINE
2010 GOSUB 9980
2020 PRINT AT 14,0;"WHAT DO YOU
WISH";TAB 0;"TO SELL?";TAB 0;"(G
/A/S/W/O)"
2030 INPUT P$
2040 IF P$<>"G" AND P$<>"A" AND
P$<>"S" AND P$<>"W" AND P$<>"O"
THEN GOTO 2030
2050 IF P$="G" THEN LET P=P(1)
2060 IF P$="A" THEN LET P=P(2)
2070 IF P$="S" THEN LET P=P(3)
2080 IF P$="W" THEN LET P=P(4)
2090 IF P$="O" THEN LET P=P(5)
2100 GOSUB 9980
2110 PRINT AT 14,0;"HOW MANY DO
YOU";TAB 0;"WISH TO SELL?";
2120 INPUT Q
2130 IF P$="G" AND Q>G THEN GOTO
2120
2140 IF P$="A" AND Q>A THEN GOTO
2120
2150 IF P$="S" AND Q>S THEN GOTO
2120
2160 IF P$="W" AND Q>W THEN GOTO
2120
2170 IF P$="O" AND Q>O THEN GOTO
2120
2180 LET B=B+P*Q
2190 LET U=U+Q
2200 IF P$="G" THEN LET G=G-Q
2210 IF P$="A" THEN LET A=A-Q
2220 IF P$="S" THEN LET S=S-Q
2230 IF P$="W" THEN LET W=W-Q
2240 IF P$="O" THEN LET O=O-Q
2245 IF B>100000 THEN GOTO 9000
2250 GOSUB 9980
2300 GOTO 100
2999 STOP
3000 REM QUIT ROUTINE
3005 LET T=T+1
3010 GOSUB 9980
3020 PRINT AT 14,0;"DESTINATION?"

```

```

;AT 16,0;"1.HONG KONG";TAB 0;"2
.SINGAPORE";TAB 0;"3.MACAO";TAB
0;"4.BANGKOK";TAB 0;"5.SHANGHAI"
3030 INPUT L
3040 IF L<>INT L OR L<1 OR L>5 T
HEN GOTO 3030
3050 GOSUB 9980
3060 IF AND<1.25 THEN GOSUB 9700
3070 LET N=INT ((31-(LEN N$+9))/
2)
3080 PRINT AT 0,N;"HOUSE OF ";N$
3090 PRINT AT 2,0;"*****"
*****;AT 12,0;"**
*****"
3100 PRINT AT 4,0;"BANK $";AT
6,0;"SUM YAN $";AT 8,0;"UNITS
$";AT 10,0;"LOCATION:"
3110 PRINT AT 4,15;"GENERAL";AT
5,15;"ARMS";AT 6,15;"SILK";AT 7,
15;"WHISKEY";AT 8,15;"OPIUM"
3140 GOSUB 9980
3145 LET Y=INT (1.12*Y)
3150 GOTO 95
4000 REM SUM YAN ROUTINE
4010 GOSUB 9980
4020 PRINT AT 14,0;"DO YOU WISH
TO";TAB 0;"BORROW OR REPAY?";TAB
0;"(B/R)"
2 PRINT AT 0,12;"TAIPAN"
3 GOSUB 9500
5 PRINT AT 5,4;"WITH WHOM AM
I PLAYING?"
10 INPUT N$
15 CLS
19 LET N=INT ((31-(LEN N$+9))/
2)
20 PRINT AT 0,N;"HOUSE OF ";N$
25 PRINT AT 2,0;"*****"
*****;AT 12,0;"**
*****"
30 PRINT AT 4,0;"BANK $";AT
6,0;"SUM YAN $";AT 8,0;"UNITS
$";AT 10,0;"LOCATION:"
35 PRINT AT 4,15;"GENERAL";AT
5,15;"ARMS";AT 6,15;"SILK";AT 7,
15;"WHISKEY";AT 8,15;"OPIUM"
37 LET T=0
40 LET B=500
45 LET Y=5000
50 LET U=50
55 LET G=0
60 LET A=0
65 LET S=0
70 LET W=0
75 LET O=0
80 LET L=1
90 GOSUB 9980
95 GOSUB 9980
100 PRINT AT 4,0;"";AT 4,
9;B;TAB 25;"";AT 4,25;G;TAB
25;"";AT 5,25;A;TAB 9;"";
;AT 6,9;Y;TAB 25;"";AT 6
,25;S;TAB 25;"";AT 7,25;W;T
AB 10;"";AT 8,10;U;TAB 25;"
";AT 8,25;O
110 PRINT AT 10,10;L$
120 PRINT AT 14,0;"OPTIONS:";AT
16,0;"1.BUY";TAB 0;"2.SELL";TAB
0;"3.QUIT"
130 IF L=1 THEN PRINT AT 19,0;"
4.VISIT SUM YAN";TAB 0;"(THE MON
EY LENDER)"
140 PRINT AT 14,18;"PRICES:";AT
16,18;"GENERAL $";AT 16,27;
P(1);TAB 18;"ARMS $";AT
17,27;P(2);TAB 18;"SILK $";
;AT 18,27;P(3);TAB 18;"WHISKEY
$";AT 19,27;P(4);TAB 18;
"OPIUM $";AT 20,27;P(5)
150 INPUT C
155 IF C<>INT C OR C<1 OR C>5 T
HEN GOTO 150
160 IF L<>1 AND C>3 THEN GOTO 1
50
170 GOTO C*1000
1000 REM BUY ROUTINE
1010 GOSUB 9980
1040 PRINT AT 14,0;"WHAT DO YOU
WISH";TAB 0;"TO BUY?";TAB 0;"(G
/A/S/W/O)"
1050 INPUT P$
1060 IF P$<>"G" AND P$<>"A" AND
P$<>"S" AND P$<>"W" AND P$<>"O"
THEN GOTO 1050
1070 IF P$="G" THEN LET P=P(1)
1080 IF P$="A" THEN LET P=P(2)
1090 IF P$="S" THEN LET P=P(3)
1100 IF P$="W" THEN LET P=P(4)
1110 IF P$="O" THEN LET P=P(5)
1115 GOSUB 9980
1120 PRINT AT 14,0;"YOU CAN AFFO
RD ";TAB 0;"TO BUY";INT (B/P)
1130 PRINT AT 17,0;"HOW MANY DO
YOU";TAB 0;"WISH TO BUY?";
1140 INPUT Q

```

BREAKOUT



BREAKOUT GAMES are very popular and also very numerous. This has some novel features which sets it apart from the rest. It does not have a bat; the ball travels along the bottom of the screen until a key is hit, when it goes up to the wall in the normal way and knocks out a chunk. The angle at which the ball travels can be controlled by the length of time the key is held down, with a maximum of 90 degrees.

An interesting feature is that every so often an impact causes a crack to appear on the wall shown by a series of grey squares. When that crack is hit again it all falls away, with debris falling to the bottom of the screen.

When a breakout is achieved it is shown by a O at the top of the screen and one point is scored. If the breakout point is hit again, the wall is blocked-up and one deducted from the score. A time limit is imposed instead of the player losing lives.

Breakout runs on 4K RAM on the ZX-81 and was sent by Nicholas Moss, of Loughborough. The grey squares are shifted Hs.

```

1000 LET S=0
1010 PRINT "WELCOME TO BREAKOUT"
1020 DIM A$(7,30)
1030 FOR A=1 TO 7
1040 FOR B=1 TO 30
1050 LET A$(A,B)=" "
1060 PRINT A$(A,B);
1070 NEXT B
1080 NEXT A
1090 FOR A=0 TO 31 STEP 2
1100 PRINT AT 20,A;" "
1110 NEXT A
1120 PRINT AT 21,5,0;"SCORE="
1130 PRINT AT 21,10;"LIVES="
1140 PRINT AT 21,20;"TIME="
1150 SLOW
1160 LET E=1
1170 FOR X=0 TO 31
1180 IF M<0 THEN GOTO 5000
1190 LET M=M-1
1200 PRINT AT 19,X;"O"
1210 IF INKEY$="" THEN GOTO 500
1220 PRINT AT 19,X;" "
1230 NEXT X
1240 LET E=0
1250 FOR X=31 TO 0 STEP -1
1260 IF M<0 THEN GOTO 5000
1270 LET M=M-1
1280 PRINT AT 19,X;"O"
1290 IF INKEY$="" THEN GOTO 500
1300 PRINT AT 19,X;" "
1310 NEXT X
1320 GOTO 115
1330 LET T=10
1340 IF INKEY$="" THEN GOTO 535
1350 LET T=T-1
1360 GOTO 510
1370 IF T<0 THEN LET T=0
1380 IF E=0 THEN LET K=X-T
1390 IF E=1 THEN LET K=X+T
1400 IF K<0 OR K>31 THEN LET K=X
1410 PRINT AT 21,5,0;" "
1420 PRINT AT 21,20,M
1430 LET G=0
1440 LET H=0
1450 LET U=K-X
1460 LET Y=19-7
1470 LET Z=0
1480 IF ABS Y>Z THEN LET Z=ABS Y
1490 FOR F=1 TO Z
1500 PRINT AT 19-H,G+X;"O"
1510 PRINT AT 19-H,G+X;" "
1520 LET H=H-1
1530 LET G=G+U/Z
1540 LET H=H+Y/Z
1550 NEXT F
1560 IF A$(1,K+1)="O" THEN GOTO

```

```

650 LET S=S
670 IF A$(S+1,K+1)=" " THEN GOT
0 2000
690 IF S=0 THEN GOTO 710
695 LET S=S-1
700 GOTO 670
750 LET S=5
770 PRINT AT S,K;"O"
780 PRINT AT S,K;" "
782 IF A$(S+1,K+1)=" " THEN GOT
0 791
793 IF S=0 THEN GOTO 3000
795 LET S=S-1
796 GOTO 785
791 LET A$(S+1,K+1)=" "
800 IF INT (RND*3) < 1 THEN GOTO
4000
810 GOTO 115
1000 LET Q=0-1
1005 PRINT AT 21,5,0
1010 FOR Z=7 TO 0 STEP -1
1020 PRINT AT Z,K;"O"
1030 PRINT AT Z,K;" "
1040 NEXT Z
1050 PRINT AT 0,K;" "
1060 LET A$(1,K+1)=" "
1070 GOTO 115
2000 LET A=S
2010 IF A$(A+1,K+1)(">""") THEN GO
TO 2040
2020 LET A=A-1
2030 GOTO 2010
2040 FOR Z=S+1 TO A+1 STEP -1
2050 PRINT AT Z,K;"O"
2060 FOR D=Z+1 TO 19
2070 PRINT AT D,K;" "
2080 PRINT AT D,K;" "
2090 NEXT D
2100 LET A$(Z+1,K+1)=" "
2105 PRINT AT Z,K;" "
2110 NEXT Z
2120 GOTO 115
3000 LET Q=0+1
3010 PRINT AT 21,5,0
3020 LET A$(1,K+1)="O"
3030 PRINT AT 0,K;"O"
3040 GOTO 115
4000 FOR Z=S-2 TO INT (RND*(5-2)
+1 STEP -1
4010 LET A$(Z+1,K+1)=" "
4020 PRINT AT Z,K;" "
4030 NEXT Z
4040 GOTO 115
5000 PRINT AT 15,10;"OUT OF T3
ME=3"
6010 PRINT "HIT ANY KEY TO RESTA
RT"
6020 IF INKEY$="" THEN GOTO 5020
6030 CLS
6040 RUN

```

BOMB RUN



```

2 CLS
3 LET A=CODE " "
4 LET B=CODE " "
5 LET C=CODE " "
6 LET D=B
7 LET E=D+C
8 LET F=CODE "<"
9 GOSUB CODE ">"
10 FOR N=0 TO CODE "*"
11 PRINT AT E-C,N-C;" "
12 PRINT AT E,N;" "
13 PRINT AT B,N;" "
14 IF INKEY$="7" THEN LET B=B-
C
15 IF B<D THEN PRINT AT B+C,N;
" "
16 IF INKEY$="0" THEN LET A=C
17 IF A=C THEN LET E=E+.43
18 PRINT AT E,N+C;" "
19 IF E>CODE ":" AND E+CODE "?"
" AND N=CODE "=" THEN PRINT TAB
CODE ">";"BANG"
20 IF B<D AND A<C THEN PRINT "
SHOT DOWN"
21 IF N=CODE "(" AND B>N-D THE
N PRINT "CRASH"
22 NEXT N
23 RUN
24 PRINT AT CODE "F",F;" ";TAB
F;" ";TAB F;" "
25 PRINT TAB CODE ">";" "
26 PRINT AT CODE ":";CODE "=";
"0"
27 PRINT " "
28 RETURN
    
```

YOUR MISSION is to fly at wave-top height and launch your bomb with the Ø key at a submarine hiding in a cave. After releasing your bomb you must climb steeply with the 7 key to avoid the cliffs above. Do not climb too soon, as there is a cliff-top radar station capable of arranging your instant destruction.

The composer of the program, Andrew Kelcey of Bewdley, Worcestershire, says that removing line 20 to 27 will enable it to be fitted into an unexpanded ZX-81. He has obviously limited the complexity of the graphics and, though pleasing, they are in our opinion capable of improvement. You might also try to devise a scoring line. Graphics notes:

- 13—Graphic shifted 2, graphic shifted W.
- 19—Inverse BANG.
- 20—Inverse SHOT DOWN.
- 21—Inverse CRASH.
- 24—Graphic shifted E; two graphic shifted Rs, graphic shifted E; graphic shifted 8, two graphic shifted 5s.
- 25—Eight graphic shifted As.
- 27—Twenty-five graphic shifted As.

QUADRATIC EQUATIONS

A NEAT program for solving quadratic equations on an unexpanded ZX-81 has been sent by Richard Harris of Eastleigh, Hampshire.

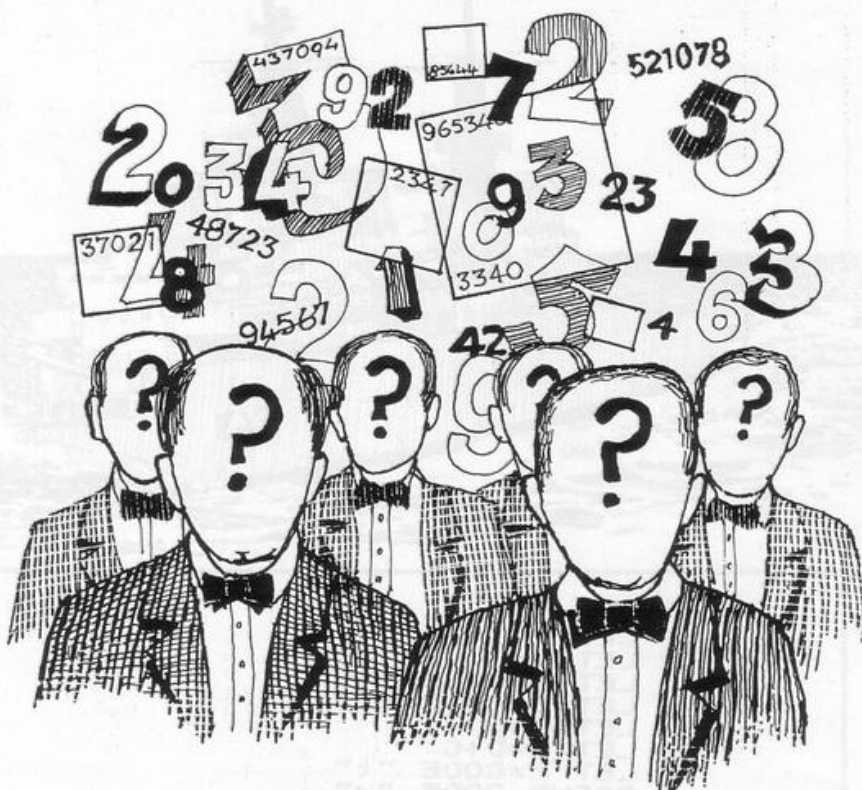
The program invites you to enter the co-efficients of the equations and then displays the equation with the known values inserted, followed by the roots. It also points-out when a negative square root occurs.

Graphics notes:

130—Graphic shifted 1.

251—Graphic shifted 2.

530—Two graphic shifted 2s.



```

2 CLEAR
10 PRINT "PRESS RUN TO START"
20 IF INKEY$="" THEN GOTO 10
L "20"
30 CLS
120 PRINT "A(X)2+B(X)+C=0"
130 FOR F=CODE "A" TO VAL "S"
140 PRINT
150 NEXT F
160 PRINT "ENTER A"
170 INPUT A
175 PRINT
180 PRINT "ENTER B"
190 INPUT B
195 PRINT
200 PRINT "ENTER C"
205 PRINT
210 INPUT C
230 PRINT
240 PRINT
241 LET A$="+"
242 LET B$="+"
243 IF B<CODE "" THEN LET A$="-"
244 IF C<CODE "" THEN LET B$="-"

```

```

245 LET Z=B
246 LET X=C
247 IF B<CODE "" THEN LET Z=-B
248 IF C<CODE "" THEN LET X=-C
250 PRINT A;"X2+";Z;"X";B$;
;X;"=0"
251 LET L=(ABS B)+CODE "A"-(VA
L "4"+B+C)
252 IF L<CODE "" THEN GOTO VAL
"500"
253 LET P=SQR L
260 PRINT
270 PRINT
280 PRINT "X=";(-B+P)/(2+A);"
X=";(-B-P)/(2+A)
320 RUN
500 PRINT
510 PRINT
520 LET P=ABS L
530 PRINT "X=";-B/(CODE "A"+A);
"+/-";(SQR P)/(CODE "A"+A);"0"
540 PRINT
550 PRINT "WHERE 0=SQR ROOT OF
-1"
590 RUN

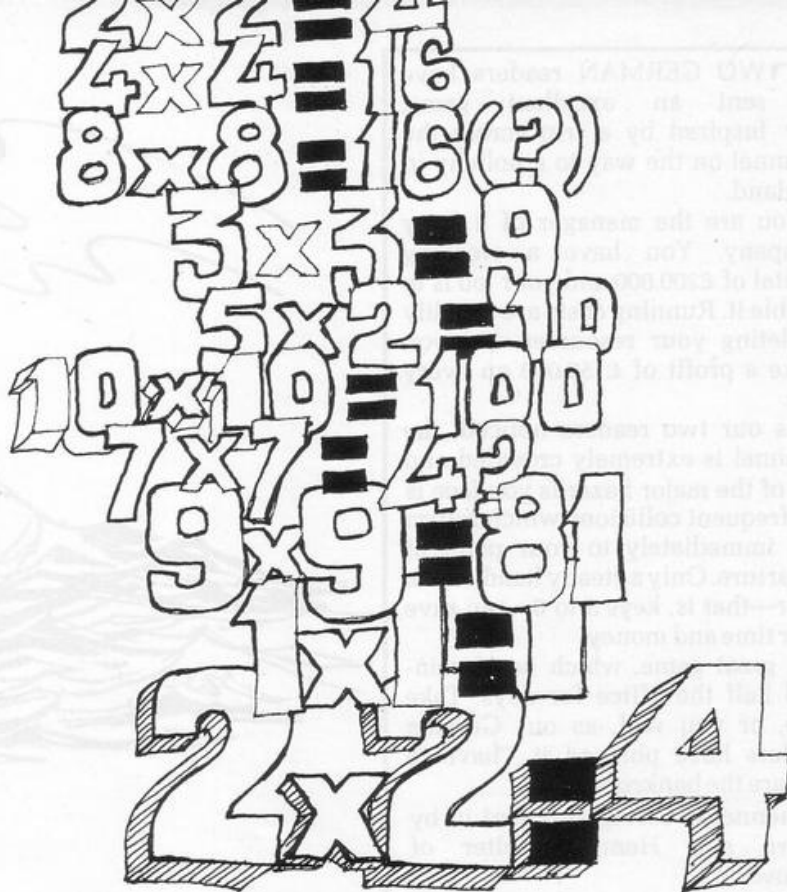
```

BUILDER

AT LAST there is a program which takes only five minutes to key-in but which will provide you with hours of annoying enjoyment. It is also likely to make you very unpopular with the rest of the family if you are using the television set and they want to watch something else.

Despite its simplicity, it takes a long time to achieve the aim, which is to build a row of = signs. Start by pressing run and then hold down any key until the screen is filled with greater than signs with = at the end of each line. Then keep a key pressed down to move the = sign along a line to try to add it to the other = sign. Releasing the key stops the = sign.

You have one attempt at each line as you go down the screen, the inverse space showing which line you are on. When you reach the bottom you start again at the top. This clever game for the basic ZX-81 was sent by Julian Smith of Maidstone, Kent.



```

1 GOTO 10
2 SAVE "BUILDER"
10 FOR I=0 TO 31
20 PRINT AT I,25; "="
30 FOR J=0 TO 25
40 PRINT AT I,J; ">=" AND INKEY
$<>"
50 NEXT J
60 PRINT AT I,25; " "
70 NEXT I
80 GOTO 0
    
```

SKITTLES

```

5 REM "SKITTLES"
10 PLOT 3,15
20 PLOT 3,16
30 PLOT 3,17
40 PLOT 3,18
50 PLOT 3,19
60 PLOT 3,20
70 PLOT 3,21
80 PLOT 3,22
90 PLOT 3,23
100 PLOT 9,17
110 PLOT 9,20
120 PLOT 9,23
130 PLOT 12,19
140 PLOT 12,22
150 PLOT 15,21
155 FOR N=1 TO 8
160 LET A=31
170 LET B=20
175 FOR M=31 TO 2 STEP -1
180 PLOT A,B
190 LET A$=INKEY$
195 UNPLOT A,B
197 PLOT A,B
198 UNPLOT A,B
200 IF A$="7" THEN LET B=B+1
210 IF A$="6" THEN LET B=B-1
220 LET A=A-1
230 NEXT M
240 NEXT N
    
```



WE WILL say nothing about being bowled over by this game, or about going down like nine-pins, or about it being right up our alley. It is a 1K game for the ZX-81 called **Skittles** but the title is somewhat misleading, since the eight balls are steered after they are released, not before.

They are amazingly responsive, manoeuvred with the 6 and 7 keys to a target of 15 pins.

It is a highly-enjoyable game submitted by Philip Teakle of Bristol.

Channel Crossing was sent in by Bjoern and Henrik Wolter of Hanover.



CHANNEL

```

1 CLS
2 DIM A$(15,52)
3 LET A=17
4 LET B=22
5 GOSUB 2005
7 LET WORCAP=200000
8 GOSUB 4000
9 PRINT AT 0,0;"WORKING CAPITAL"
AL = 10 PRINT AT 21,0;"EACH CROSSING"
G = 150000 PROFIT"
11 LET H$="D"
12 LET N1=-1
14 LET N2=-1
16 SLOW
20 LET X=0
30 GOSUB 1020
40 GOSUB 2023
48 GOSUB 1500
50 IF SL=2 THEN GOTO 60
51 FOR N=1 TO 15
52 NEXT N
53 GOTO 70
60 GOSUB 2050
70 GOSUB 1500
80 LET WORCAP=WORCAP-3000
95 PRINT AT 0,20;WORCAP;" "
100 IF WORCAP<=0 THEN GOTO 130
110 GOSUB 1500
120 IF WORCAP<400000 THEN GOTO
40
130 IF WORCAP<=0 THEN PRINT AT
1,14;"GAME OVER";AT 2,14;"YOUR F
ERRY COMPANY";AT 3,14;"HAS TO DE
CLARE THE";AT 4,14;"BANKRUPT"
140 IF WORCAP>=400000 THEN PRIN
T AT 2,15;"GAME OVER";AT 3,15;"
YOU ARE A SMART";AT 4,15;"BUSINESS
SMAN"
145 PRINT AT 17,0;"FOR A NEW GA
ME"
147 PRINT AT 16,0;"PRESS 0"
150 GOSUB 2023
155 GOSUB 2050
160 IF INKEY$="0" THEN GOTO 1
170 GOTO 150
1020 PRINT AT 1,0;"-----CALAIS"
1030 PRINT AT 2,7;" "
1040 PRINT AT 3,7;" "

```

```

1050 PRINT AT 4,7;" "
1060 PRINT AT 19,0;" "
-----COVER-----
1090 PRINT AT 15,20;" "
2009 LET A$(3)=" {###}
({##}) {###}
2011 LET A$(4)=" {###} ({###})
({##}) ({##})
2013 LET A$(5)=" {000000}
({##}) ({##})
2015 LET A$(6)=" {XX} (==)
<00> <###>
2017 RETURN
2023 LET N1=N1+1
2024 FOR Z=1 TO 5 STEP 2
2025 PRINT AT 2*Z+3,N1;A$(Z) (1 T
0 (32-N1));AT 2*Z+3,0;A$(Z) (32-
N1+1) TO 32)
2027 NEXT Z
2030 IF N1=31 THEN LET N1=-1
2032 GOSUB 1210
2035 RETURN
2050 LET N2=N2+1
2060 FOR Z=2 TO 6 STEP 2
2070 PRINT AT 2*Z+3,0;A$(Z) (1+N2
TO 32);AT 2*Z+3,31-N2;A$(Z) (1 T
0 N2+1)
2080 NEXT Z
2090 IF N2=31 THEN LET N2=-1
2095 GOSUB 1210
2100 RETURN
2230 FOR M=1 TO 6
2231 PRINT AT A,B-2;"CRASH"
2239 FOR K=1 TO 5
2240 NEXT K
2241 POKE 16437,255
2242 PRINT AT A,B-2;" "
2243 NEXT M
2245 PRINT AT A+1,B;" "
2250 IF H$="C" THEN LET A=2
2251 IF H$="C" THEN LET B=9
2260 IF H$="D" THEN LET A=17
2261 IF H$="D" THEN LET B=22
2265 GOSUB 1020
2270 RETURN
2330 FOR M=1 TO 6
2331 PRINT AT A+1,B-2;"CRASH"
2339 FOR K=1 TO 5
2340 NEXT K
2341 POKE 16437,255
2342 PRINT AT A+1,B-2;" "

```



CROSSING

```

2343 NEXT M
2345 PRINT AT A,B;" "
2350 IF H$="C" THEN LET A=2
2351 IF H$="C" THEN LET B=9
2352 IF H$="D" THEN LET A=17
2351 IF H$="D" THEN LET B=22
2355 GOSUB 1020
2370 RETURN
4000 PRINT "YOU ARE THE MANAGER
OF A FERRY COMPANY AND YOU HAVE
TO INCREASE YOUR WORKING CAPITAL
"
4010 PRINT
4020 PRINT "EACH FERRYING-OVER B
RINGS YOU A PROFIT OF £ 150000."
4030 PRINT
4040 PRINT "AFTER A CRASH YOU AR
E PUT BACK INTO YOUR STARTING H
ARBOUR."
4050 PRINT
4060 PRINT "THE STANDING CHARGES
ARE PERMANENTLY ABSORBING
YOUR WORKING CAPITAL."
4070 PRINT
4080 PRINT "THE GAME HAS FINISHE
D, WHEN YOU HAVE EITHER LOST YOU
R WHOLE WORKING CAPITAL OR W
HEN YOU HAVEDOUBLED IT."
4090 PRINT
4100 PRINT "THE FERRY IS MOVED B
Y THE KEYS: ""5"", ""6"", ""7"" OR
""8""
4110 PRINT "PRESS NEW LINE TO ST
ART."
4120 INPUT S$
4130 CLS
4132 PRINT AT 8,1;"INPUT SKILL L
EVEL (1 OR 2)"
4134 INPUT SL
4136 IF SL<>1 AND SL<>2 THEN GOT
O 4134
4138 CLS
4140 RETURN
1100 PRINT AT 17,20;"
1105 PRINT AT 16,20;"
1110 PRINT AT A,B;CHR$ 137;AT A+
1,B;CHR$ 138
1120 RETURN
1210 PRINT AT A,B;
1220 LET FERRY=PEEK (PEEK 16398+
256*PEEK 16399)

```

```

1225 IF FERRY=137 OR FERRY=0 THE
N GOTO 1300
1230 GOSUB 2230
1300 PRINT AT A+1,B;
1320 LET FERRY=PEEK (PEEK 16398+
256*PEEK 16399)
1325 IF FERRY=138 OR FERRY=0 THE
N GOTO 1400
1330 GOSUB 2330
1400 PRINT AT A,B;CHR$ 137;AT A+
1,B;CHR$ 138
1405 RETURN
1500 LET U$=INKEY$
1510 IF U$<>"5" AND U$<>"6" AND
U$<>"7" AND U$<>"8" THEN RETURN
1520 PRINT AT A,B;" ";AT A+1,B;"
"
1530 IF U$="3" THEN LET B=B+1
1540 IF U$="5" THEN LET B=B-1
1550 IF U$="7" THEN LET A=A-1
1560 IF U$="6" THEN LET A=A+1
1570 IF B<2 THEN LET B=2
1580 IF B>29 THEN LET B=29
1590 PRINT AT A,B;
1600 IF PEEK (PEEK 16398+256*PEE
K 16399) <> 0 THEN LET X=1
1610 PRINT AT A+1,B;
1620 IF PEEK (PEEK 16398+256*PEE
K 16399) <> 0 THEN LET X=2
1630 PRINT AT A,B;CHR$ 137;AT A+
1,B;CHR$ 138
1640 IF X=1 THEN GOSUB 2230
1650 IF X=2 THEN GOSUB 2330
1651 LET X=0
1653 IF (H$="C" AND A)=17 AND B)
20 AND B<24) OR (H$="D" AND A)=2
AND B>7 AND B<11) THEN GOSUB 17
50
1655 RETURN
1750 LET WORCAP=WORCAP+150000
1752 PRINT AT 8,20;WORCAP;"
1755 IF H$="C" THEN GOTO 1770
1760 LET H$="C"
1765 GOTO 1300
1770 LET H$="D"
1800 RETURN
2005 LET A$(1)=" (|||||) (00)
(==) (XX)
2007 LET A$(2)=" (|||||) (|||)
<000000>

```



HURKLE

THERE WAS a good response to our request for Spectrum programs. **Hurkle** is a hunt-the-monster game on fairly traditional lines and will provide a relaxing introduction to the mysteries of sound and colour.

The display presents you with a 10 x 10 grid, within whose nexus lurks the eponymous monster. You are required to enter your guess for the monster's co-ordinates with "y-axis ENTER x-axis ENTER". The computer will then tell you in which direction to head to close the range on the elusive creature. Submitted by Max Renby of Croydon.

```

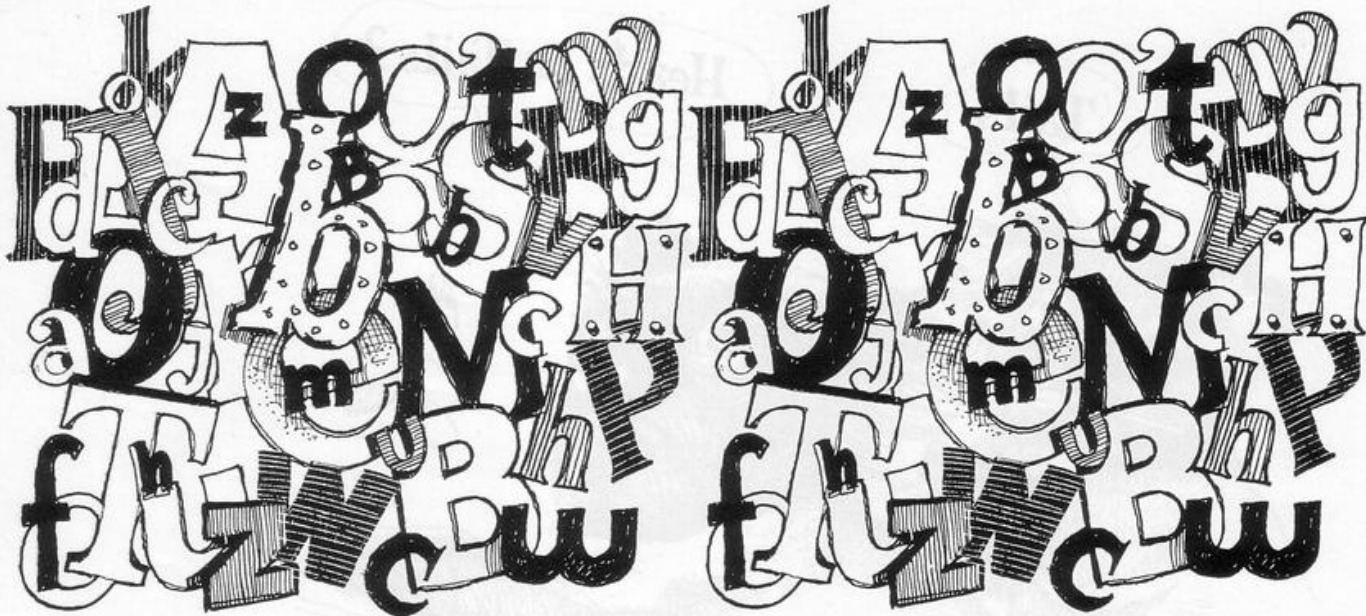
1 DEF FN a(x)=x*12+50
5 BRIGHT 1: INK 6: BORDER 0:
PAPER 0: CLS
6 GO SUB 700
7 LET q=0
8 CLS
10 FOR x=50 TO 170 STEP 12
20 PLOT x,50: DRAW 0,120
30 PLOT 50,x: DRAW 120,0
40 NEXT x
60 PRINT INK 2: PAPER 0: AT 18,
6, " 2 4 6 8 10"
80 FOR z=0 TO 21
90 PRINT INK 2: PAPER 0: AT 0,4
, "10": AT 3,4: "6": AT 5,4: "6": AT 9
,4: "4": AT 12,4: "2"
95 RANDOMIZE
100 LET c=INT (RND*11): LET d=I
NT (RND*11): LET c1=FN a(c): LET
d1=FN a(d)
140 LET q=q+1
141 IF q>5 THEN GO TO 220
145 IF q>5 THEN GO TO 220
146 INPUT "INK 5: Input your g
uess,": a$, b$: IF a$="c" OR a$="
d" THEN GO TO 146
147 IF q>1 THEN PRINT AT 18,0: "
": PLOT INK 6:a,b: PRI
NT AT 19,0: "
157 IF a$="" OR b$="" THEN GO T
O 146
158 LET a=VAL (a$): LET b=VAL (
b$): IF a<0 OR a>10 OR b<0 OR b>
10 THEN GO TO 146
159 LET a=FN a(a): LET b=FN a(b
)
160 PLOT INK 1:a,b
161 BEEP .5,5
170 IF a=c1 AND b=d1 THEN GO TO
500
180 PRINT AT 18,0: "North " AND
b<d1: "South " AND b>d1: "West " A

```

```

ND a>c1: "East" AND a<c1
210 GO TO 140
220 PRINT AT 18,0: "You have sad
ly exhausted your five guesses
!The Hurkle was at", "(",c,"",d,
")".
225 PLOT FLASH 1: INK 4:c1,d1
229 PRINT AT 21,0: "Again? (y OR
n)"
230 READ a: IF a=-99 THEN RESTO
RE: READ a
231 READ b: BEEP a,b
239 LET a$=INKEY$: IF a$="" THE
N GO TO 230
240 IF a$(1)="y" THEN GO TO 7
250 PRINT "Goodbye,": STOP
500 PRINT AT 18,0: "Well done!Yo
u took ",q," turns."
510 GO TO 225
600 DATA 1,0,1,0,1,0,1,0,1,0,
1,0,1,0,1,0,1,0,1,0,1,0,1,0,
7,1,0,1,0,1,0,1,0,1,0,1,0,1,0,
5,5,1,0,1,0,1,0,1,0,1,0,1,0,1,0,
7,1,0,1,0,1,0,1,0,1,0,1,0,1,0,
0,1,0,1,0,1,0,1,0,1,0,1,0,1,0,
0,1,0,1,0,1,0,1,0,1,0,1,0,1,0,
700 PRINT "This is the game of
'Hurkle'. In this game it is your
job to find a hurkle that is hid
ing on a 10 by 10 grid. When aske
d input your guess for the hurkle
's co-ordina-tes."
710 PRINT "If you have not gue
ssed them correctly you will b
e given the direction in which t
he hurkle lies from your last
guess."
720 PRINT "Good luck."
730 PRINT "OK, and by t
he way, you must input each c
oordinate separately (i.e. 2 AND p
ress enter, 8 AND press enter.
)"
740 INPUT "Press enter to start
": a$
750 RETURN

```



ALPHABET

ALPHABET is a teaching aid for students—so if you can't read this, read on. The program runs initially in FAST mode, then the screen clears and displays the alphabet in random order. The student has a laser base and has to blast the letters in their correct order. The distance of the laser from the letters is decided by the level of difficulty selected and the laser is moved with the usual keys 5 and 8. The program was sent by P Styles of Rotherham. It runs on an expanded ZX-81

```

1 REM **A L P H A B E T**
2 REM **P. STYLES 1982**
3 CLS
5 LET A=CODE "="
7 LET B=CODE "3"
8 FAST
9 LET A=38
30 DIM C$(26)
32 FOR Q=1 TO 26
34 LET D$="ABCDEFGHIJKLMNOPQRSTUVWXYZ"
35 LET U=INT (RND*26)+1
42 LET C$(Q)=D$(U)
45 FOR U=1 TO Q-1
48 IF C$(Q)=C$(U) THEN GOTO 34
52 NEXT U
53 NEXT Q
54 SLOW
55 FOR Z=1 TO 26
56 PRINT AT Q,1+Z;C$(Z);
57 NEXT Z
58 PRINT AT 15,0;"ENTER LEVEL
1-19 (1=HARDEST)"
59 INPUT M
60 LET A=A-M
61 PRINT AT 15,0;"

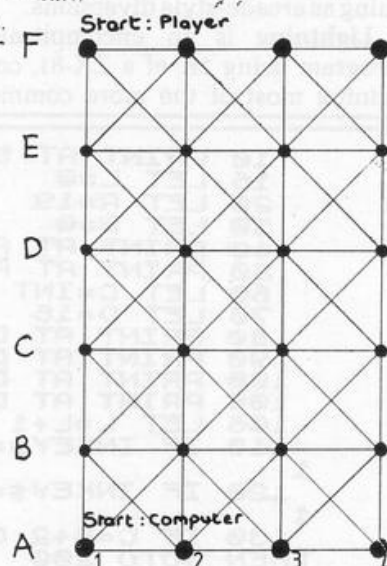
100 LET A$=" "
110 PRINT AT A,B;A$
120 IF INKEY$="5" AND B>0 THEN
LET B=B-PI/PI
130 IF INKEY$="8" AND B<27 THEN
LET B=B+PI/PI
140 IF INKEY$="0" THEN GOTO 200

150 GOTO 110
200 FOR T=19-M TO 0 STEP -1
210 PRINT AT T,B+2;"*"
220 PRINT AT T,B+2;" "
230 NEXT T
232 LET Y=B+1
233 IF C$(Y) <> CHR$ A THEN GOTO
400
235 LET A=A+1
250 PRINT AT 21,0;TAB Y;CHR$ (A
-1)
260 IF A=64 THEN GOTO 320
310 GOTO 110
320 IF M)=5 THEN PRINT AT 15,0;
"NOW TRY IT AT A HARDER LEVEL"
325 LET M=M-4
330 FOR Q=21 TO 1 STEP -5
340 FOR J=1 TO 26
350 PRINT AT Q,J;C$(J)
355 PRINT AT Q,J;" "
360 NEXT J
370 NEXT Q
386 RUN
387 LET B=CODE " "
400 PRINT AT 19,0;"YOU MISSED T
HE ",CHR$ (A); "YOU GOT ";A-38
410 PRINT AT 21,0;"PRESS NEWLIN
E TO START AGAIN"
420 IF INKEY$ <> CHR$ 118 THEN GO
TO 420
425 CLS
430 LET A=CODE "="
440 LET B=CODE "3"
450 GOTO 55

```




HAZARDOUS CROSSING



TRY TO out-think your ZX-81 by playing **Hazardous Crossing**. It is a pleasant little game which will fit into the 1K version but will take some time to master.

The aim is to travel from one line to another, moving in steps following the grid as shown. The player must start at the top on the F line and try to reach the A line at the bottom by moving from one grid point to the next.

The problem is that the computer is lurking somewhere in the grid and must be avoided if the safety line is to be reached. By playing the game for some time it is possible to learn the regular movements of the computer character.

To allow the program to fit into 1K, Michael Woodruff of Accrington, Lancashire, was not able to include graphics, which means that a grid has to be written separately, or you could use the one we have shown, using a coin or a counter to check your position.

It is important to input the grid references with the number before the letter or the move will not be accepted, nor will impossible moves.

If you do not believe there is a computer figure moving in the grid, you can enter two lines 54 and 99, both PRINT CS and the moves will be shown following your moves.

In the printout the graphics are in line 50, a shifted 4 and, in line 65, shifted 1.

```

10 LET W=SGN PI
15 LET U=W+W
20 INPUT P$
25 IF P$(U) < "F" THEN GOTO VAL
"20"
30 PRINT P$
35 LET P=CODE P$(U)
40 LET Q=CODE P$(U)
45 LET Q$=CHR$ P
50 LET C$=CHR$ (INT (RND*CODE
" "+CODE "1"))+"A"
54 PRINT C$
55 GOTO VAL "105"
60 LET Z=(P-C)*U+((P-C=U)+(C=P
) AND RND(VAL ".5"))+(P$(U)>Q$ AN
D RND(VAL ".5" AND C<=CODE "2"))-
(C-P)*U-((C-P=U)-(C=P) AND RND(U
AL ".5"))-(P$(U)>Q$ AND RND(VAL ".
5" AND C>=CODE "3"))
65 IF Z>CODE "" THEN LET Z=CO
DE ""
70 IF Z<-U THEN LET Z=-U
75 LET C=C+Z
80 IF C<CODE "1" THEN LET C=CO
DE "1"
85 IF C>CODE "4" THEN LET C=CO
DE "4"
90 LET D=D+(Q-D)*U-(D=Q)
95 LET C$=CHR$ C+CHR$ D
99 PRINT C$
100 LET Q$=CHR$ P
105 INPUT P$
110 IF LEN P$(U) THEN GOTO VAL
"105"
115 IF ABS (CODE P$(U)-P) > U OR
ABS (CODE P$(U)-Q) > U THEN GOTO V
AL "105"
120 CLS
125 IF P$=C$ THEN GOTO VAL "165"
130 IF P$(U)="A" THEN GOTO VAL
"170"
135 PRINT P$
140 LET P=CODE P$(U)
145 LET Q=CODE P$(U)
150 LET C=CODE C$(U)
155 LET D=CODE C$(U)
160 GOTO VAL "50"
165 PRINT "GOTO":X
170 PRINT "SAFE"

```

LIGHTENING

OFTEN we receive letters from computing novices asking for straightforward games which are as much exercises in programming as arcade-style diversions.

Lightning is an uncomplicated program using 1K of a ZX-81, containing most of the more common

functions and producing a moving display under cursor control.

Drive your car left and right across the screen with the 0 and 1 keys and hope that you are not struck by lightning—a kind of meteorological Russian roulette.

```

10 PRINT AT 5,5; "LIGHTENING"
15 LET L=0
20 LET A=19
30 LET B=0
40 PRINT AT A,B; "  "
50 PRINT AT A+1,B; "  "
60 LET C=INT (RND*51)+1
70 LET D=15
80 PRINT AT D,C; "<"
90 PRINT AT D+1,C; "<"
100 PRINT AT D+2,C; ">"
105 PRINT AT D+3,C; ">"
106 LET L=L+1
110 IF INKEY$="0" THEN LET B=B+
1
120 IF INKEY$="1" THEN LET B=B-
1
130 IF C=B+2 OR C=B+3 OR C=B+4
THEN GOTO 200
135 PAUSE 25
140 CLS
150 GOTO 40
200 PRINT AT A,B; "((CRASH))"
210 PRINT AT 0,0; "YOU SURVIVED
";L; " STRIKES"
```



MARK UP



PROBABLY the most frequent criticism of personal computers is that they are toys for big boys and of no practical use.

Mark Up shows that an unexpanded ZX-81 can be of use in business, as a means of computing retail selling prices.

The program, submitted by David Eddison of Manchester, can calculate VAT and operates with a choice of five pre-determined mark-up rates, including, for the especially greedy, a boost of 100 percent.

It is straightforward enough, though Eddison reports that whenever INPUT appears in a PRINT statement he saved memory by entering THEN INPUT and afterwards deleting THEN.

```

1 REM "ACCOUNTS"
10 PRINT "INPUT PRICE LESS VAT"
20 INPUT A
30 PRINT "INPUT MARK UP CODE"
40 PRINT "1=20", "2=25", "3=33",
"4=50", "5=100"
41 PRINT AT 5,15; "PERCENT"
50 INPUT B
52 IF B=1 THEN LET C=A*1.20
53 IF B=2 THEN LET C=A*1.25
54 IF B=3 THEN LET C=A*1.333
55 IF B=4 THEN LET C=A*1.50
56 IF B=5 THEN LET C=A*2.00
60 CLS
62 PRINT "IF ZERO VAT INPUT 0"
63 PRINT "IF VAT RATED INPUT 1"
64 INPUT V
65 IF V=1 THEN LET C=C*1.15
66 IF V=0 THEN GOTO 70
70 PRINT "INPUT QUANTITY"
80 INPUT D
90 CLS
100 LET E=C/D
110 PRINT "RETAIL PRICE IS £";E
120 GOTO 10
```



TRUE OR FALSE

WE FEEL that many of the education games sent to us ignore the crucial place of good graphics in the interest of the young learner.

True or False is a program for teaching multiplication. The authors, Neil Pick and Rae Bryant of Harrogate, obviously worked hard

to accompany the didactics with a lively display and a line in cheery patter.

The operator has a very limited time in which to judge the displayed arithmetic as true or false and to input 7 or 5 accordingly. Error or delay will advance a decrepit-looking automobile further and

further towards a brick wall. There are three levels of difficulty and a running score for every correct answer. Graphics notes:

24—Inverse space, graphic 7, inverse space.

100—Graphic F, graphic G.

670—Inverse GOOD.

680—Inverse BYE.

```

1 REM "TF" BY L.BRYANT AND N.
2 PICK
3 LET R=0
4 PRINT
5 LET R=R+1
6 IF R=9 THEN GOTO 8
7 GOTO 3
8 PRINT AT 8,0;"-----TRUE
OR FALSE-----"
9 PRINT AT 3,0;"THE GAME BEGI
NS WITH A CAR, A
10 PRINT "BALL AND A MULTIPLI
ATION SUM"
11 PRINT "BEING DISPLAYED ON T
HE SCREEN."
12 PRINT "YOU HAVE TO DECIDE
WHETHER THE
13 PRINT "GIVEN ANSWER IS TRUE
OR FALSE."
14 PRINT "IF YOU ARE RIGHT, 10
IS ADDED TO
15 PRINT "YOUR SCORE. IF, HOWEVE
R, YOU ARE
16 PRINT "WRONG THE CAR MOVE
NEARER THE
17 PRINT "WALL. TO PLAY, USE KEY
"5" FOR
18 PRINT "FALSE AND KEY
R FOR
19 PRINT "GOOD LUCK. (YOU'LL NE
ED IT)"
20 PRINT "PRESS ANY KEY TO SEE
INT"

```

```

21 PRINT "DIFFICULTY? (1-3)"
22 INPUT P
23 LET Q=0
24 PRINT AT 19,0;"
25 PRINT AT 20,0;"
26 PRINT AT 21,0;"
27 PRINT AT 15,0;"
28 IF Q=26 THEN GOTO 38
29 PRINT AT 19,0;"
30 PRINT AT 20,0;"
31 PRINT AT 21,0;"
32 LET Q=Q+1
33 IF Q<26 THEN PRINT AT 17,5;
"DONT PRESS YET."
34 IF Q<26 THEN PRINT AT 18,0;
"-----"
35 IF Q=26 THEN PRINT AT 17,0;
"
36 IF Q=26 THEN PRINT AT 17,5;
"PRESS NOW."
37 GOTO 24
38 PAUSE 4E4
39 CLS
40 PRINT AT 7,11;"SET P=0"
41 PRINT AT 12,11;"3..."
42 PAUSE 45
43 PRINT "2..."
44 PAUSE 45
45 PRINT "1..."
46 PAUSE 45

```



```

47 CLS
48 PRINT AT 8,5;" "
49 PRINT AT 7,5;" "
50 PRINT AT 8,5;" "
51 PRINT AT 9,5;" "
52 PRINT AT 10,5;" "
53 PRINT AT 11,5;" "
54 PRINT AT 12,5;" "
55 PRINT AT 13,5;" "
56 PRINT AT 14,5;" "
57 PAUSE 100
58 CLS
59 LET S=1
60 LET A=0
61 FAST
62 PRINT AT 5,0;" "
63 PRINT AT 11,0;" "
64 FOR U=5 TO 21
65 PRINT AT U,24;" "
66 NEXT U
67 FOR Q=11 TO 21
68 PRINT AT Q,17;" "
69 NEXT Q
70 IF A+3=21 THEN PRINT AT 15,
0;"QUICK TURN,"
71 IF A+3=21 THEN PRINT AT 16,
0;"YOUR GOING OFF"
72 IF A+3=21 THEN PRINT AT 17,
0;"THE ROAD."
73 IF A+3=21 THEN PRINT AT 18,
0;"OH,NO,YOURE GOING"
74 IF A+3=21 THEN PRINT AT 19,
0;"TO CRASH."
75 FOR I=0 TO 20
76 PRINT AT 8,I;" "
77 NEXT I
78 FOR J=3 TO 21
79 PRINT AT J,20;" "
80 NEXT J
81 SLOW
95 PRINT AT 7,A;" "
97 PRINT AT 8,A;" "
98 PRINT AT 9,A;" "
99 FOR C=6 TO 9
100 PRINT AT C,27;" "
101 NEXT C
120 IF A+3=27 THEN GOTO 300
130 LET D=INT (RND*(P+10))+1
135 IF P=2 AND D<=10 OR P=3 AND
D<=20 THEN GOTO 130
140 LET E=INT (RND*(P+10))+1
145 IF P=2 AND E<=10 OR P=3 AND
E<=20 THEN GOTO 140
150 LET F=INT (RND+2)
155 PRINT AT 0,10;" "
156 PRINT AT 1,10;" " AT 1,24;" "
157 PRINT AT 2,10;" "
160 PRINT AT 1,11,0;" X ";E;" "
;D+E+F;
170 IF P=1 THEN PAUSE 50
172 IF P=2 THEN PAUSE 100
175 IF P=3 THEN PAUSE 150

```

```

180 LET A$=INKEY$
200 IF A$="S" AND F=1 OR A$="7"
AND F=0 THEN GOTO 230
210 LET A=A+3
215 PAUSE 25
217 CLS
220 GOTO 61
230 PRINT AT 0,0;"SCORE=";S
240 LET S=S+1
250 PAUSE 50
255 CLS
270 GOTO 61
300 PAUSE 50
301 CLS
302 LET U=0
303 PRINT " "
304 IF U=21 THEN GOTO 320
305 LET U=U+1
306 GOTO 303
310 CLS
314 FOR I=1 TO 21
315 PRINT " "
316 NEXT I
320 PRINT AT 9,6;" "
330 PRINT AT 10,6;" "
340 PRINT AT 11,6;" "
350 PRINT AT 12,6;" "
360 PRINT AT 13,6;" "
365 PRINT " "
370 PAUSE 100
380 CLS
390 LET T=0
400 PRINT " "
410 LET T=T+1
420 IF T=22 THEN GOTO 440
430 GOTO 400
440 PRINT AT 0,0;"YOU HAVE CRASHED"
450 LET X=0 TO 15
450 LET K=INT (RND+30)
460 LET U=INT (RND+20)
470 IF U=1 THEN GOTO 460
480 PRINT AT U,K;" ";S-1;" "
490 NEXT X
500 PAUSE 50
510 CLS
520 LET N=25
530 PRINT AT 11,N;" "
540 PRINT AT 12,N;" "
550 PRINT AT 13,N;" "
560 IF N=0 THEN GOTO 600
570 LET N=N-2
575 CLS
580 GOTO 530
600 PRINT AT 12,N;"AGAIN?"
610 INPUT A$
620 IF A$="YES" THEN GOTO 39
630 PAUSE 50
640 CLS
650 PRINT AT 7,0;"WELL,I HOPE Y
OU HAVE ENJOYED."
660 PRINT "YOUR GAME."
661 PRINT "(PRESS A KEY.)"
662 PAUSE 400
663 CLS
670 PRINT AT 10,13;" "
675 PAUSE 100
680 PRINT AT 10,13;" "

```

CLEARANCE



IN CLEARANCE, the ecosphere fights back. In the game for the Spectrum, you are a mad axeman steering yourself round a forest with the usual cursor keys and increasing your score by destroying the arboreal paradise—one point for every tree felled.

As you cut, you are enraging the giant squirrel whose habitat you are destroying and simultaneously pen-

ning it in a smaller and smaller space. The wrathful rodent appears at unpredictable points within the dells and if its position is the same as yours, either in terms of row or column number, the game ends.

An entertaining program making use of the colour, sound and user-definable graphics of the Spectrum, and submitted by David Bryant of Crowborough, Sussex.

```

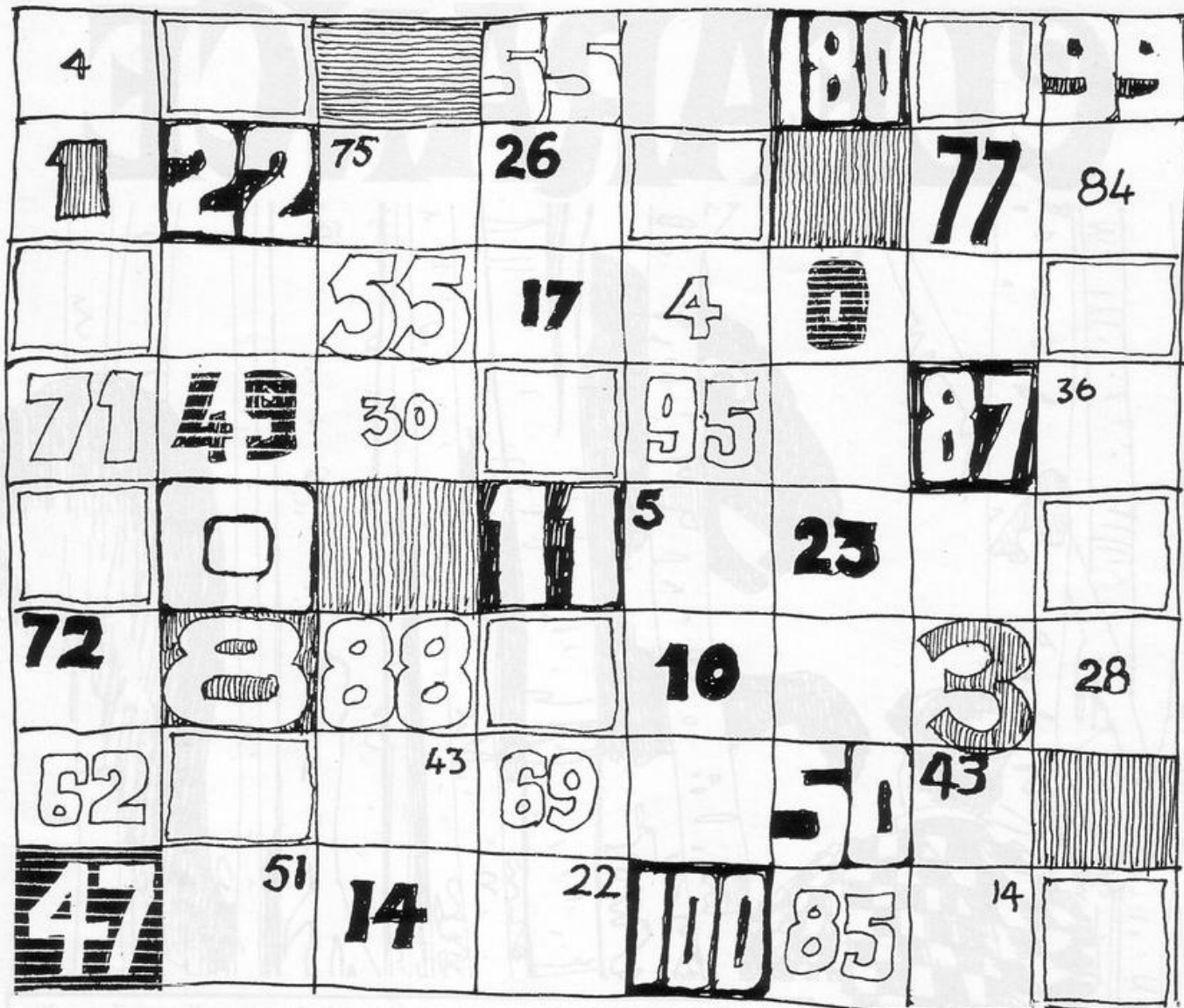
1 DATA 49,18,50,22,22,28,120,
0,42,28,8,8,8,20,20
2 FOR a=32500 TO 32514
3 READ b
4 POKE a,b
5 NEXT a
10 BORDER 0: PAPER 0: INK 7: C
LS
40 FOR a=1 TO 20: BEEP .005,a:
P
+++++
50 LET y=0: LET z=0: LET x=1:
LET y=1: LET s=-1
55 FOR a=0 TO 4
60 LET x=x+(INKEY$="5")-(INKEY
#="7")
61 IF INKEY$="5" THEN PRINT AT
x-1,y: INK 1;" "
62 IF INKEY$="7" THEN PRINT AT
x+1,y: INK 1;" "
63 IF INKEY$="5" THEN PRINT AT
x,y: INK 1;" "
64 IF INKEY$="8" THEN PRINT AT
x,y: INK 1;" "
70 LET y=y+(INKEY$="8")-(INKEY
#="5")
75 IF y>=31 THEN LET y=30
76 IF y<=0 THEN LET y=0
77 IF x<=1 THEN LET x=1

```

```

78 IF x>=20 THEN LET x=20
80 PRINT AT x,y;"I"
81 IF x=2 AND y=y THEN GO TO 5
0
82 IF ATTR (x,y)=7 THEN LET s=
s+1
86 IF ATTR (x,y-1)=1 AND ATTR
(x,y+1)=1 OR ATTR (x+1,y)=1 AND
ATTR (x-1,y)=1 THEN LET s=s-1
87 LET z=x: LET y=y
88 PRINT PAPER 4: INK 0: AT 21,
12;"SCORE=";s
90 NEXT a
100 LET c=INT (RND*18)+2: LET d
=INT (RND*18)+2
110 PRINT FLASH 1: AT c,d;"Y"
120 IF x=c OR y=d THEN GO SUB 1
50
130 FOR i=0 TO 50: NEXT i: PRIN
T INK 4: AT c,d;"Y"
140 GO TO 51
220 PRINT FLASH 1: PAPER 2: INK
0: AT 10,10;"HE GOT YOU!"
230 PRINT PAPER 2: FLASH 1: AT x
,y;"X"
240 FOR a=4 TO 1 STEP -1: BEEP
.5,a: NEXT a
250 INPUT "Another game? ";a$
260 IF a$(1)="Y" THEN RUN

```



TOMBOLA

HERE IS a program which is essential for all club secretaries who do not like drawing the numbers in the tombola. All you have to do is to enter the lowest and highest ticket numbers and the number of winners and the computer does the rest.

Although short, it includes checks to prevent incorrect numbers being drawn. One problem is that when there is a small number of tickets and a relatively high number of winners, there is a danger that it will repeat numbers. No doubt some readers will be able to find a way to deal with that.

It was sent for the ZX-81 without the RAM pack by R S P Humpleby, of Heckmondwike, West Yorkshire.

```

10 CLS
20 RAND
30 PRINT "LOWEST TICKET NO. ?"
40 INPUT A
50 PRINT "HIGHEST TICKET NO. ?"
60 INPUT B
70 PRINT
80 LET E=B-A+1
90 IF E<99999 THEN GOTO 120
100 PRINT "TOO MANY TICKETS"
110 STOP
120 PRINT "HOW MANY WINNERS?"
130 INPUT C
140 CLS
150 IF C>E THEN GOTO 270
160 PRINT "THE WINNING"
170 IF C>1 THEN GOTO 200
180 PRINT "TICKET IS *"
190 GOTO 210
200 PRINT "TICKETS ARE *"
210 FOR D=1 TO C
220 LET F=INT (RAND*E)
230 PRINT "---->"; F+A-1
250 NEXT D
260 STOP
270 CLS
280 PRINT "JUST NOT ON"
290 GOTO 280

```

A GAME which could easily become addictive has been sent by T V Cook of East Molesey, Surrey. It is called **Cramp** because as it progresses you run out of space on the screen.

The aim is to travel as far as possible without hitting your own trail, which is shown as a thick black line. The black square producing the trail is controlled by the cursor keys and the game becomes more difficult the longer it proceeds; the screen fills quickly with the trail and the square moves faster.

The two methods of escape are to hit * when it appears, which sends you to another clear but smaller screen, or to go off the screen, which causes a diagonal line to appear across your path.

Once loaded, the instructions are easy to follow, with three levels of difficulty from one to three. When your turn ends, the score is shown in the top right-hand corner.

To help with the graphics in line 6 and 7 there are 32 shifted Fs; in line 2000 there are 13 spaces; in line 3000 15 spaces; in line 6000 and 6005 four spaces; and the grey squares in line 7025 are shifted Hs.



CRAMP

```

1 LET L=0
2 GOSUB 6000
3 LET B=0
4 CLS
5 PRINT
6 PRINT "
7 PRINT AT 21,0: "
8 PRINT AT 0,20: "SCORE="
9 RAND
10 LET C=1
11 FOR W=2 TO 20
15 IF B>1 THEN PRINT AT W,15: "
18 NEXT W
19 IF X=225 THEN PRINT AT 4,15: "
20 LET Z=PEEK 16396+256*PEEK 1
6397+371
21 IF L=31 AND X=75 THEN GOSUB
7000
25 IF X<>75 THEN LET L=0
50 IF INKEY$="5" THEN LET C=-1
60 IF INKEY$="6" THEN LET C=33
70 IF INKEY$="7" THEN LET C=-3
3
80 IF INKEY$="8" THEN LET C=1
83 LET Z=Z+C
85 IF PEEK Z<>0 THEN GOSUB 400
0
87 POKE Z,128
88 LET B=B+1
89 IF INT (B/X)=B/X THEN GOSUB
3000
91 IF B>45 THEN GOTO 50
1000 LET D=11
1010 IF B>15 THEN LET D=7
1015 IF B>20 THEN LET D=5
1020 IF B>29 THEN LET D=3
1025 IF B>37 THEN LET D=0
1030 FOR J=1 TO D
1035 NEXT J
1040 GOTO 50
2000 PRINT AT 0,1: "YOU DIED
SCORE="
2010 FOR F=1 TO 50
2020 POKE Z-C,0
2030 POKE Z-C,21
2035 POKE Z-C,136
2040 NEXT F
2050 CLS
2060 PRINT AT 12,2: "PRESS CONT F
OR ANOTHER GAME"
2070 IF INKEY$="C" THEN GOTO 1

```

```

2080 GOTO 2070
2500 STOP
3000 PRINT AT 0,10: "
3010 PRINT AT 0,5: "ESCAPE
3020 LET E=PEEK 16396+256*PEEK 1
6397+INT (RND*650)+50
3030 IF PEEK E<>0 THEN GOTO 5000
3040 IF PEEK E=0 THEN POKE E,23
3500 RETURN
4000 IF PEEK Z>116 AND PEEK Z<>
23 THEN GOTO 2000
4015 IF PEEK Z=116 AND C=1 THEN
LET Z=Z-32
4020 IF PEEK Z=116 AND C=-1 THEN
LET Z=Z+32
4030 IF PEEK Z=23 THEN GOTO 4
4031 IF L=31 THEN RETURN
4035 IF X=75 AND L=31 THEN RETURN
4050 IF 1<B AND B<250 OR 400<B A
ND B<550 OR B>700 THEN GOSUB 700
0
5000 RETURN
6000 PRINT " WHAT SKILL LEVEL
(1,2,3) ?"
6005 PRINT " 3 IS THE HARDEST
6010 IF INKEY$="1" OR INKEY$="2"
OR INKEY$="3" THEN GOTO 6030
6020 GOTO 6010
6030 IF INKEY$="1" THEN LET X=75
6040 IF INKEY$="2" THEN LET X=15
0
6050 IF INKEY$="3" THEN LET X=22
5
6060 RETURN
7000 LET I=1
7002 PRINT AT 0,1: "DON'T HIT
7005 FOR L=1 TO 50
7011 IF L=9 THEN LET I=I+3
7012 IF L=9 THEN LET L=L+14
7020 LET I=I+1
7025 IF X=150 OR X=225 THEN PRINT
AT 11,10: "
7030 PRINT AT 1,1: "
7035 IF X=225 THEN PRINT AT 1,31:
-L: "
7040 NEXT L
7045 PRINT AT 0,1: "
7050 RETURN

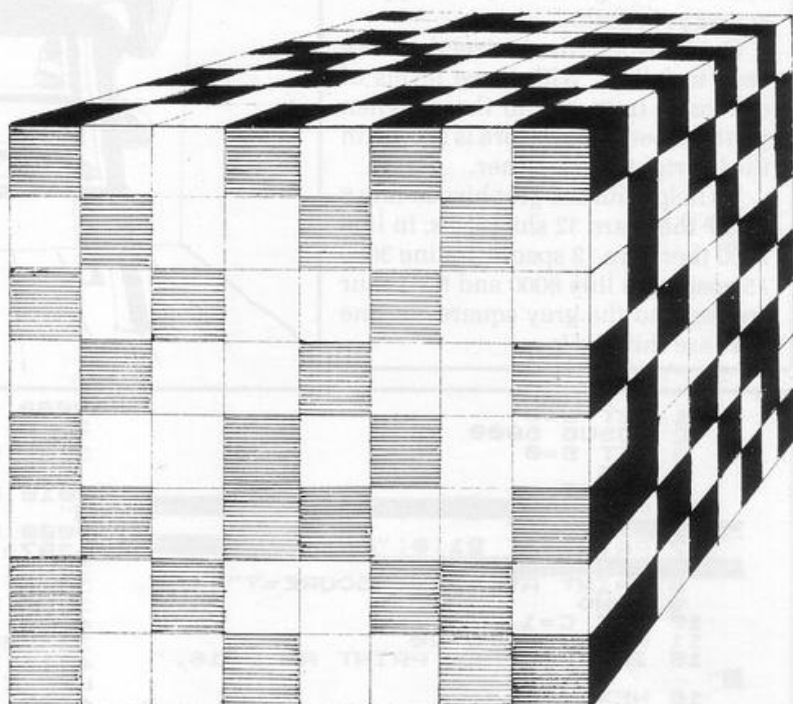
```

GRAPHIC GENERATOR

TO EASE the problem of generating graphics on the Spectrum, Mark Bateman of Wolverhampton, worked out this program.

When run it displays a square measuring eight by eight. The program is user-friendly, giving full instructions to obtain the necessary design.

On finishing, the design it is printed in the top right-hand corner of the screen.



```

1 REM GRAPHIC GENERATOR
2 REM © Mark Bateman
10 BORDER 4: PAPER 7: INK 0: C
LS
20 PRINT AT 1,0;"USER DEFINED
  GRAPHICS GENERATOR" INK 2;"
30 PRINT AT 4,8;"You are only
  allowed to define characters on
  the letters a to u."
40 INPUT "Which letter do you
  want to use ";a$
50 IF a$="a" OR a$="u" OR LEN
  a$>1 THEN PRINT AT 3,0; FLASH 1;
  "Error in input": GO TO 40
60 CLS: PRINT AT 5,11;"123456
  78"
70 FOR x=1 TO 8
80 PRINT AT 5+x,10;x
90 FOR y=1 TO 8
100 PRINT AT 5+x,10+y; INK 6;"
110 NEXT y
120 POKE USA a$+x-1,0
130 NEXT x
140 PRINT AT 15,1;"When a square
  flashes hit 0 to leave a space.
  Hit any other key to block
  in."
150 INPUT "Which row do you wish
  to work on";r$
160 IF r$="0" OR r$="8" OR LEN

```

```

r$>1 THEN INPUT "Input must be a
  integer between 0 and 8.";r$:
  GO TO 160
170 LET r=VAL r$
180 IF r=0 THEN PAPER 7: PRINT
  AT 2,1;"Finished character is
  ";CHR$(CODE a$+47): GO TO 32
0
200 LET s=0
210 FOR y=1 TO 8
220 PRINT AT 5+r,10+y; FLASH 1;
  PAPER 6;"
230 PAUSE 0
240 IF INKEY$="0" THEN PRINT AT
  5+r,10+y; PAPER 6;" ": GO TO 29
0
250 PRINT AT 5+r,10+y; PAPER 6;
  "
260 LET s=s+2+(8-y)
290 NEXT y
300 POKE USA a$+r-1,s
310 GO TO 160
320 INPUT "To amend this character,
  input 0 otherwise any other
  key.";d$
330 IF d$="0" THEN PRINT AT 2,1;
  "Unamended": GO TO 160
340 INPUT "Do you want to define
  another character? (y or n)";a$
345 IF a$="y" THEN GO TO 10
350 IF a$="n" THEN INPUT "Answer
  must be y or n";a$: GO TO 345

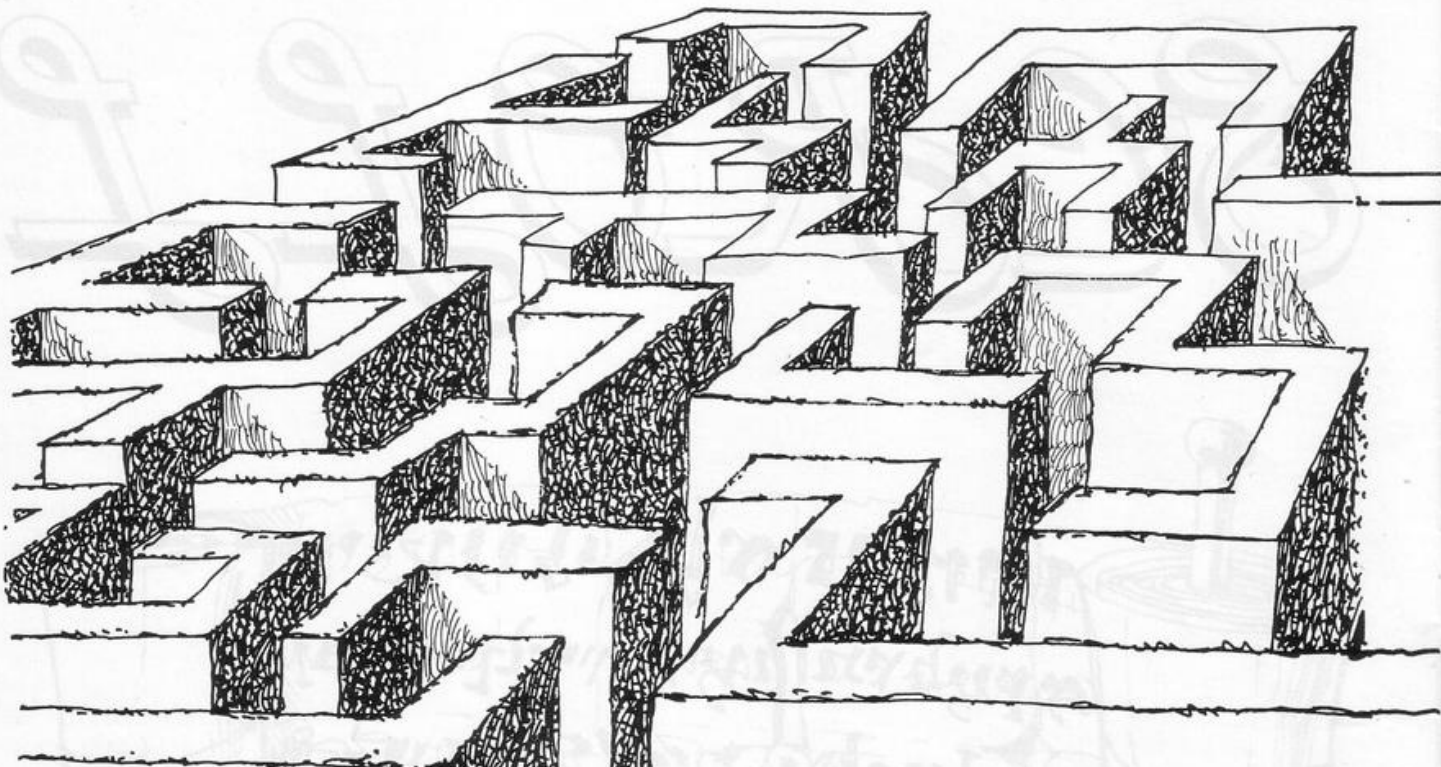
```

Once entered and running, the scrolling can be stopped by pressing BREAK and then it starts again when CONT is pressed.

```

110 LET N=1
120 IF A$(N+31)="*" THEN GOTO 1
130 PRINT AT 10,0;A$(N TO N+30)
140 FOR X=1 TO 4
150 NEXT X
160 LET N=N+1
170 GOTO 120

```



AM

```

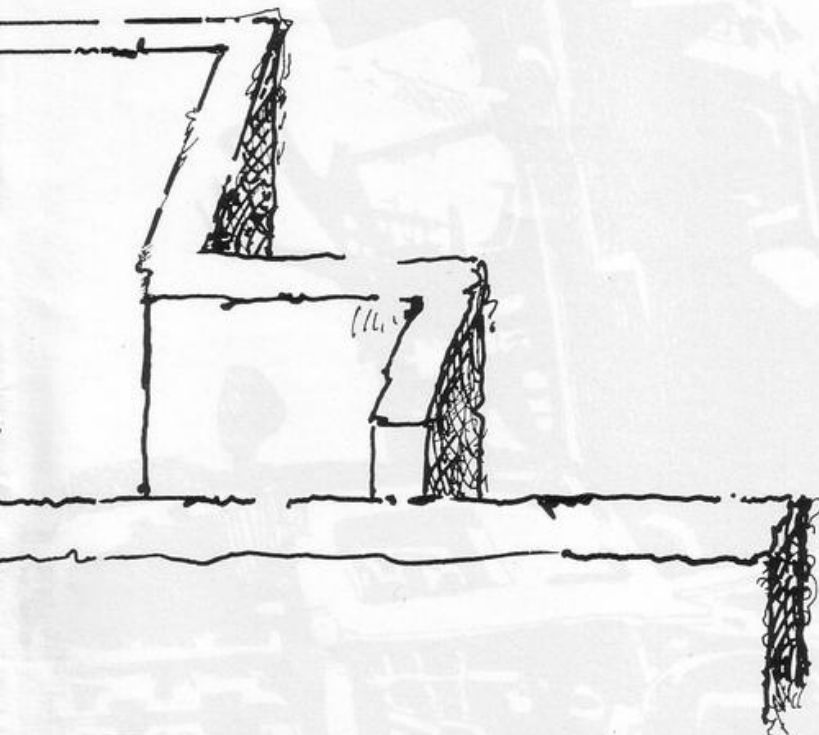
1 REM AMAZE
2 REM © Mark Bateman
3 FOR X=0 TO 23
4 READ S: POKE USA "A"+X, S
5 NEXT X
6 DATA 255,0,0,0,0,0,0,0,128,
128,128,128,128,128,128,128,0,0,
80,80,80,80,0,0
10 RANDOMIZE : LET U=20: LET Z
=30
20 BORDER 1: PAPER 5: INK 0: C
LS
30 PRINT AT 5,12: "AMAZE"
40 PRINT AT 10,1: "PLEASE WAIT,
... YOUR MAZE IS BEING GENERAT
ED."
50 DIM A(U+2,Z+2)
60 LET X=2: LET Y=2: LET CO=0
70 LET S(X,Y)=-25
90 LET UP=0: LET dn=0: LET lt=
0: LET rt=0: LET SUM=0
100 IF X>2 AND S(X-1,Y)=0 THEN
LET UP=1
110 IF X<U+1 AND S(X+1,Y)=0 THE
N LET dn=1
120 IF Y>2 AND S(X,Y-1)=0 THEN
LET lt=1
130 IF Y<Z+1 AND S(X,Y+1)=0 THE
N LET rt=1
140 LET CH=INT (RND*(UP+dn+lt+r
t)+1)
150 IF UP=1 THEN LET SUM=SUM+1

```

```

160 IF SUM=CH THEN LET S(X-1,Y)
=Y-1+(X-2)*Z: LET X=X-1: GO TO 9
170 IF dn=1 THEN LET SUM=SUM+1
180 IF SUM=CH THEN LET S(X+1,Y)
=Y-1+(X-2)*Z: LET X=X+1: GO TO 9
190 IF lt=1 THEN LET SUM=SUM+1
200 IF SUM=CH THEN LET S(X,Y-1)
=Y-1+(X-2)*Z: LET Y=Y-1: GO TO 9
210 IF rt=1 THEN LET SUM=SUM+1
220 IF SUM=CH THEN LET S(X,Y+1)
=Y-1+(X-2)*Z: LET Y=Y+1: GO TO 9
230 LET PP=S(X,Y)
240 LET X=INT (PP/Z)+2
250 LET Y=PP-(X-2)*Z+1
260 IF Y=1 THEN LET X=X-1: LET
Y=Z+1
270 IF X<2 OR Y<2 THEN GO TO
90
280 CLS: BEEP 1,1
290 PRINT AT 3,1: "YOUR MAZE IS
READY..."
300 PRINT AT 3,1: "YOUR LOCATION IN THE
MAZE..."
310 PRINT AT 3,1: "IS SHOWN BY ";CHR$(14
6): "..."
320 PRINT AT 3,1: "USE THE CURSOR KEYS TO
MOVE..."
330 PRINT AT 3,1: "ENTER BOTTOM RIGHT HAN
D CORNER..."
340 PRINT AT 3,1: "EXIT TOP LEFT..."
350 PRINT AT 3,1: "THE CLOCK WILL START AS SOON..."
360 PRINT AT 3,1: "AS THE MAZE HAS BEEN DRAWN..."
370 PRINT AT 3,1: "Hit any key to draw the maze"

```



MAZE

MARK BATEMAN of Wolverhampton called this program **Amaze** and that is what it does. On **RUN**ning, it designs a maze which the player has to negotiate. The amazing section is the setting-up of the maze, which can take between three and five minutes. The design is based on a complex algorithm which results in a different maze each time.

When the maze is solved, the player has the option to keep it and start again and try to beat the earlier time, which is displayed on completion. It is also possible to end the game, ask for another maze to be drawn, or have the first one printed-out.

The route through the maze is controlled by the cursor keys working in the usual directions.

```

300 PAUSE 0
310 CLS
320 FOR X=2 TO U+1
330 FOR Y=2 TO V+1
340 IF A(X,Y) <> (X-2)*Z+Y-2 AND
A(X,Y-1) <> (X-2)*Z+Y-1 THEN PRINT
AT X-1,Y-1; OVER 1; CHR$ 145
350 IF A(X,Y) <> (X-3)*Z+Y-1 AND
A(X-1,Y) <> (X-2)*Z+Y-1 THEN PRINT
AT X-1,Y-1; OVER 1; CHR$ 144
360 NEXT Y
370 NEXT X
380 PLOT 0,0: DRAW 232,0
390 PLOT 248,0: DRAW 0,160
400 IF CO=1 THEN COPY: LET CO=
0: GO TO 560
410 BEEP .1,15: POKE 23674,0: P
OKE 23673,0: POKE 23672,0
420 LET X=X+1: LET Y=Y+1
430 PRINT AT X-1,Y-1; OVER 1;
CHR$ 146
440 PAUSE 0
445 PRINT AT X-1,Y-1; OVER 1;
CHR$ 146
450 IF INKEY$="S" AND (A(X,Y)
=(X-2)*Z+Y-2 OR A(X,Y-1)=(X-
2)*Z+Y-1) THEN LET Y=Y-1
460 IF INKEY$="S" AND (A(X,Y)
=(X-1)*Z+Y-1 OR A(X+1,Y)=(X-
2)*Z+Y-1) THEN LET X=X+1
470 IF INKEY$="7" AND (A(X,Y)
=(X-3)*Z+Y-1 OR A(X-1,Y)=(X-
-2)*Z+Y-1) THEN LET X=X-1
480 IF INKEY$="8" AND (A(X,Y)
=(X-2)*Z+Y OR A(X,Y+1)=(X-2
)*Z+Y-1) THEN LET Y=Y+1
490 IF X<2 OR Y<2 THEN GO T
O 430
500 LET I1=PEEK 23672+256*PEEK
23673+65536*PEEK 23674
510 LET I2=PEEK 23672+256*PEEK
23673+65536*PEEK 23674
520 CLS: BEEP .05,40
530 IF I1<I2 THEN LET I1=I2
540 LET I=I1/50
550 PRINT AT 1,1;"CONGRATULATIO
NS..... YOU HAVE FINISHED THE MA
ZE IN..... A TIME OF.....";I;" S
ECONDS....." ENTER
560 INPUT "What is your selecti
on";S$
570 IF S$="0" THEN STOP
580 IF S$="1" THEN GO TO 310
590 IF S$="2" THEN GO TO 20
600 IF S$="3" THEN LET CO=1: GO
TO 310
610 INPUT "Your selection must
be an integer between 0 and 3.";
S$
620 GO TO 570

```



ROCKET ATTACK

```

3 GO SUB 1000
10 LET a=1: LET b=0: LET s=b:
LET t=20
100 LET c=10: LET e=20: LET d=a
150 PRINT AT 21,b: " "
170 PRINT AT 20,b: " "
180 LET y=INT (RND*10)+10
182 BEEP 0.009,20
185 PRINT AT y,e: "ab "; IF INK
EY$="p" THEN PRINT AT c,d: " "
190 IF INKEY$="p" THEN PRINT AT
c,d: " "
191 BEEP 0.009,-12
200 IF y=c AND e=d THEN GO TO 4
00
210 PRINT AT c,d: " "
220 IF INKEY$="p" THEN LET c=c-
a: LET d=d+1
240 IF c=4 THEN GO TO 410
250 LET e=e-a
260 IF e=b THEN GO TO 410
270 GO TO 185
400 LET s=s+1: PRINT AT y,e-1: "
>xxx<": BEEP 0.3,-20: PAUSE 20
410 CLS: LET t=t-a: IF t=0 TH
EN GO TO 100
440 PRINT AT 10,11: "GAME OVER"
450 PRINT AT 10,11: "Score=";s
460 FOR f=-10 TO 10: BEEP 0.009,
f: BORDER AND+7: NEXT f: BEEP 2,
-17: STOP
1000 FOR f=0 TO 7
1010 READ c9: POKE USA "a"+f,c9
1020 NEXT f
1030 DATA 0,0,20,53,255,255,127,
0,0
1040 FOR f=0 TO 7
1050 READ c9: POKE USA "b"+f,c9
1060 NEXT f
1070 DATA 14,20,56,254,255,248,2
48,0,0
1080 RETURN

```

ROCKET ATTACK is yet another spin-off from the Sinclair Programs R&D industry. J Sells of Enfield has updated a program printed originally in our May-June issue.

He has Spectrumised D E Healey's Rocket Attack games, composed originally for the ZX-81. The game involves a squadron of 20 planes heading towards your missile station. Pressing P will fire the missile. To destroy the plans you can either hit them directly or leave the missile in their path. Your hawk-eyed reviewer only managed 12 out of 20. Graphics notes:

160—Three graphics 8s, twenty-nine graphic 3s.

170—Graphic 6.

185—"ab" as in graphic mode.

440—Inverse video "Game over".

SHARP SHOOTER



AN ESPECIALLY pleasing display is the strong point of the **Sharp Shooter** program from Paul Naylor of Tyldesley, Greater Manchester.

You are the black-hatted villain confronting a posse of lily-livered bounty hunters. An inverted O

represents the deputy badge on their trembling chests. You are armed with a Colt ten-shooter (what?) which you fire with the P key. When the gun is fired the outlaw falls into a very effective crouching position.

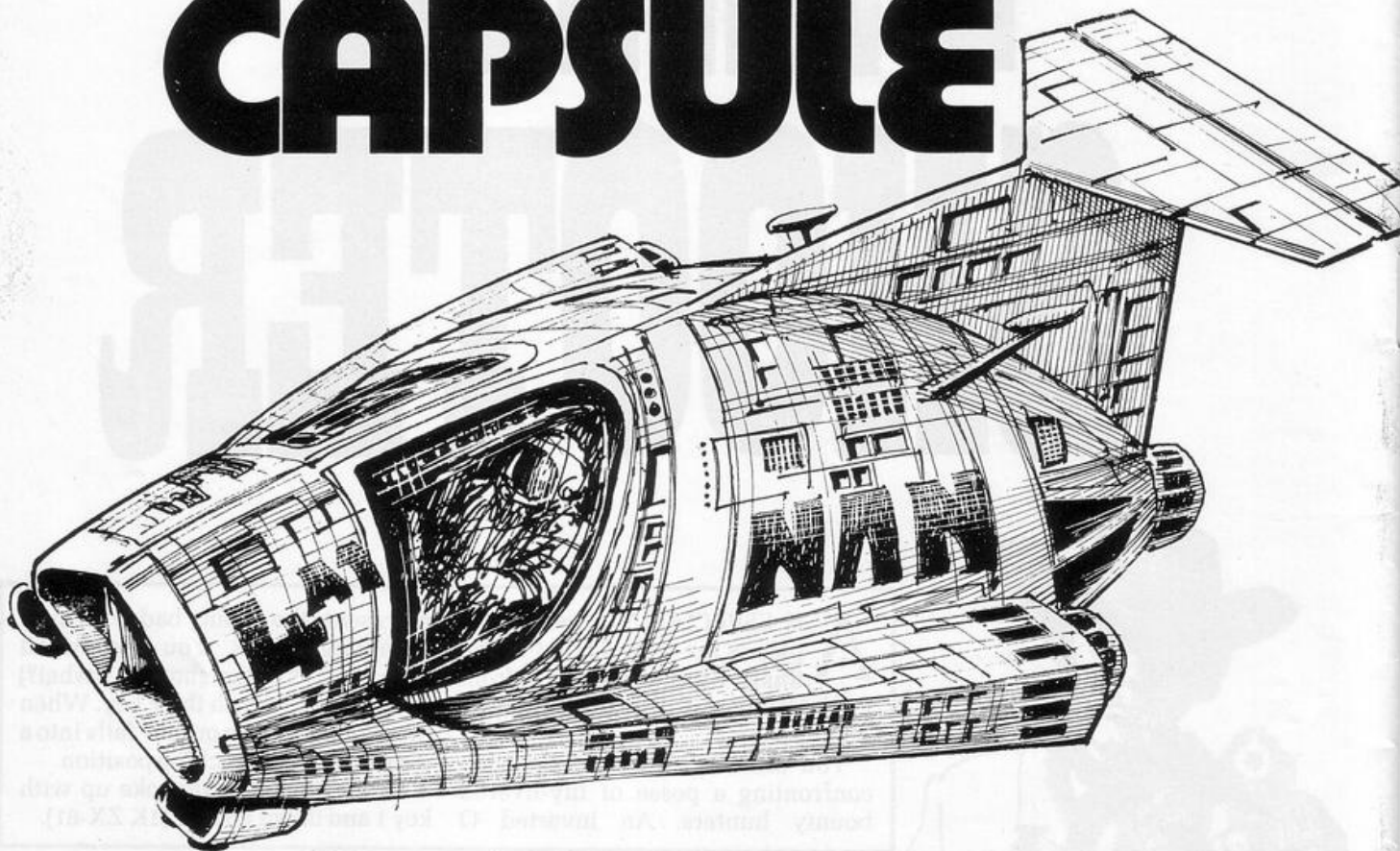
Manoeuvre the cowpoke up with key 1 and down with A. (1K ZX-81).

```

1 LET N=PI/PI
2 LET D=VAL "29"
3 LET A=5
4 LET H=SIN PI
5 LET S=H
6 LET T=INT (AMD+VAL "17")+N
7 LET M=INT (AMD+INT PI)
8 IF M=N AND T=N THEN LET T=T
-N
9 IF M=VAL "2" AND T=VAL "18"
THEN LET T=T+N
10 CLS
20 PRINT AT T,SIN PI;"O";AT A,
D;" ";AT A+N,D+N;" ";AT A+VAL
"2",D;" ";AT A+INT PI,D;" ";
AT A+VAL "4",D;" "
30 IF INKEY$="P" THEN GOTO VA
L "120"
40 PRINT AT A+N,D-N;" ";AT A+V
AL "2",D;" ";AT A+INT PI,D;" "
;AT A+VAL "4",D-N;" "
50 FOR F=VAL "26" TO SIN PI ST
EP -N
60 PRINT AT A+N,F;" "
70 NEXT F
80 LET S=S+N
90 IF A+N=T THEN LET H=H+N
100 IF S=VAL "18" THEN GOTO VAL
"150"
110 IF A+N=T THEN GOTO VAL "5"
120 IF INKEY$="1" AND A>SIN PI
THEN LET A=A-N
130 IF INKEY$="A" AND A<VAL "17"
THEN LET A=A+N
140 GOTO VAL "7"
150 PRINT AT A+N,SIN PI;" HITS
";H

```

SPACE CAPSULE



SPACE CAPSULE is a simple version of the lander programs. It will fit the unexpanded ZX-81 and, when run, displays a space ship being launched at the bottom of the screen.

It rises to the top and then falls back to earth. As it does so, the landing pad is moving and the player has to manoeuvre the craft to land on it. If after a few attempts you find that too simple, delete line 100 and it becomes almost impossible.

The graphics are, in line 50 the graphic shifted 3, two inverse spaces and graphic shifted 4; and in line 60 shifted T and Y and two shifted Hs. They are repeated in lines 60 and 170. It was sent by Colin Healey, of Workington, Cumbria.

```

1 LET G=0
2 DIM E(28)
13 LET A=INT (RND*2)
15 PRINT AT 0,10;"SCORE=";G
20 IF A=0 THEN GOTO 80
30 LET C=INT (1+10*RND)
40 FOR B=28 TO 0 STEP -1
50 IF B=1 THEN GOTO 200
60 GOTO 100
80 LET C=INT (1+10*RND)
90 FOR B=0 TO 28
100 PRINT AT C,B;" A "
110 IF INKEY$="G" THEN GOTO 200
120 NEXT B
130 GOTO 13
200 PRINT AT C,B;" "
210 FOR E=C TO 28
220 PRINT AT E,B+1;"A"
230 PRINT AT E,B+1;" "
240 NEXT E
245 PRINT AT 28,B+1;"A"
246 IF E(B)=1 THEN GOTO 300
247 LET E(B)=1
250 LET G=G+1
255 IF G=28 THEN GOTO 2
260 GOTO 13
300 CLS
310 PRINT TAB 2;"YOU CRASHED ON
E"
320 PRINT TAB 7;"ANOTHER GO PRE
55 N/L"
330 PRINT TAB 12;"YOU LANDED ";
G
340 INPUT I$
350 IF I$<>" " THEN STOP
360 CLS
370 RUN
    
```

PATTERN MAKER



```

10 INPUT "border?";b: IF b<0 OR
R b>9 THEN GO TO 10
20 INPUT "paper?";p: IF p<0 OR
p>9 THEN GO TO 20
30 INPUT "ink?";i: IF i<0 OR i
>9 THEN GO TO 30
40 INPUT "s/igh?";s: IF s<0 OR
AND s<>0 THEN GO TO 40
60 INPUT "X-position?";x: IF x
<0 OR x>255 THEN GO TO 60
70 INPUT "Y-position?";y: IF y
<0 OR y>175 THEN GO TO 70
80 LET y=INT y: LET x=INT x
90 BORDER b: PAPER p: CLEAR 1:
BORDER s: OVER 1: CLS
110 PLOT 0,0: DRAW X,y
120 PLOT 255,175: DRAW -x,-y
130 PLOT 255,0: DRAW -x,y
140 PLOT 0,175: DRAW x,-y
150 LET x=x+INKEY$="3" AND x<2
55)-(INKEY$="5" AND x)
160 LET y=y+INKEY$="7" AND y<1
75)-(INKEY$="6" AND y)
170 GO TO 110

```

BRICK CATCHER is a smashing game. You are protecting a greenhouse at the bottom of the screen from the destructive attentions of some Dennis the Menace figure. He is hurling bricks at your charge and it is your unfortunate duty to catch them.

You can move by means of the cursor keys 5 and 8 but if you fail to stop one of these projectiles, the

game ends and the enraged owner emerges, clutching his head.

A neat game for the 1K ZX-81 sent by Grahame Chidwick of Grimsby. Graphic notes:

210—Graphic 7; graphic Y, space, graphic T; graphic A.

505—Graphic T, O, graphic Y; graphic 2, inverse space, graphic 1; inverse space; graphic T, space, graphic Y.

BRICK CATCHER

```

1 RAND 0
40 LET T=15
50 LET W=0
150 LET U=0
155 LET P=INT (RAND*32)
200 LET T=T+(INKEY$="8" AND T<3
0)-(INKEY$="5" AND T>1)
210 PRINT AT 21,T: " "; AT 20,T-1
; " "; AT U,P: " "
230 LET U=U+1
235 IF U>20 THEN GOTO 400
240 LET X=RND*RND
245 CLS
250 GOTO 150
400 IF T<P THEN GOTO 500
405 LET W=W+1
410 GOTO 150
500 PRINT AT 21,P-3: "BRICK"
505 PRINT AT 15,0: "GO" AT 19,0
; " " AT 20,1: " " AT 21,0: " "
510 PRINT AT 15,3: "GRRR..."
515 PRINT AT 19,4: "(THE OWNER)"
550 PRINT AT 10,12: "GAME OVER"
560 PRINT AT 12,12: "SCORE=";W

```





ALPHABETICAL SORTING

ALPHABETICAL SORTING is a neat routine for sorting A\$ into alphabetical order. Alter the numbers in lines 9540 and 9770 according to the number of elements in A\$. For example, if you DIM A\$ (100,15), the number in those lines should be 100.

Michael Horton of St Edmond's Junior School, Canterbury, who sent the program, says that it is the fastest sort of which he knows for the ZX-81.

```

9500 FAST
9530 LET A=1
9540 LET N=100
9550 IF 2*A>N THEN GOTO 9580
9560 LET A=A+SGN A
9570 GOTO 9550
9580 LET F=2*A-1
9590 LET F=INT (F/2)
9600 IF NOT F THEN GOTO 9750
9610 LET D=N-F
9620 LET B=SGN A
9630 LET A=B
9635 LET E=A+F
9650 IF A$(A)>A$(E) THEN GOTO 97
9660 LET B=B+SGN B
9670 GOTO (B>0 AND 9590)+(9620 A
ND B<0)
9700 LET B#=A$(A)
9710 LET A$(A)=A$(E)
9720 LET A$(E)=B#
9730 LET A=A-F
9740 GOTO (9650 AND A(1)+(9630 A
ND A)>1)
9750 SLOW
9760 CLS
9770 FOR F=1 TO 100
9780 SCROLL
9790 PRINT A$(F)
9800 NEXT F
9810 RETURN

```

LASER Cannon

```

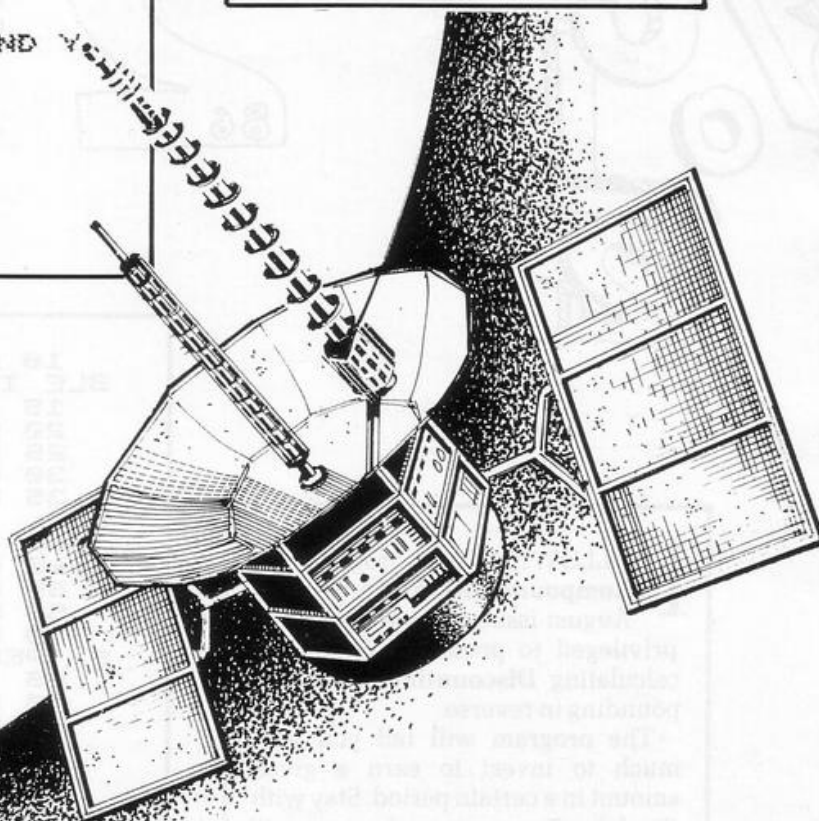
10 LET A=0
20 LET J=200
30 LET K=10
40 LET G=0
50 LET X=INT (RND*15)+2
60 LET A=A+1
70 IF A=21 THEN GOTO 260
80 LET Y=30
90 PRINT AT X,0;CHR$ 130;CHR$
120:AT X,Y;"X"
100 IF J<0 THEN GOTO 150
110 IF INKEY$="7" THEN LET K=K-
1
120 IF INKEY$="5" THEN LET K=K+
1
130 IF INKEY$="8" THEN PRINT AT
K,2;"*****"
140 IF INKEY$="5" THEN LET J=J-
1
150 LET Y=Y-1.5
160 IF Y=3 THEN LET G=G+1
170 IF G=5 THEN GOTO 240
180 IF Y=3 THEN GOTO 50
190 IF INKEY$="8" AND K=X AND Y=
<21 THEN GOTO 220
200 CLS
210 GOTO 90
220 PRINT AT X,Y+1;CHR$ 169
230 GOTO 50
240 PRINT "DESTROYED"
250 STOP
260 PRINT "YOU WIN"
270 PRINT "FUEL LEFT=";J

```

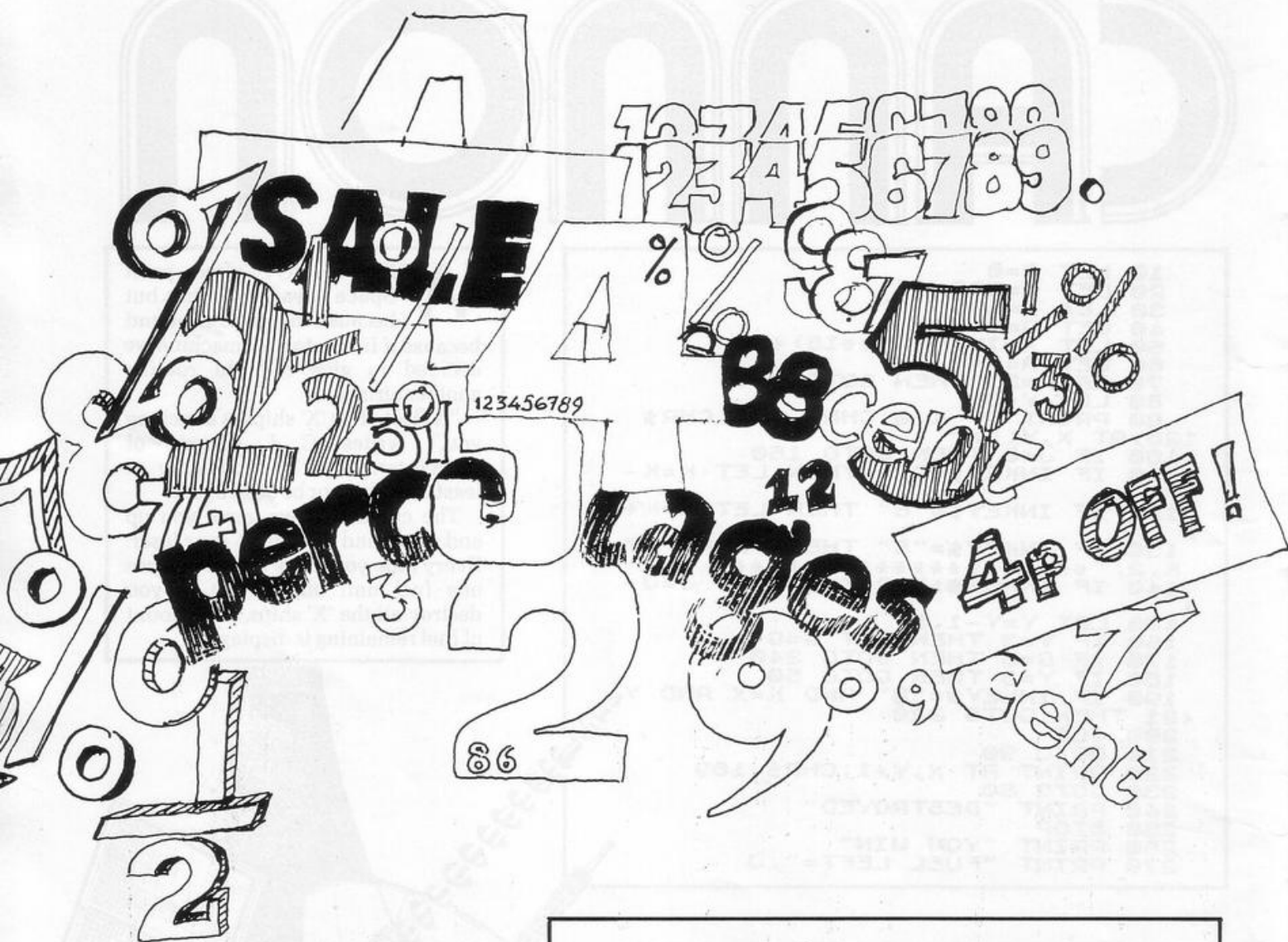
WE DO NOT often print **Space Invaders** games but because this is so neat and because it fits on to a 1K machine we decided to give the old routine another airing.

"A fleet of 20 'X' ships is attacking you," writes C J Barnatt of Worcester. "You must destroy at least 15 of them or be destroyed."

The cursor arrows move you up and down and the 8 fires your laser. Every time you move or fire you use one fuel unit out of 200. If you destroy all the 'X' ships, the amount of fuel remaining is displayed.



DISCOUNTING



FOLLOWING our program for **Compound Interest** in the July/August issue, we are proud and privileged to present a method of calculating **Discounting**—i.e., compounding in reverse.

The program will tell you how much to invest to earn a given amount in a certain period. Stay with **Sinclair Programs** and you will always have money to invest.

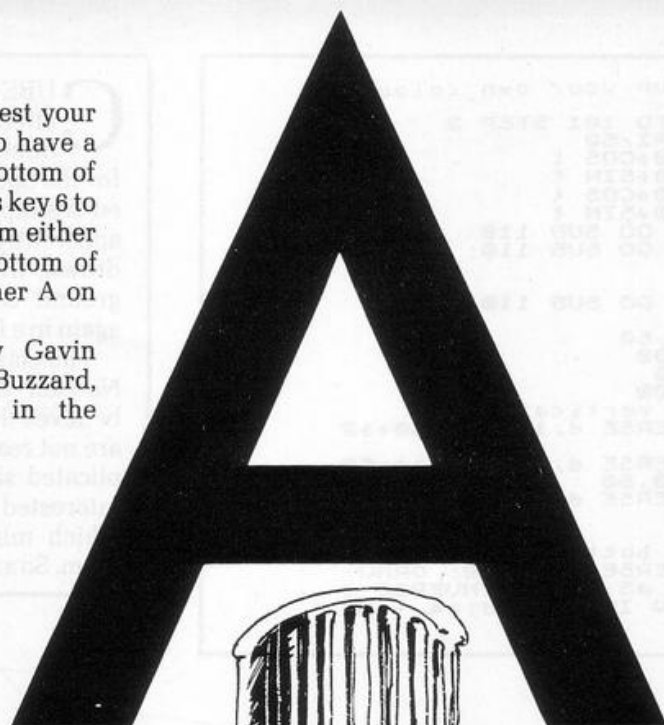
```

10 PRINT "ENTER AMOUNT RECEIVABLE IN X NUMBER OF YEARS"
15 INPUT X
20 PRINT
25 PRINT "X";X
30 PRINT
35 PRINT "ENTER NUMBER OF YEARS"
40 INPUT Y
45 PRINT
50 PRINT Y
55 PRINT
60 PRINT "ENTER RATE OF INTEREST PER ANNUM"
65 INPUT R
70 PRINT
75 PRINT R
80 CLS
90 LET PV=X*(1/(1+R/100)**Y)
95 PRINT "GIVEN "X;" PERCENT OF INTEREST PER ANNUM, THE PRESENT VALUE OF X;"X;" IN "Y;" YEARS IS "PV

```

THIS IS short game to test your eyesight. The aim is to have a row of As along the bottom of the screen. To do it you press key 6 to stop the As as they come from either side and then fall to the bottom of the screen. If they hit another A on the bottom the game ends.

A **Lander** was sent by Gavin Cheshire, of Leighton Buzzard, Bedfordshire. It will fit in the unexpanded ZX-81.



LANDER

```

10 LET C=15
20 LET A=14
30 LET B=15
40 CLS
50 PRINT AT 21,A;" "
60 PRINT AT C,B;" "
70 LET C=C-1
80 IF C=0 THEN GOTO 40
90 LET D=INT (RND*2)+1
100 IF C=15 THEN LET D=0
110 IF D=1 THEN LET A=A-1
120 IF D=2 THEN LET A=A+1
130 CLS
140 IF INKEY$="5" THEN LET B=B-1
150 IF INKEY$="5" THEN LET B=B+1

```

```

160 PRINT AT 21,A;" "
170 PRINT AT C,B;" "
180 LET C=C+1
190 IF C=19 AND B=A+1 THEN GOTO 220
200 IF C=20 THEN GOTO 250
210 GOTO 90
220 PRINT AT 10,10;"LANDED"
230 INPUT A$
240 RUN
250 PRINT AT 10,10;"PRESS N/L FOR ANOTHER GO"
260 INPUT A$
270 RUN

```

```

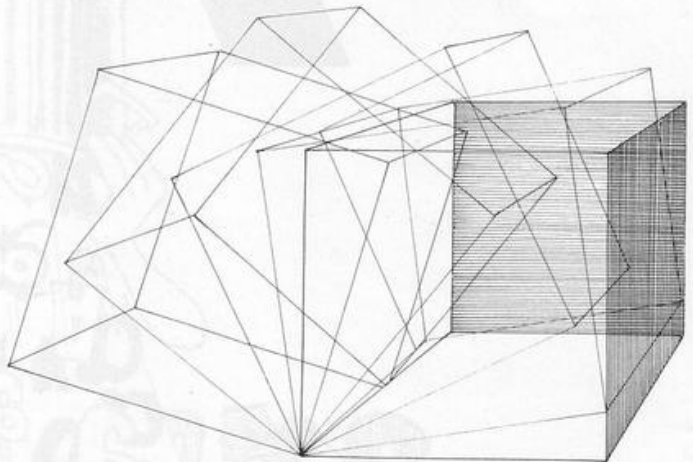
5 REM Set up your own colours
here
10 FOR q=1 TO 101 STEP 2
20 LET t=q*PI/50
30 LET a1=50*COS t
40 LET a2=10*5IN t
50 LET a3=10*COS t
60 LET a4=50*5IN t
70 LET d=0: GO SUB 110
80 LET d=1: GO SUB 110: REM on
draw
90 NEXT q
100 LET d=0: GO SUB 110
105 STOP
110 PLOT 127,50
120 GO SUB 200
130 DRAW 0,50
140 GO SUB 200
149 REM draw verticals
150 PLOT INVERSE d;127+a1,50+a2
: DRAW 0,50
160 PLOT INVERSE d;127+a1-a4,50
+a2+a3: DRAW 0,50
170 PLOT INVERSE d;127-a4,50+a3
: DRAW 0,50
180 RETURN
199 REM draw bottom or top
200 DRAW INVERSE d;a1,a2: DRAW
INVERSE d;-a4,a3: DRAW INVERSE d
;-a1,-a2: DRAW INVERSE d;a4,-a3
210 RETURN

```

CUBE ROTATE is an interesting attempt at producing three dimensional moving graphics for the Spectrum. The shape displayed is simple—a cube—and is shown apparently rotating by being first drawn, then re-drawn in the background colour, and finally drawn again in a fresh position.

The composer of the program is D Noonan of London N.19, and he believes that the principles involved are not really suitable for more complicated shapes but says he is very interested in any improvements which might be made to the program. So are we.

CUBE ROTATE



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