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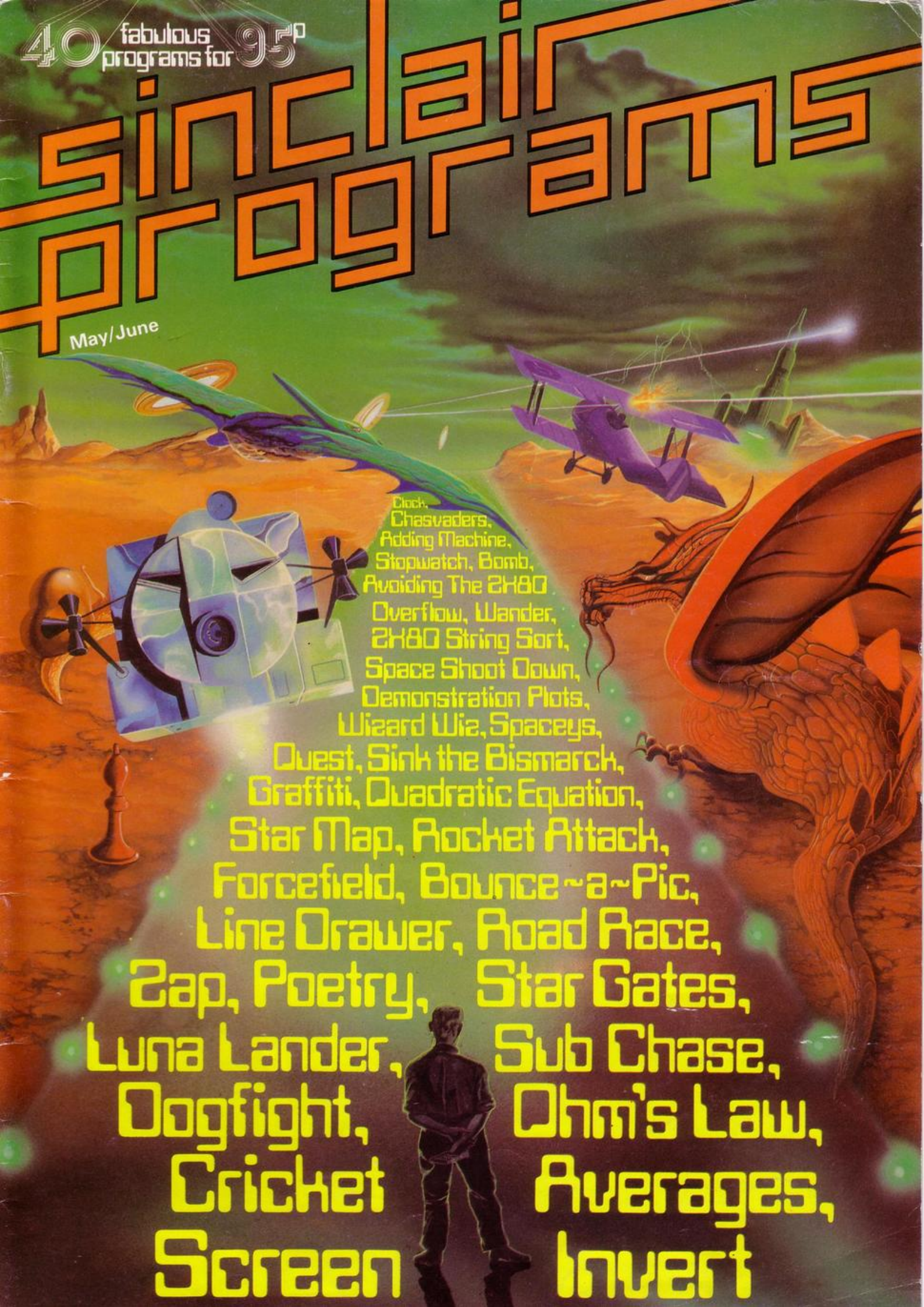

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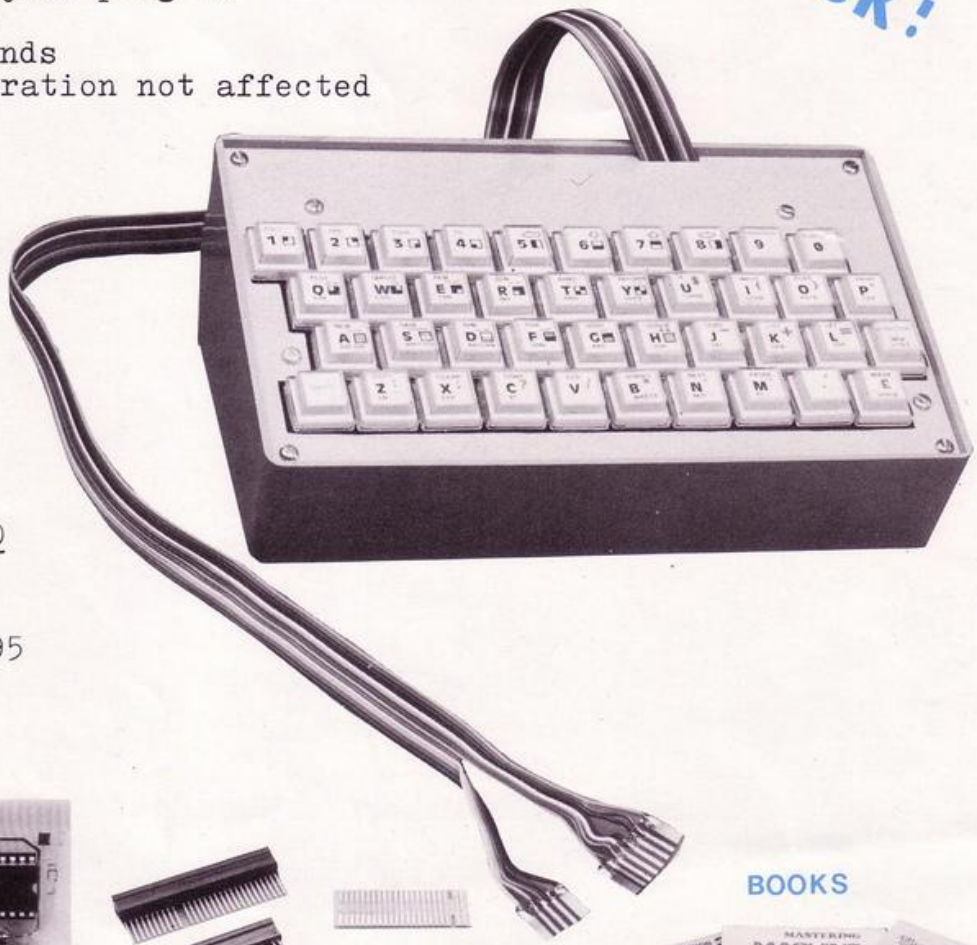

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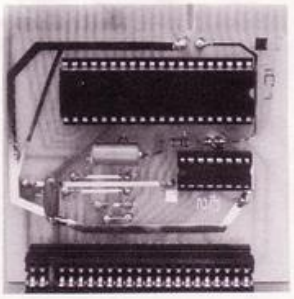

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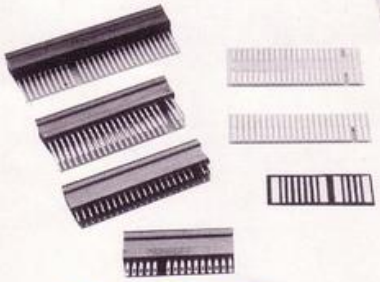

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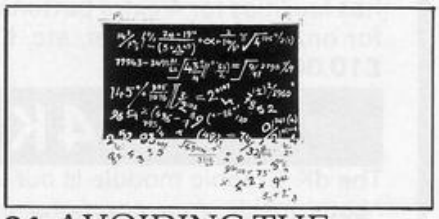

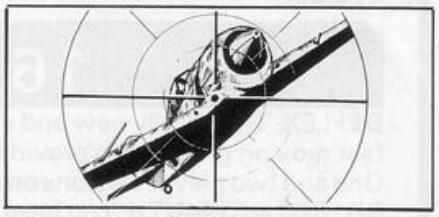

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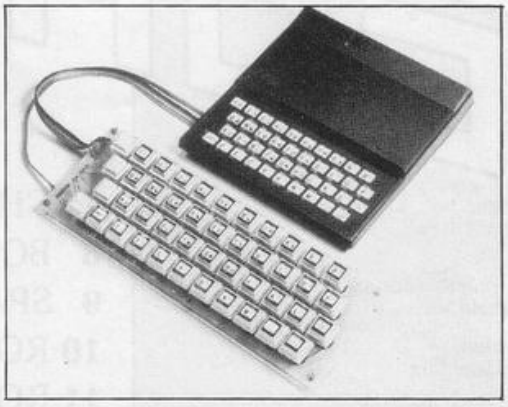
ZX KEYBOARD



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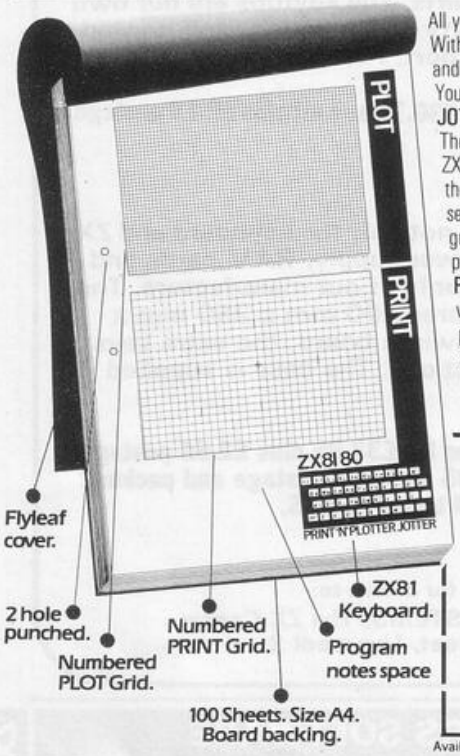

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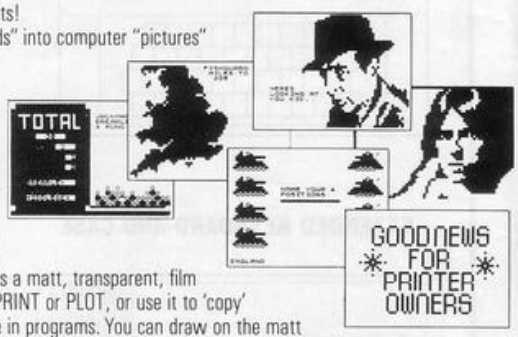

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CHASVADERS

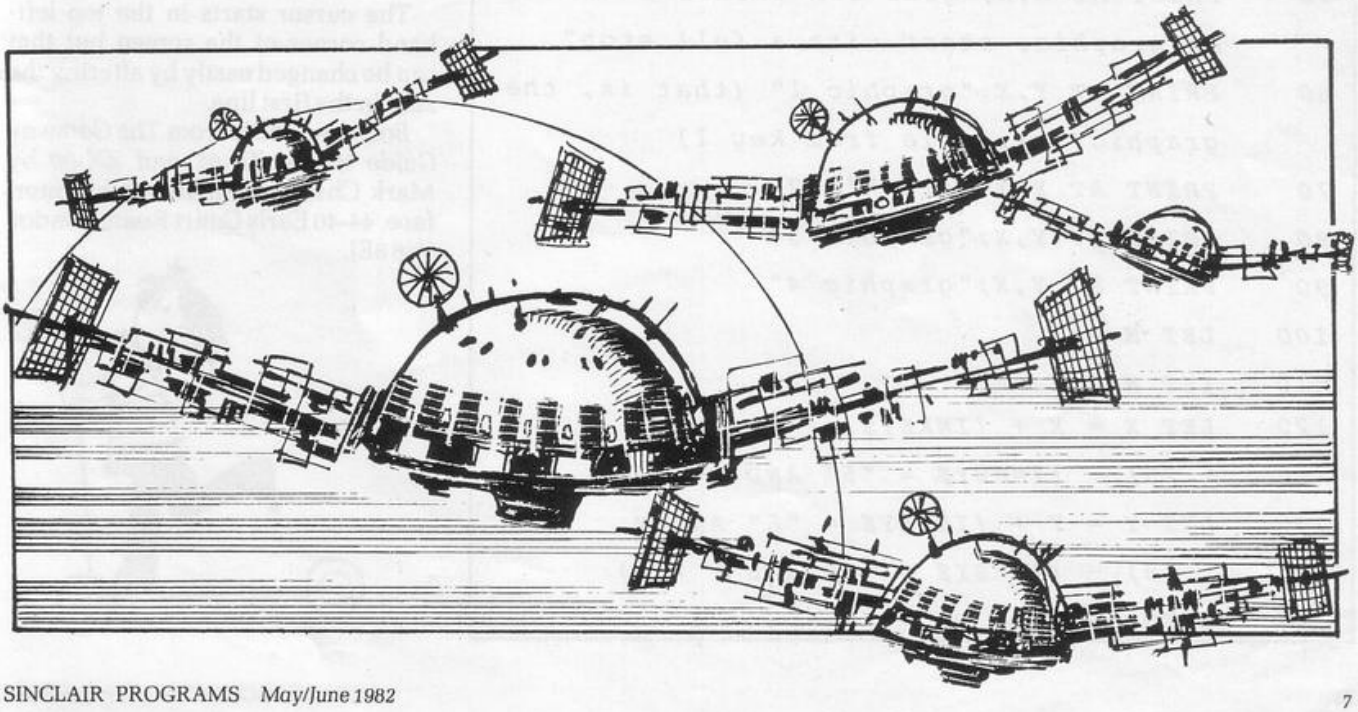
FROM 15-year-old Charles King-Cox of Appleby is a self-titled version of 1K ZX-80 *Space Invaders*. Five Chasvaders are landing on earth and you—equipped with the best technology earth can muster, a 1K, old ROM ZX-80—must stop them. Unfortunately, the game is impossible to win, because if you destroy them all they produce another five. That continues until you are blown up or the Chasvaders land.

You have two missile bases—earth has spared no expense in its defence. One of the bases is positioned somewhere beneath the invader on the right and you have to wait until it is directly above you to fire, which you do by pressing F. You have only five shots for each brace of Chasvaders.

The plucky player scores 200 for every Chasvader destroyed, although you lose 10 points for every shot you fire. There is a bonus of 50 if you shoot all five invaders, making a grand total for the round of 1,000. The highest score we could obtain playing the game in office was 3570. Try to beat that.

Keeping pressing NEWLINE over and over again to keep the invasion under way, unless you want to fire, when you press F before NEWLINE.

```
10 LET A=0
20 LET B=0
30 LET C=0
40 LET D=0
50 LET E=0
60 LET B=B+1
70 LET F=15
80 LET G=5
90 GOTO 160
100 IF G>0 THEN PRINT "{2 spaces shift G D
shift G)";
110 RETURN
120 FOR H=1 TO 16
130 PRINT "{2 shift G)";
140 NEXT H
150 RETURN
160 PRINT
170 FOR I=1 TO E
180 IF E>0 THEN PRINT
190 NEXT I
200 LET J=RND(4)
210 FOR K=1 TO J
220 PRINT "{single space)" ;
230 NEXT K
240 FOR L=1 TO G
250 GOSUB 100
260 NEXT L
270 FOR M=1 TO F
280 IF F>0 THEN PRINT
290 NEXT M
300 IF RND(15)=5 THEN GOTO 590
310 FOR N=1 TO G
320 PRINT "{5 spaces)";
330 NEXT N
340 PRINT "{Shift F Shift A Shift D)"
350 GOSUB 120
360 PRINT
370 IF A=0 THEN PRINT "{Shift F Shift A
Shift D)"
380 INPUT O$
390 IF D=5 THEN GOTO 410
400 IF O$="F" THEN GOSUB 540
410 IF F=1 THEN GOTO 460
420 LET E=E+1
430 LET F=F-1
440 CLS
450 GOTO 160
460 PRINT"HARD LUCK,"; G; "* OF THEM
LANDED
470 PRINT*(B*1000)-(G*200)-(10*D); "*
POINTS"
480 STOP
490 PRINT "WELL DONE, YOU"
500 PRINT "GOT THEM ALL"
510 INPUT P$
520 CLS
530 GOTO 30
540 IF J=3 THEN LET G=G-1
550 IF J=3 THEN LET C=C+1
560 IF C=5 THEN GOTO 490
570 LET D=D+1
580 RETURN
590 FOR Q=1 TO G
600 PRINT "{5 spaces)";
610 NEXT Q
620 PRINT "{Shift M Shift H Shift N)"
630 GOSUB 120
640 LET A=A+1
650 PRINT "YOU GOT BLOWN UP"
660 IF A=2 THEN GOTO 470
670 INPUT R$
680 CLS
690 GOTO 170
```



Bounce-a-Pic

```
10    LET X = 0
20    LET N = X
30    LET Y = X
40    LET M = X
50    PRINT AT M,N;"your own choice
      of graphic, start with a full stop"
60    PRINT AT Y,X;"graphic 1" (that is, the
      graphic available from key 1)
70    PRINT AT Y,X;"graphic 2"
80    PRINT AT Y,X;"graphic 3"
90    PRINT AT Y,X;"graphic 4"
100   LET M = Y
110   LET N = X
120   LET X = X + (INKEY$ = "8" AND X
      < 29) - (INKEY$ = "5" AND X > 2)
130   LET Y = Y + (INKEY$ = "6" AND Y
      < 18) - (INKEY$ = "7" AND Y > 2)
140   GOTO 50
```

BOUNCE-A-PIC, written to run on a 1K ZX-81, draws pictures with a difference as the cursor is already bouncing and dancing over the screen before you input anything. Its direction can be controlled using the cursor keys—5, 6, 7, 8.

The cursor starts in the top left-hand corner of the screen but that can be changed easily by altering the zero in the first line.

Bounce-a-Pic is from *The Gateway Guide to the ZX-81 and ZX-80* by Mark Charlton. Published by Interface, 44-46 Earls Court Road, London W8 6EJ.

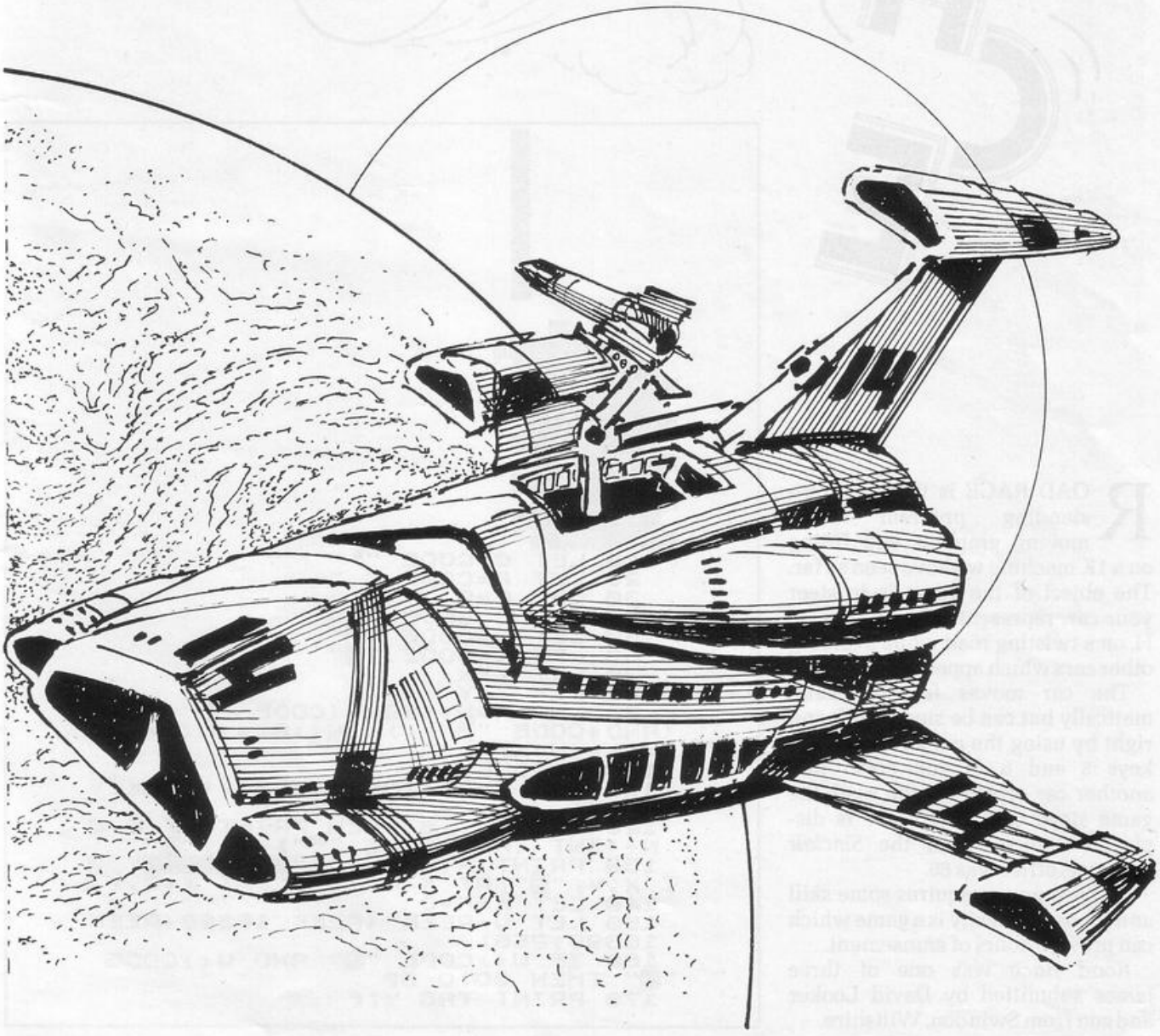
SPACEYS

ANOTHER game for 1K ZX-81 is *Spaceys*, in which a space ship cruises overhead. Using the 1 key will fire a missile, represented by an asterisk, which can then be guided using the 8 key for left movement and the Ø key for right movement.

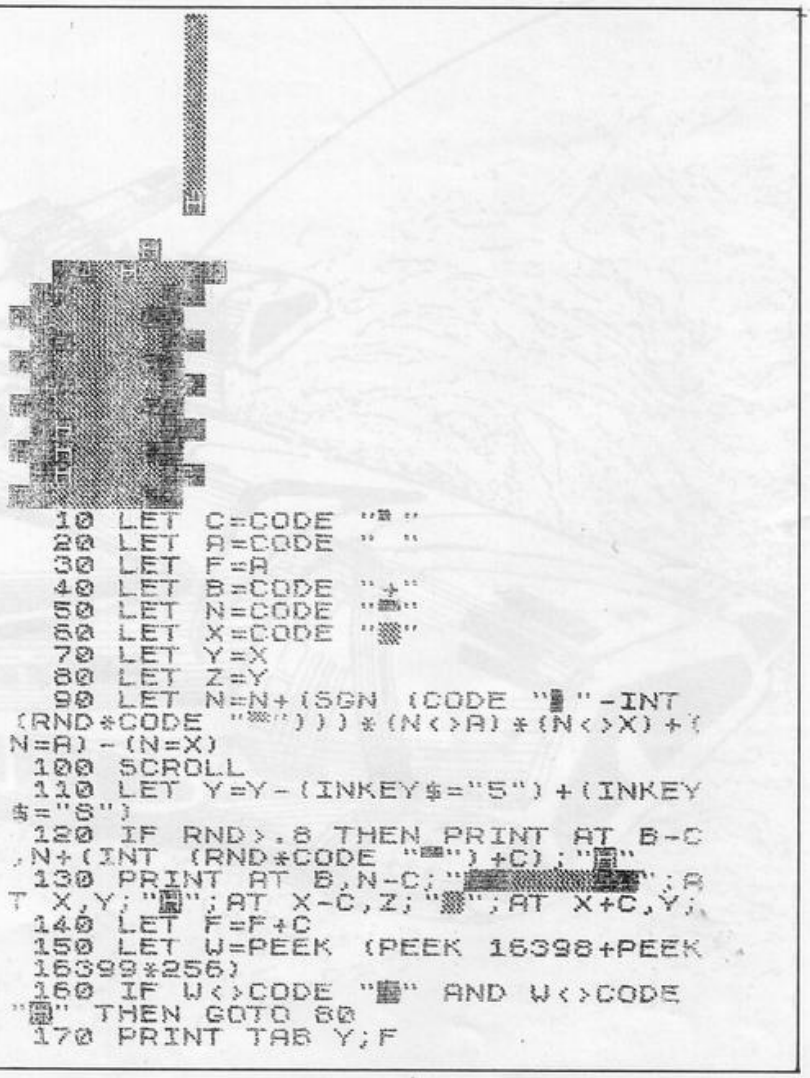
When 200 ships have passed overhead your score and the best score so far are displayed. Hitting the middle of the ship scores 25 points, while clipping the ends rates 10. The missile can be guided both on the ground and in the air.

Spaceys is from *The Gateway Guide to the ZX-81 and ZX-80* by Mark Charlton. Published by Interface of 44-46 Earls Court Road, London W8 6EJ.

```
10   LET T = 0
20   LET S = 0
30   GOSUB 250
40   LET P = 15
50   FOR Z = 1 TO 20
60   LET H = INT(RND*8) + 5
70   FOR N = 0 TO 29
80   LET P = P + (1 AND INKEY$ = "0" AND
     P < 31) - (1 AND INKEY$ = "8" AND
     P > 0)
90   IF INKEY$ = "1" THEN LET C$ = "C - 1"
100  LET C = VAL C$
110  IF C = 0 THEN GOSUB 250
120  CLS
130  PRINT AT H,N;"graphic shift N graphic
     shift B graphic shift M";AT C,P;"*"
140  GOTO 180 + (60 AND C = H AND P  >= N
     AND P < N + 3)
150  NEXT N
160  NEXT Z
170  IF S > T THEN LET T = S
180  PRINT "SCORE: ";S;"BEST:";T,"N/L
     TO START"
190  INPUT A$
200  GOTO 280 - (260 AND A$ = "")
210  PRINT AT H - 1, N + 1;"*";TAB N;"***";
     TAB N + 1;"*"
220  LET S = S + 10 + (15 AND P = N + 1+
230  GOSUB 250
240  GOTO 160
250  LET C = 19
260  LET C$ = "C"
270  RETURN
```



ROAD RACE



```
  10 LET C=CODE "▓"
  20 LET A=CODE " "
  30 LET F=A
  40 LET B=CODE "+"
  50 LET N=CODE "▓"
  60 LET X=CODE "▒"
  70 LET Y=X
  80 LET Z=Y
  90 LET N=N+(SGN (CODE "▓"-INT
(RND*CODE "▒")))*(N<>A)*(N<>X)+(
N=A)-(N=X)
 100 SCROLL
 110 LET Y=Y-(INKEY$="5")+(INKEY
$="8")
 120 IF RND>.8 THEN PRINT AT 8-C
,N+(INT (RND*CODE "▓")+C);"▓"
 130 PRINT AT 8,N-C;"▓▓▓▓▓▓▓";A
T X,Y;"▓";AT X-C,Z;"▒";AT X+C,Y;
 140 LET F=F+C
 150 LET W=PEEK (PEEK 16398+PEEK
 16399*256)
 160 IF W<>CODE "▓" AND W<>CODE
"▒" THEN GOTO 80
 170 PRINT TAB Y;F
```

ROAD RACE is the most outstanding program using moving graphics and fitting on a 1K machine we have seen so far. The object of the game is to steer your car, represented by an inverse H, on a twisting road while avoiding other cars which appear at random.

The car moves forward automatically but can be steered left and right by using the cursor controls—keys 5 and 8. If you crash into another car or run off the road, the game stops and your score is displayed—top score in the *Sinclair Programs* office was 66.

To keep going requires some skill and for once it really is a game which can provide hours of amusement.

Road Race was one of three James submitted by David Looker and son from Swindon, Wiltshire.

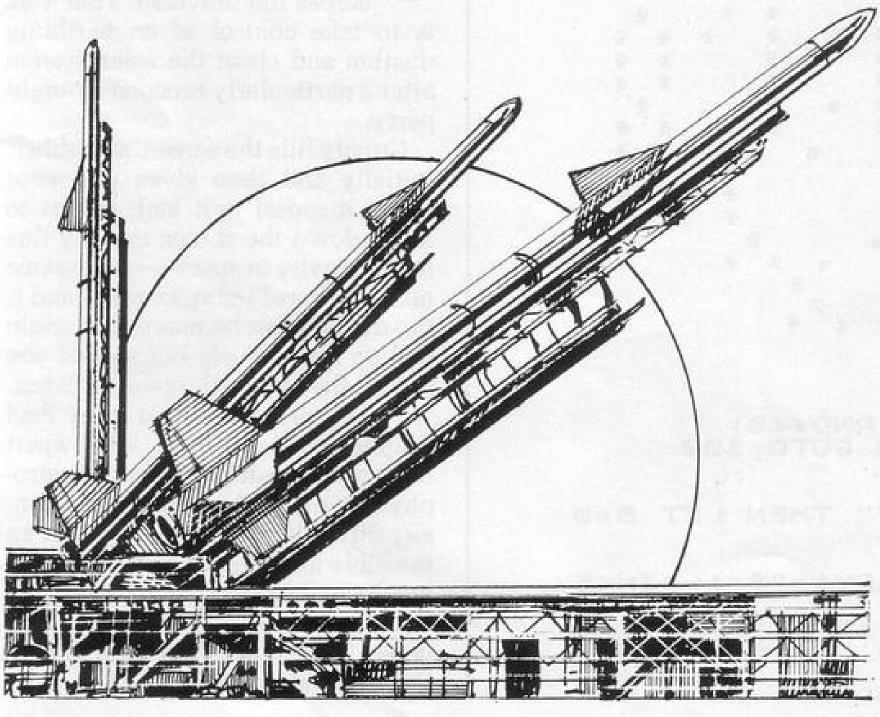
ROCKET ATTACK

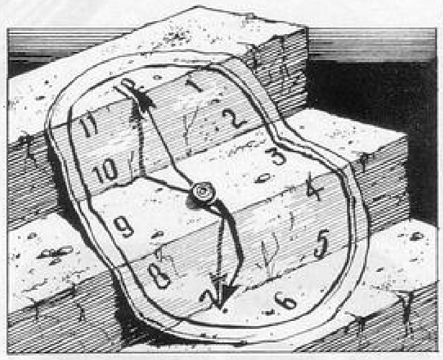
IN *Rocket Attack* for 1K machines the player is in control of a guided missile launcher defending the shores from air attack. A rocket launcher is situated at the bottom left-hand corner of the screen, while enemy planes approach at random height from the right.

To fire, the P key is used and, when depressed, a rocket is launched, rising at 45 degrees. The rocket will continue its advance only as the key is depressed, so there is a measure of control over its progress. Aircraft can be destroyed either by scoring a direct hit or by leaving the rocket in the path of the aircraft.

Rocket Attack was submitted by D E Healey of Coseley, West Midlands.

```
 10 LET A = PI / PI
 20 LET B = PI - PI
 30 LET S = B
 40 LET T = 20
100 LET C = 19
120 LET E = 29
130 LET D = A
160 PRINT AT 21,B;"▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀"
170 PRINT AT 20,B;"▞"
180 LET Y = INT ( RND * 15)+ 4
185 PRINT AT Y,E;"<= "
190 IF INKEY$ = "P" THEN PRINT
AT C,D; "■"
200 IF Y = C AND E = D THEN GOT
O 400
210 PRINT AT C,D;" "
220 IF INKEY$ = "P" THEN LET C
=C - A
230 IF INKEY$= "P" THEN LET D =
D + A
240 IF C=4 THEN GOTO 410
250 LET E=E-A
260 IF E=B THEN GOTO 410
270 GOTO 185
400 LET S=S+A
410 CLS
420 LET T=T-A
430 IF T<>B THEN GOTO 100
440 PRINT AT 10,11;"GAME OVER"
450 PRINT AT 12,11;"SCORE   = ";
S
```





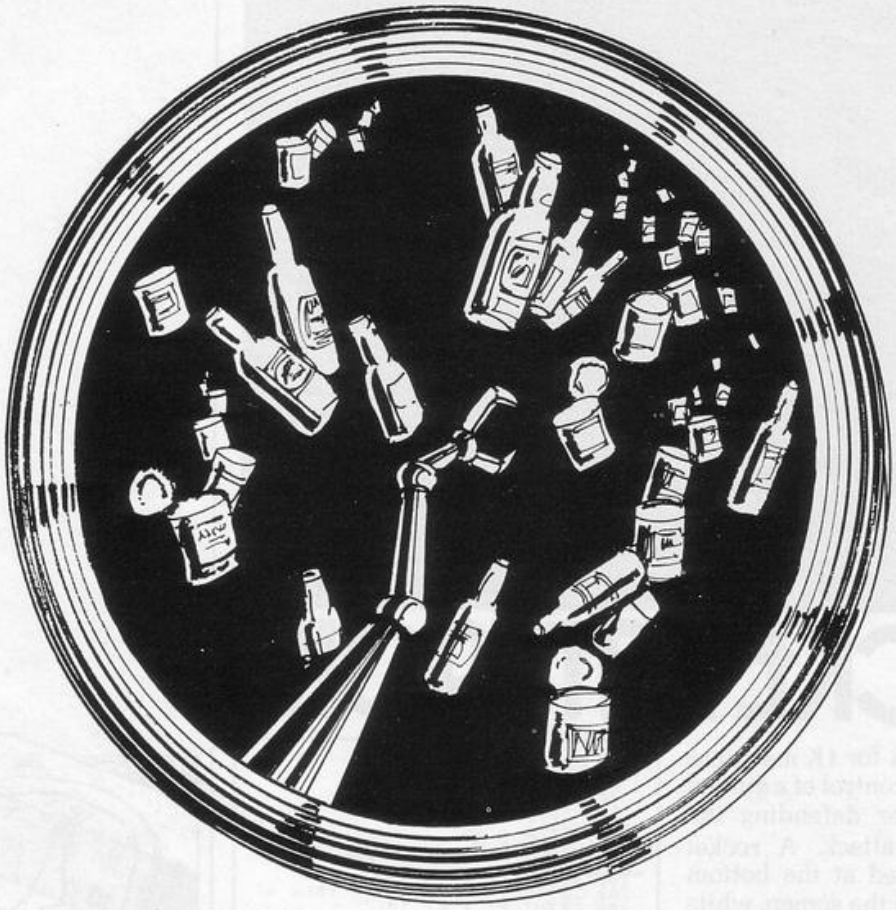
CLOCK

CLOCK uses a FOR and NEXT loop in which to keep the time rather than the more conventional PAUSE statement, resulting in a clearer screen display.

Running in slow mode, the program does not include seconds and, because of zero suppression, the time entered as 10.09 will appear as 10.9.

According to author Chris Hutchin of Cirencester the clock is accurate to a few seconds a day. To start, type the usual RUN and, when prompted, put in the hour and then the minutes. Use BREAK to get out of the program. It will run on 1K machines.

```
  4 LET L=1
  5 PRINT "HOUR ?"
 10 INPUT H
 15 PRINT "MINUTE ?"
 20 INPUT M
 25 CLS
 35 IF M=60 THEN GOTO 100
 39 PRINT AT 10,10;H;":";M
 50 LET M=M+L
 60 FOR F=L TO 2732
 70 NEXT F
 80 GOTO 30
100 LET M=0
105 LET H=H+L
110 IF H>12 THEN LET H=L
120 CLS
130 GOTO 39
```



GRAVITY

```
 10 LET A=0
 20 LET B=9
 30 LET C=9
 40 PLOT A,INT (RND*40)
 50 IF A=60 THEN GOTO 100
 60 LET A=A+1
 70 GOTO 40
100 IF INKEY$="7" THEN LET B=B-
1
110 LET B=B+1
115 LET C=C+(INKEY$="8")-(INKEY
$="6")
120 PRINT AT B,C;"   "
130 PRINT AT B,C;" * "
140 GOTO 100
```

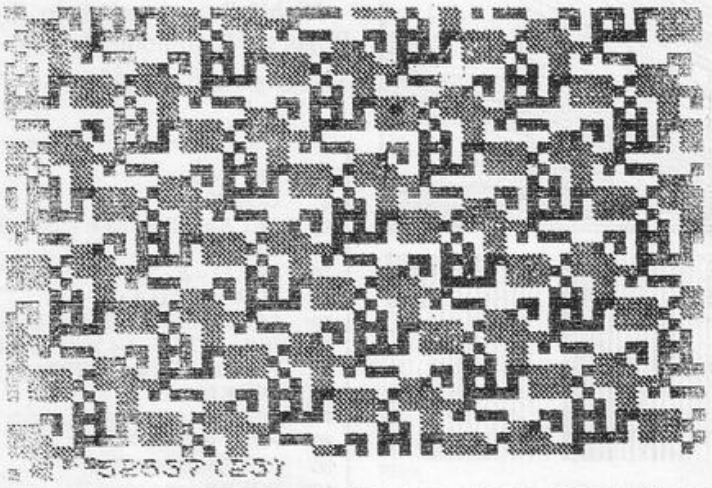
GRAVITY for 1K ZX-81s envisages aliens spreading rubbish across the universe. Your task is to take control of an earthling dustbin and clean the solar system after a particularly raucous all-night party.

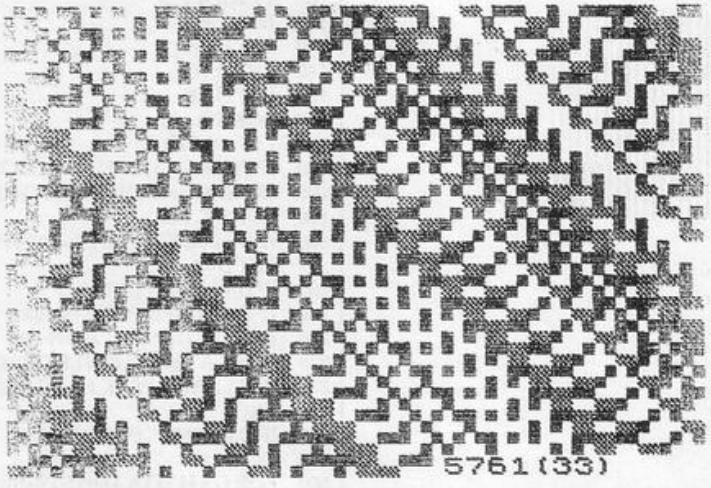
Gravity fills the screen with dibris initially and then gives you your waste disposal unit hich begins to move down the screen quickly due to the gravity in space—surely some mistake there? Using keys 6, 7 and 8, the dustbin can be moved left, right and up respectively but should you run off the screen, the game finishes.

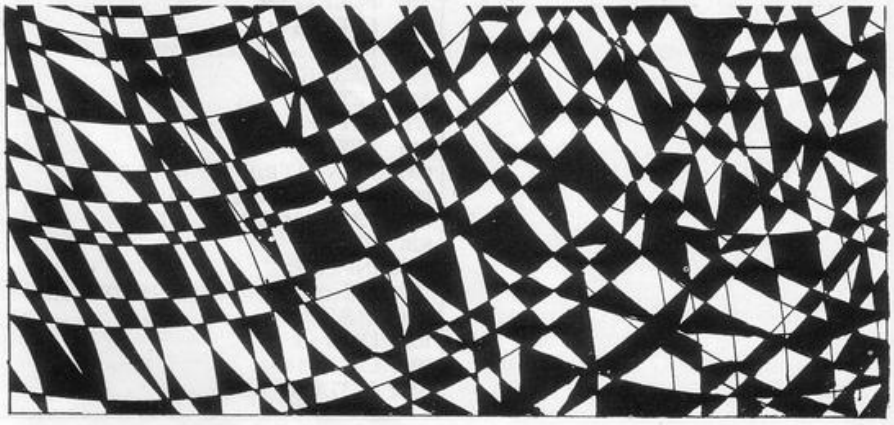
The program was sent in by Paul Ralphs of Manchester who, apart from re-designing the laws of astrophysics, made the game exceptionally difficult by giving the player an invisible dustbin. To help beginners we have inserted an asterisk but when you feel sufficiently confident delete the asterisk from line 130 but leave the two spaces.

UNIVERSAL PATTERNER

```
  10 DIM A(33)
  15 SLOW
  20 PRINT "RANDOM PATTERN ? (Y
OR N)"
  30 INPUT A$
  40 CLS
  50 IF NOT A$="Y" THEN GOTO 200
  60 LET L=INT (RND*33)+1
  70 LET X=INT (RND*65535)+1
  80 RAND X
  85 FAST
  90 FOR J=1 TO L
 100 LET A(J)=INT (RND*10)+1
 110 NEXT J
 120 FOR J=1 TO 660/L
 130 FOR K=1 TO L
 140 PRINT CHR$ A(K);
 150 NEXT K
 160 NEXT J
 170 PRINT X;"(";L;")"
 180 STOP
 200 PRINT "PATTERN NUMBER ?"
 210 INPUT X
 220 CLS
 230 PRINT "STRING LENGTH ?"
 240 INPUT L
 250 CLS
 260 GOTO 80
```

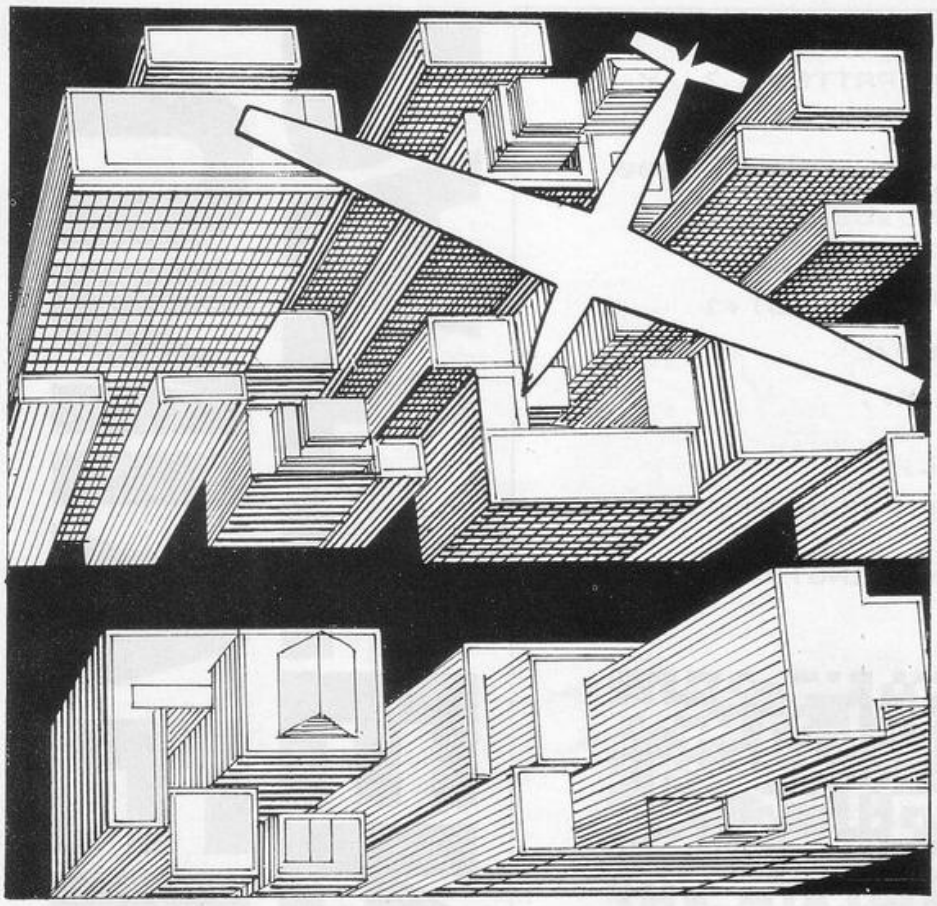


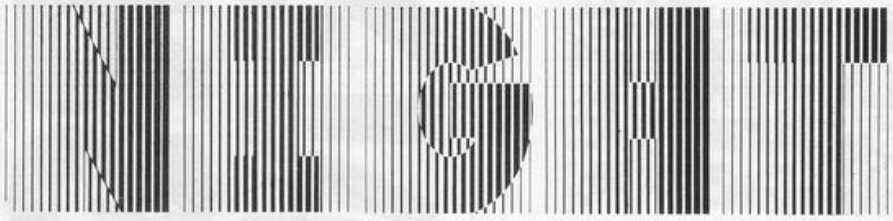


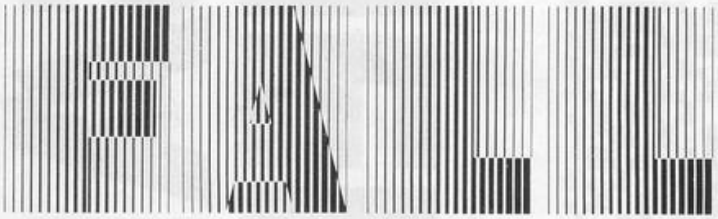


UNIVERSAL PATTERNER is for 16K ZX-81 users and produces patterns at random. Author W. S. Hearn, of Ilford, Essex, states that more than two million designs can be printed on the screen.

Each pattern has a number and string length printed at the bottom, so can be recalled and adjusted using those numbers. Answer N for No when asked if a random pattern is required and then input the numbers.







NIGHTFALL requires 4K RAM and involves blowing-up sky-scrapers from a glider flying over a city. You start by entering a number between sero and 10 to define how high you want the sky-scrapers built. The glider is represented by an inverse plus sign and flies from left to right, getting lower each time it goes across the screen.

Because of the gradual loss of height it is imperative to eliminate the more protruding buildings before you crash into them.

Pressing O will release a bomb and only one bomb may be in the air at a time. Points are scored for each portion of building destroyed. to start the game again after reducing the city to ruins and landing or crashing, enter a new level of difficulty to the display file.

Nightfall was sent in by Tim Rogers of Richmond, Surrey.

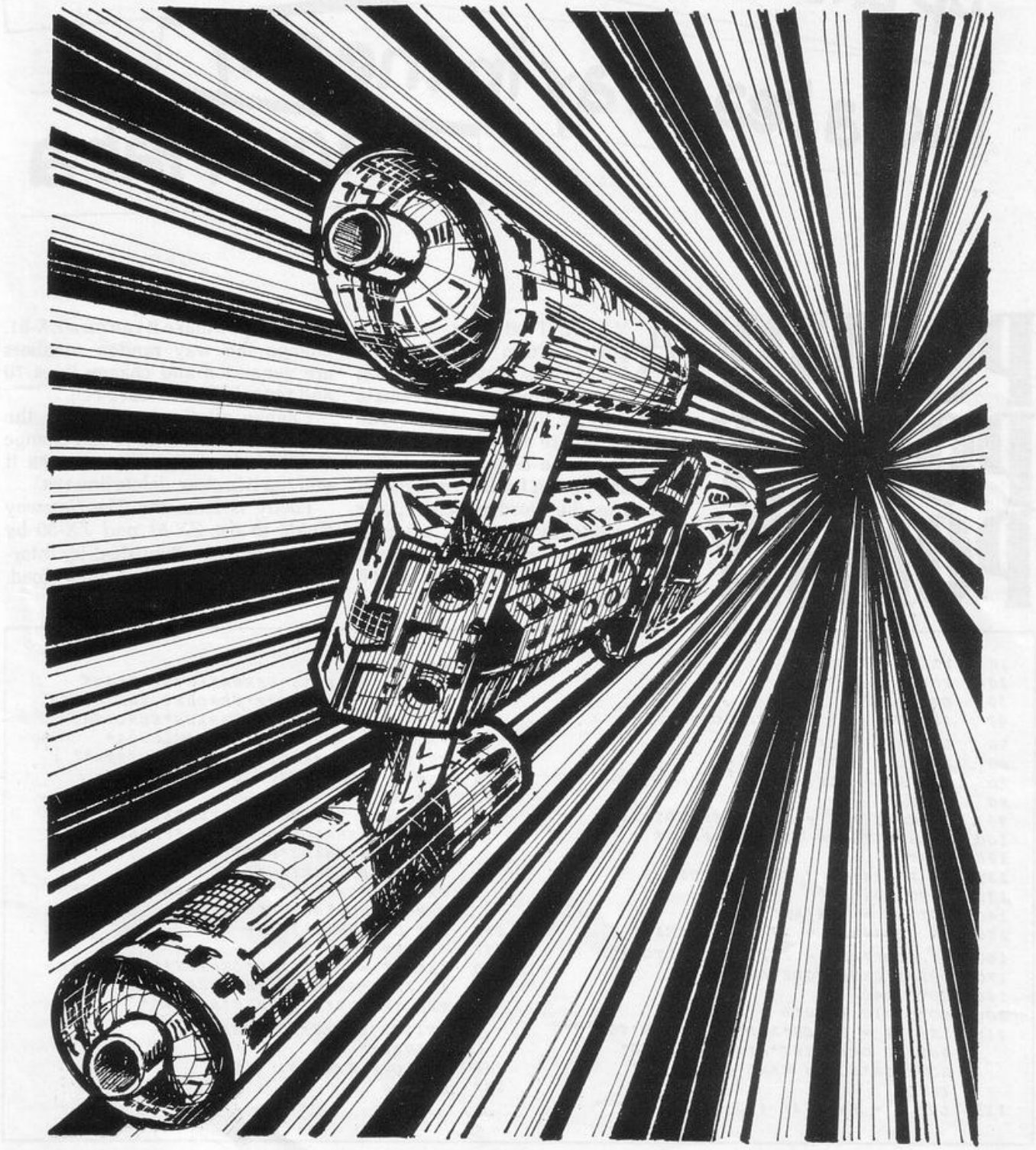

```
1     LET T=0
2     GOSUB 1000
10    LET A = PEEK 16396 + 256 * PEEK 16397
      +1
20    LET A1 = A + 724
30    FOR B=A TO A+31
40    LET C=(INT(RND*10)+E)*33
45    IF B=A OR B=A+31 THEN LET C=660
50    FOR D=B TO B+C STEP 33
60    POKE D,128
70    NEXT D
80    NEXT B
90    FOR B=A1-31 TO A1
100   POKE B, 128
110   NEXT B
130   LET F=A
140   LET D=0
150   LET H=F
160   POKE F, 128
170   LET F=F+1
180   IF PEEK F=118 THEN GOTO 170
185   IF PEEK F=0 THEN GOTO 600
190   POKE F, 149
200   IF D=0 AND INKEY$="0" THEN
      LET D=1
205   IF D=0 THEN LET H=F
210   IF D=1 THEN POKE H, 128
220   IF D=1 THEN LET H=H+33
225   IF H>A+693 THEN LET D=0
230   IF D=1 AND PEEK H=0 THEN GOSUB
      500
240   IF D=1 THEN POKE H, 155
250   GOTO 160
500   FOR G=H TO A+693 STEP 33
510   POKE G, 128
515   LET S=S+1
520   IF RND>.9 THEN GOTO 540
530   NEXT G
540   LET H=F
550   LET D=0
560   RETURN
600   PRINT AT 0,0; "SCORE:"; S,
605   IF T<S THEN LET T=S
610   PRINT "HI-SCORE:";T
620   GOTO 2
1010  INPUT E
1020  IF E<0 OR E>10 THEN GOTO 1010
1030  CLS
1035  LET S=0
1040  LET E=10-E
1050  RETURN
```

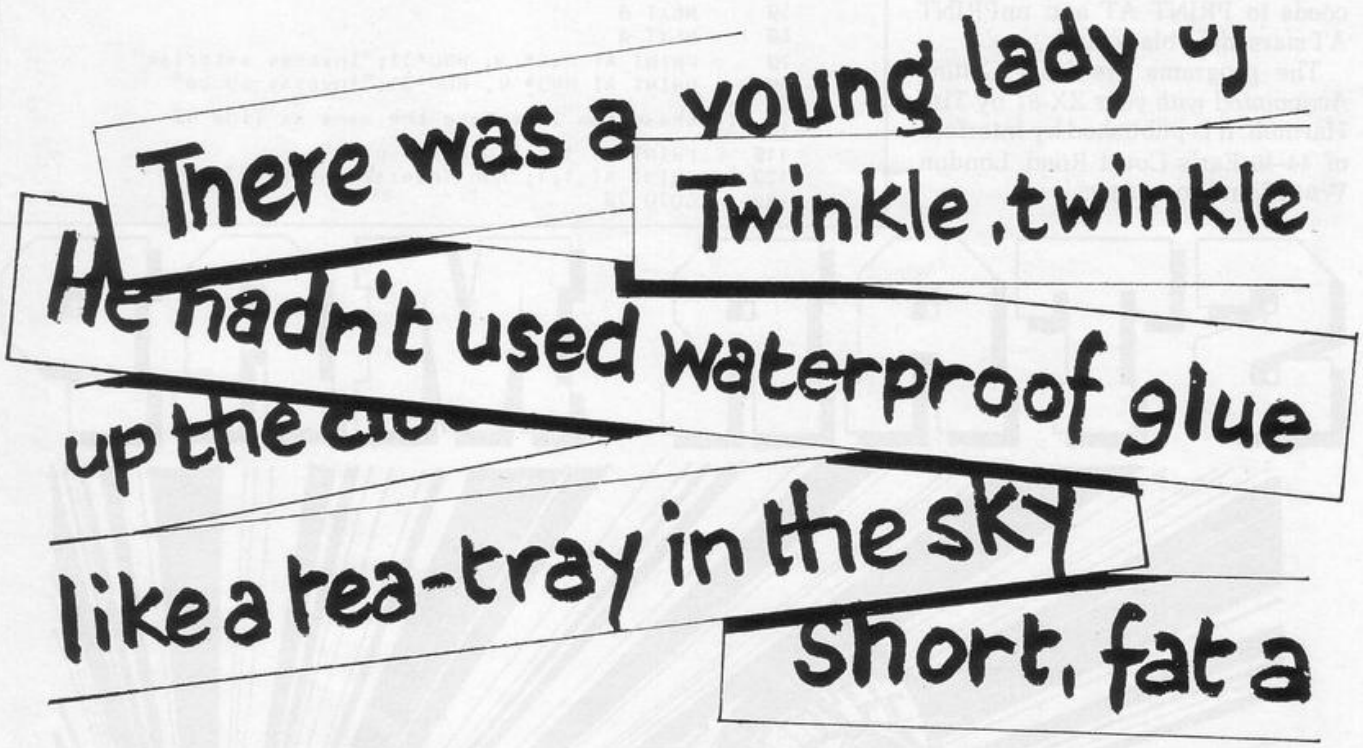
Star Map is another display program which draws pictures on your screen, if left to run for long enough. It sets up a black rectangle and proceeds to PRINT AT and unPRINT AT stars into a black void.

The programs are from *Getting Acquainted with your ZX-81* by Tim Hartnell. It is published by Interface of 44-46 Earls Court Road, London W8 6EJ, and costs £4.95.

```
10      SLOW
20      FOR A = 1 TO 10
30      FOR B = 1 TO 32
40      PRINT "inverse space";
50      NEXT B
60      NEXT A
70      PRINT AT RND* 9, RND*31;"inverse asterisk"
80      PRINT AT RND* 9, RND*31;"inverse space"
90    )
100   )- these two lines are the same as line 80
110     PRINT AT 1,1;"inverse space"
120     PRINT AT 1,1;"non-inverse asterisk"
130     GOTO 70
```

STAR MAP





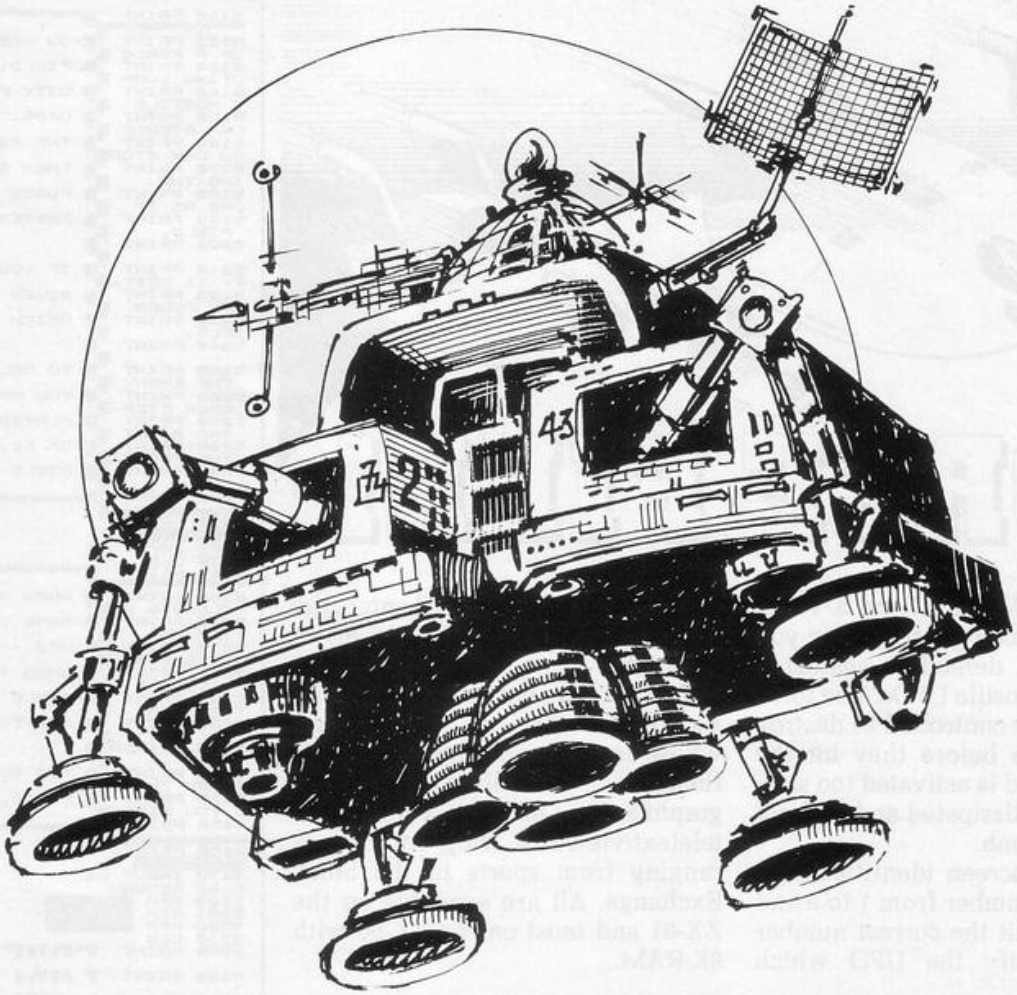
POETRY POETRY POETRY

A VALIANT attempt to write poetry within 4K is made by *Poetry*. It is very slow, taking up to five minutes to write a single poem, which fills the screen. The words used are stored in four long strings and the computer searches the string until it finds an asterisk; it then uses the word which follows that randomly-selected asterisk. From time to time the ZX-80 will stop writing to let you admire what it has written. A tap on NEWLINE will re-start it. To make it run on a ZX-81, change the way randon numbers are generated and change lines 70 and 140 to LET A$ = A$ (2 TO).

Change all the asterisks in the strings into the letter X and change the 222 in lines 90 and 150 into 63. If you run it in slow, delete line 120.

Poetry is from the *The Gateway Guide to the ZX-81 and ZX-80* by Mark Charlton. Published by Interface of 44-46 Earls Court Road, London W–6EJ.

```
10   RANDOMISE
20   FOR D = 0 TO 3
30   GOSUB 200
40   IF RND(3) = 1 THEN GOSUB 200
50   LET N = 3*C/4
60   FOR D = N TO C
70   LET A$ = TL$(A$)
80   NEXT D
90   IF CODE(A$) = 222 THEN GOTO 140
100  IF RND(20) = 19 THEN PRINT
110  NEXT B
120  IF RND(4) = 2 THEN INPUT B$
130  GOTO 20
140  LET A$ = TL$(A$)
150  IF CODE(A$) = 222 THEN PRINT "
160  IF CODE(A$) = 222 THEN GOTO 100
170  PRINT CHR$(CODE(A$));
180  GOTO 140
200  GOTO 210 + 10*B
210  LET A$ = "THEN*AND*BOTH*FOR*TO*
     BUT*IF ONLY*YET*AFTER*BEFORE*
     HOWEVER*SO*IN CASE OF*AS IF*
     IF*"
215  LET C = RND(73) + 3
217  RETURN
220  LET A$ = "EYES*FERNS*LOVERS*LOVE
     *PARTING*TWILIGHT*VERDANT PASTURES
     *THE FIRE*STREAM*PEBBLES*SUNLIGHT
     *MORNING*FOREST*GLADES*CLOUDS*
     EVENING*DAWN*FRIENDS*PATH*VISTA*"
225  LET C = RND(134)+ 3
227  RETURN
230  LET A$ = "GLANCED*APPEARED*
     SHARING*SHADOWED*ASKING*FEARING*
     HOPING*SIGHING*STROLLING*
     OVERHEAD*LOOKING*LANGUISHED*
     CRYING*PASSING*DREAMED*BEGINNING*
     TURNED*MOVING*RETURNING*"
235  LET C = RND(138) + 6
237  RETURN
240  LET A$ = "SMILING*GENTLY*QUICKLY*
     IN FEAR*SADLY*WITH SORROW*
     PEACEFULLY*TOGETHER*SLOWLY*
     BRIGHT*EARLY*AWAY*ALWAYS*
     SILVER*"
245  LET C = RND(94) + C
247  RETURN
```



LUNAR LANDER

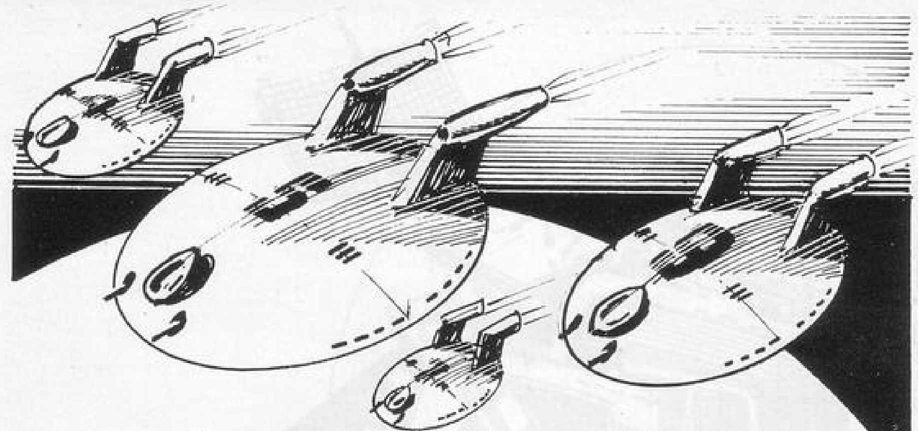
LUNAR LANDER is yet another 1K program from Looker and son. This is a superior version of the lunar landing game. Your spacecraft is 600ft. above the lunar landing pad and descends automatically at a velocity of 20 feet per second.

The initial fuel reserve is 130 gallons and to achieve a safe landing you must fire your retro-rocket thrusters—by pressing the T key—to slow the machine and, allowing for the random drift of the spacecraft, attempt to land on the landing pad displayed.

Lunar Lander displays remaining fuel, altitude and velocity in the top right-hand corner of the screen, while the spacecraft descends on the left-hand side. Too much thrust and the spacecraft begins to ascend, shown by a negative velocity reading, while too great a speed in landing causes a crash.

```
FUEL 110
ALT  300
VEL  35
```

```
  1 LET M=PI/PI
  2 LET N=M
  5 LET F=CODE "▙"
  8 LET A=CODE "="
 10 LET B=A
 15 LET C=CODE "2"
 20 LET V=A
 30 GOTO F
 40 LET Z=A
 50 LET T=M-M
 60 LET A=INT (A-V/C)*(A)=V/C)
 70 PRINT AT B-Z,N;"   ";AT B-Z
+M,N+M;" "
 80 LET N=N+RND
 90 PRINT AT B-A,N;"▟▙"
100 IF INKEY$="T" AND F)=CODE "
=" THEN LET T=CODE "▀"
105 IF T=CODE "▀" THEN PRINT AT
B-A+M,N+M;"V"
110 LET F=F-T
120 LET V=V+CODE "▌"-T
130 PRINT AT M,B;"FUEL ";F;" ";
TAB B;"ALT ";A*C;" ";TAB B;"VEL
 ";V;" ";AT CODE "+",M;"▟▙"
140 IF A>M-M THEN GOTO CODE "C"
150 IF V>B THEN GOTO CODE "COS
"
160 PRINT AT M,M;"LANDED"
170 STOP
200 PRINT AT M,M;"CRASHED"
```



FORCE FIELD

AS COMMANDER of a *Force Field* which guards a city you have to defend it against a squadron of hostile UFOs. The force field has to be controlled to destroy enemy bombs before they hit the city. If the field is activated too soon the power is dissipated and will not destroy the bomb.

The radar screen identifies each UFO with a number from 1 to 9 and you have to hit the correct number key to identify the UFO which dropped the bomb when it enters the force field. There are four levels of difficulty.

The program has been supplied by Video Software of Stourbridge, whose ambitious products include a financial modelling package, graphics, a private version of teletext/viewdata (sic), and games ranging from sports to the Stock Exchange. All are available on the ZX-81 and most on the ZX-80 with 8K RAM.

```
   1 REM
   2 REM  ** FORCE FIELD **
   3 REM
   4 REM
   5 REM  COPYRIGHT MAY 1981
   6 REM  VIDEO SOFTWARE LTD
   7 REM
  15 DIM H$(4,8)
  20 DIM H(4)
  35 GOTO 1000
  40 SAVE "FORCE-FIEL█"
  45 GOTO 1000
  90 REM
  91 REM  SUB-ROUTINES
  92 REM
  93 REM
 100 REM
 101 REM  BOMBS
 102 REM
 110 LET UFO=INT (RND*8+1.4)
 120 LET BOMB=((INT (UFO-(INT (UFO/2+0.4))*2))*-4)+4
 130 FOR S=BOMB TO 14
 140 PLOT UFO*6,36-S
 150 UNPLOT UFO*6,36-S
 160 NEXT S
 200 IF CODE (INKEY$)-28=UFO THEN GOTO 300
 210 FOR I=1 TO ((5-DIFF)*2)-MISS/10
 220 IF CODE (INKEY$)-28=UFO THEN GOTO 400
 230 NEXT I
 300 FOR S=1 TO 12
 310 PLOT UFO*6,14-S
 320 UNPLOT UFO*6,16-S
 330 NEXT S
 340 GOSUB 500
 350 LET MISS=MISS+1
 390 RETURN
 400 GOSUB 600
 410 LET HIT=HIT+1
 420 RETURN
 500 REM
 501 REM  BANG
 502 REM
 510 PRINT AT 19,UFO*3-2;"    "
 515 PRINT AT 20,UFO*3-2;"    "
 520 PRINT AT 21,UFO*3-2;"    "
 525 PAUSE 10
 530 PRINT AT 19,UFO*3-2;"    "
 535 PRINT AT 20,UFO*3-2;"    "
 540 PRINT AT 21,UFO*3-2;"    "
 590 RETURN
 600 REM
 601 REM  KILL
 602 REM
 610 PRINT AT 12,UFO*3-1;"   "
 620 PAUSE 10
 630 PRINT AT 12,UFO*3-1;"   "
 640 PAUSE 10
 650 PRINT AT 12,UFO*3-1;"   "
 660 PAUSE 10
 670 PRINT AT 12,UFO*3-1;"   "
 690 RETURN

1000 REM
1001 REM  CONTROL
1002 REM
1010 REM :
1020 REM MENU
1030 REM :
1035 GOSUB 9000
1040 REM  USE SELECTION
1045 GOTO 1050+M*10
1050 GOSUB 5000
1055 GOTO 1000
1060 GOSUB 2000
1065 GOTO 1100
1070 GOSUB 7000
1075 GOTO 1000
1080 CLS
1085 PRINT "CONNECT RECORDER AND TYPE N/L"
1090 INPUT Q$
1095 GOTO 40
1100 REM  END OF GAME
1105 CLS
1110 IF HIT<H(DIFF) THEN GOTO 1150
1120 LET H(DIFF)=HIT
1130 PRINT "YOU HAVE A HIGH SCORE"
1140 PRINT "WHAT IS YOUR NAME?"
1150 INPUT Q$
1155 LET H$(DIFF)=Q$
1160 GOSUB 8000
1170 GOTO 1000
2000 REM
2001 REM  GAME
2002 REM
2005 LET FF=3
2040 GOSUB 6000
2050 LET HIT=0
2060 LET MISS=0
2070 GOSUB 3000
2080 FOR B=1 TO 50
2090 REM :
2100 REM BOMBS
2110 REM :
2115 SLOW
2120 GOSUB 100
2130 PRINT AT 11,28;INT HIT;
2135 PRINT AT 12,28;"HITS";
2140 NEXT B
2150 PRINT AT 0,0;"PRESS N/L";
2160 INPUT L$
2170 RETURN
3000 REM
3001 REM  FRAME
3002 REM
3110 FOR L=1 TO 4 STEP 2
3120 FOR C=L/3*4 TO 27 STEP 6
3130 REM :
3140 REM SPACESHIP
3150 REM :
3160 GOSUB 4000
3170 NEXT C
3180 NEXT L
3190 FOR L=1 TO FF
3200 FOR L=1 TO FF
3210 PRINT AT 10+L,0;"                                ";
3220 NEXT L
3230 PRINT AT 11,2;"FORCE FIELD";
3300 PRINT AT 19,0;"                                ";
3310 PRINT AT 20,0;"                                ";
3320 PRINT AT 21,0;"                                ";
3330 PRINT AT 0,0;"PRESS N/L WHEN READY";
3340 INPUT L$
3350 PRINT AT 0,0;"                    ";
3360 RETURN

4000 REM
4001 REM  SPACESHIP
4002 REM
4010 PRINT AT L,C;"  ";CHR$ ((C+2)/3+156);"  ";
4020 PRINT AT L+1,C;"    "
4030 RETURN
4040 REM :
4050 REM END SPACESHIP
4060 REM
5000 REM
5001 REM  INSTRUCTIONS
5002 REM
5100 CLS
5110 PRINT "                                "
5120 PRINT " YOU ARE IN COMMAND OF A FORCE  "
5130 PRINT "  FIELD. IT IS PROTECTING YOUR  "
5140 PRINT "  CITY FROM ATTACK BY HOSTILE   "
5150 PRINT "  UFOS. THEIR BOMBS CAN PIERCE  "
5160 PRINT "  THE FORCE FIELD. YOU CAN STOP "
5170 PRINT "  THEM BY CONCENTRATING THE     "
5180 PRINT "  FORCE AROUND THE BOMB AS IT   "
5190 PRINT "  PASSES THROUGH THE FIELD.     "
5200 PRINT "                                "
5210 PRINT "  IF YOU FAIL THE CITY IS DEST- "
5220 PRINT "  ROYED AND WITH IT THE POWER   "
5230 PRINT "  WHICH DRIVES THE FIELD.       "
5240 PRINT "                                "
5250 PRINT "  TO HELP YOU DEFEAT THE ENEMY  "
5260 PRINT "  YOU HAVE A RADAR SCREEN DISP- "
5270 PRINT "  PLAYING THE BATTLE AND A SET  "
5280 PRINT "  OF KEYS TO CONTROL THE FORCE  "
5290 PRINT "  FIELD.                        "
5300 PRINT "                                "
5310 PRINT "           PRESS N/L            "
5320 INPUT L$
5330 CLS
5340 PRINT "                                "
5350 PRINT "  WHEN AN ENEMY UFO RELEASES A  "
5360 PRINT "  BOMB YOU MUST IDENTIFY THE    "
5370 PRINT "  UFO - THEY HAVE NUMBERS 1-9.  "
5380 PRINT "  WHEN THE BOMB IS INSIDE THE   "
5390 PRINT "  FORCE FIELD PRESS THE RIGHT   "
5400 PRINT "  KEY TO DESTROY IT.            "
5410 PRINT "                                "
5420 PRINT "  TOO SOON AND YOU WEAKEN THE   "
5430 PRINT "  FIELD. TOO LATE AND YOU MISS. "
5450 PRINT "                                "
5460 PRINT "           PRESS N/L            "
5470 INPUT L$
5480 RETURN
5500 REM
5501 REM  TITLE
5502 REM
5510 CLS
5520 PRINT "                                "
5530 PRINT "                                "
5540 PRINT "                                "
5550 PRINT "                                "
5560 PRINT
5570 PRINT
5580 RETURN
6000 REM
6001 REM  DIFFICULTY
6002 REM
6010 CLS
6020 PRINT "CHOOSE DIFFICULTY LEVEL"
6030 PRINT
6040 PRINT "1. EASY"
6050 PRINT "2. HARDER"
6060 PRINT "3. DIFFICULT"
6070 PRINT "4. IMPOSSIBLE"
6080 PRINT
6090 PRINT "CHOOSE LEVEL (1,2,3 OR 4)"
6100 INPUT DIFF
6110 IF DIFF<1 OR DIFF>4 THEN GOTO 6000
6120 CLS
6130 RAND
6140 RETURN
7000 REM  RESET HIGH SCORES
7010 FOR L=1 TO 4
7020 LET H(L)=0
7030 LET H$(L)="        "
7040 NEXT L
7050 RETURN
8000 REM  DISPLAY HIGH SCORES
8010 CLS
8020 PRINT "                                "
8030 PRINT "      H I G H   S C O R E S     "
8040 PRINT "                                "
8050 PRINT "  LEVEL   NAME      SCORE       "
8060 PRINT "                                "
8070 FOR L=1 TO 4
8080 PRINT "  ";L;TAB 8;"  ";H$(L);"       ";H(L);TAB 30;"  "
8090 NEXT L
8100 PRINT "                                "
8110 FOR L=1 TO 60
8120 NEXT L
8130 RETURN
9000 REM
9001 REM  MENU
9002 REM
9010 GOSUB 5500
9020 PRINT "                                "
9030 PRINT "       FORCE-FIELD MENU         "
9040 PRINT "                                "
9050 PRINT "                                "
9060 PRINT "  1   INSTRUCTIONS              "
9070 PRINT "  2   PLAY THE GAME             "
9080 PRINT "  3   RESET HIGH SCORES         "
9090 PRINT "  4   SAVE THE GAME ON TAPE     "
9100 PRINT "                                "
9110 PRINT "     YOUR SELECTION (1/2/3/4)"
9120 INPUT Q$
9130 IF CODE (Q$)<CODE ("1") OR CODE (Q$)>CODE ("4") THEN GOTO 9000
9140 LET M=CODE (Q$)-29
9150 RETURN
```

```
  10 CLS
  20 INPUT A$
  30 LET A=0
  40 LET B=0
  50 GOTO 80
  60 INPUT A$
  70 RETURN
  80 IF INKEY$="8" AND A<>20 THE
N LET A=A+1
  90 IF INKEY$="5" AND A<>0 THEN
 LET A=A-1
 100 IF INKEY$="7" AND B<>0 THEN
 LET B=B-1
 110 IF INKEY$="6" AND B<>20 THE
N LET B=B+1
 120 IF INKEY$="1" THEN GOSUB 60
 130 IF INKEY$="Z" THEN RUN
 140 PRINT AT B,A;A$
 150 GOTO 80
```

LINE DRAWER provides free-format drawing with any character or characters you wish to select. Having entered your chosen symbol, use the cursor controls—keys 5, 6, 7, 8—to draw pictures on a square slightly smaller than the screen. To change characters, press key 1.

The program will run on 1K machines and was sent by 16-year-old Stephen Adams.

LINE DRAWER

BOMB

THE IDEA of *Bomb* is to blow up undefined enemies, represented by an inverse space. Your bomb moves across the top of the screen and pressing any key will release it. Only one bomb can be in the air at any time, limiting the attraction of the game, but it will run on 1K machines.

For those with slow mode the PAUSE and POKE may be removed by deleting lines 100 and 110. *Bomb* was submitted by David Goodup.

```
    5 LET B$="(PEEK (PEEK 16398+2
56*PEEK 16399))=128"
    6 LET C=VAL "0"
    7 LET D=C
    8 LET S=C
   10 LET K=VAL "9.5"
   20 FOR X=VAL "1" TO VAL "5"
   30 CLS
   40 FOR A=VAL "1" TO VAL "5"
   50 PRINT AT VAL "9",RND*VAL "3
1";"■"
   60 NEXT A
   70 LET B=RND*K
   80 FOR A=VAL "0" TO VAL "30"
   90 PRINT AT B,A;">"
  100 PAUSE VAL "50"
  110 POKE VAL "16437",VAL "255"
  120 LET D=D*(C<K)+A*(NOT SGN D
AND INKEY$<>"")
  130 LET C=(C+VAL "1")*SGN D+B*(
NOT SGN D)
  140 PRINT AT C-VAL "1",D;" ";AT
 C,D;
  150 LET S=S+VAL B$
  160 LET D=D*(C<K)
  170 PRINT CHR$ (VAL "23"*SGN D)
;AT B,A;" "
  180 NEXT A
  190 NEXT X
  200 PRINT S;" POINTS"
```

ADDING MACHINE

ADDING MACHINE allows you to keep a running total of your expenditures and income—income is entered as a negative figure. First enter the amount of money involved—press NEWLINE and then enter a description of the item. As it stands the program will off-load each item automatically to a printer with a running total, though those lines can easily be deleted and the same information is displayed automatically on the screen.

Adding Machine is from Mike Salem of Hilderbay Ltd.

```
  10 REM ADDING MACHINE.
  20 REM HILDERBAY LTD 1982
  30 REM
  40 REM SOMETIMES EVEN VERY SIM
PLE PROGRAMS CAN BE REALLY USEFU
L.
  50 REM
  60 REM
  70 CLS
  80 PRINT "ADDING MACHINE, BY H
ILDERBAY LTD"
  90 PRINT
 100 PRINT
 110 PRINT "ENTER NUMBERS TO ADD
 FOLLOWED BY NEWLINE. PRECEDE NU
MBER BY MINUS SIGN ""-"" TO SUBT
RACT IT."
 112 PRINT
 114 PRINT "AFTER ENTERING EACH
NUMBER YOU MAY (OPTIONALLY) ENTE
R A FEW CHARACTERS WHICH WILL BE
 PRINTED. THEN PRESS NEWLINE AGA
IN."
 120 PRINT
 130 PRINT "ENTER STOP NEWLINE A
FTER LAST NUMBER."
 132 PRINT AT 21,0;"PRESS A KEY
TO START."
 134 PAUSE 4E4
 140 REM
 150 REM ALL SATEMENTS WITH NUMB
ERS BELOW 170 CAN BE DELETED.
 160 REM
 170 CLS
 180 SCROLL
 190 LPRINT ,"RUNNING"
 210 SCROLL
 220 PRINT "ADDENDS","SUM"
 230 LPRINT "ADDENDS","SUM"
 240 SCROLL
 250 PRINT
 260 LPRINT
 270 LET SUM=0
 280 INPUT X
 285 INPUT Q$
 290 LET SUM=SUM+X
 300 SCROLL
 310 PRINT X;" ";Q$,SUM
 320 LPRINT X;" ";Q$,SUM
 330 GOTO 280
 500 SAVE "ADDE"
 501 RUN
```

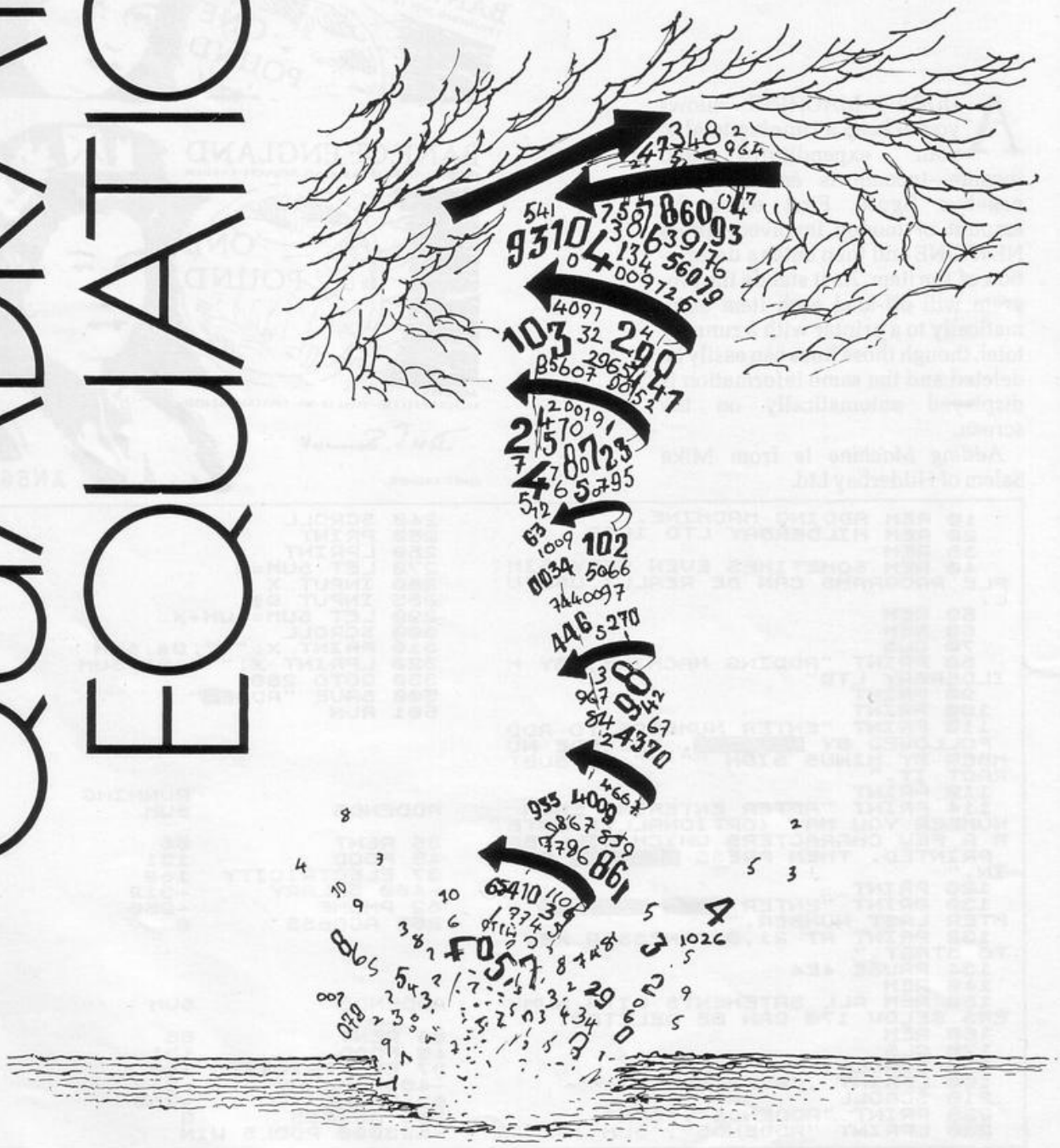
```
                          RUNNING
ADDENDS                   SUM

86 RENT                   86
45 FOOD                   131
37 ELECTRICITY            168
-480 SALARY               -312
62 PHONE                  -250
256 ACCESS                8


ADDENDS                   SUM

86 RENT                   86
45 FOOD                   131
37 ELECTRICITY            168
-480 SALARY               -312
62 PHONE                  -250
256 ACCESS                8
-523000 POOLS WIN
```

QUADRATIC EQUATION

FOR THOSE struggling with mathematics homework, *Quadratic Equation* may provide a little relief. Both roots are printed if there are two real roots, while one root is printed if they are equal and both the real and imaginary parts of imaginary roots. It is clear from the output which roots are printed.

Quadratic Equation is from *Getting Acquainted with your ZX-81* by Tim Hartnell. Published by Interface, 44-46 Earls Court Road, London W8 6EJ.

```
5      PRINT "ENTER A"
10     INPUT X
15     PRINT X, "ENTER B"
20     INPUT Y
25     PRINT Y, "ENTER C"
30     INPUT Z
35     CLS
40     LET Y = - Y/2/X
45     LET Q = Y*Y - Z/X
50     IF Q = 0 THEN GOTO 200
55     IF Q > 0 THEN GOTO 300
60     LET E = SQR (-Q)
65     PRINT "IMAGINARY ROOTS:"
70     PRINT ""REAL" ROOT * ";Y
75     PRINT "IMAGINARY ROOT * ";E
80     STOP

200    PRINT "EQUAL ROOTS: * ";Y
210    STOP

300    PRINT "REAL ROOTS:"
310    PRINT ,Y + SQR Q
320    PRINT ,Y - SQR Q
```



Quest

QUEST is an adventure program based on a journey through a cave system, the objective being to amass a personal sum of £100. Money is gained by killing monsters and you start with a strength rating of 20. On being attacked by a resident monster, any instruction which takes the fancy may be entered, so long as it does not begin with the letters R or G.

Thus, instructions such as shoot, hit, stab, bash or, for the gentler among you, perhaps even tickle, may be entered and a random score is assigned to tell you how you fared.

Weaker monsters can be killed by one action but each attempt reduces your strength rating and when it equals zero you are unfortunately extinct.

Having killed a monster you may rest (key R), which gives you two strength points, or continue (key G) but resting involves the danger that another monster sneaks up on you. Finding a magic ring makes you invisible and you can run away in the middle of a battle. A magic staff (key G) doubles fighting power for the rest of the game, while a magic potion doubles strength only for that attempt.

If strength diminishes during a battle, a sum of money can be traded for strength by typing Change as a course of action—£1 equals three strength points. To clear the program, press Stop.

The program is from a tape of programs produced by Richard Sheperd Software of Maidenhead, Berkshire. Called Bargain Bytes 1, it comprises eight programs—five games and three covering bank accounts, working-out loans and foreign exchange conversion. It costs £5.

The Program

```
UNFORTUNATELY,THE DEADLY RATTLES
NAKE HAS JUST KILLED YOU.


HOWEVER,I LIKED THE WAY YOU
PLAYED SO I AM GOING TO OFFER TO
REINCARNATE YOU
PRESS NEWLINE TO CONTINUE
```

```
   1 REM "COPYWRITE R.J.SHEPHERD
 1982"
  75 LET K$="UNEXPECTEDLY"
  80 LET Q=0
  85 LET F=0
  90 LET C=0
  92 LET C$="G"
  95 LET L=0
  96 LET J=0
 100 LET D=20
 101 GOTO 3000
 103 LET M=0
 104 LET L=0
 105 CLS
 106 PRINT "THERE IS NO DANGER.W
ILL YOU REST OR GO ON?"
 107 INPUT C$
 108 IF J=1 AND C$(1)="G" THEN P
RINT "YOU CANNOT GO ON BECAUSE O
F      A";H$
 109 IF C$(1)="R" THEN LET D=D+2
 110 IF C$(1)="R" AND INT (RND*1
0)>5 THEN GOTO 103
 111 IF J=1 AND C$(1)="G" THEN G
OTO 8020
 112 IF C$(1)="R" THEN LET K$="W
HILST RESTING"
,113 IF C$(1)="G" THEN LET K$="U
NEXPECTEDLY"
 114 LET X=INT (RND*10)
 115 CLS
 116 LET M=0
 117 IF C>=100 THEN GOTO 2500
 118 IF C$(1)="R" THEN GOTO 120
 119 IF INT (RND*10)>5 THEN GOTO
 8000
 120 GOSUB 1000+(100*X)
 122 LET C$=""
 127 IF M>=1 THEN GOTO 140
 130 PRINT "YOU ARE ATTACKED ";K
$
 131 PRINT "BY THE ";M$
 133 LET K$="UNEXPECTEDLY"
 140 PRINT "WHAT ARE YOU GOING T
O DO?"
 145 PRINT "YOU HAVE A RESISTANC
E OF ";D
 147 PRINT "YOU HAVE £";C
 150 INPUT B$
 151 LET M=M+1
 152 LET L=L+1
 154 IF B$="CHANGE" THEN GOTO 97
00
 155 IF B$(1)="G" AND F=1 AND J=
0 THEN GOTO 105
 157 IF B$(1)="G" AND J=1 THEN P
RINT "YOU CANNOT GO ON BECAUSE O
F      A";H$
 160 IF B$(1)="G" AND J=0 THEN P
RINT "YOU DO NOT HAVE A MAGIC RI
NG"
 162 IF B$(1)="G" THEN GOTO 140
 169 GOTO 6500
 172 IF R<1 THEN PRINT "THE ";M$
" IS DEAD"
 173 IF R<1 THEN PAUSE 100
 174 IF R<1 THEN LET C=C+CASH
 175 IF R<1 THEN GOTO 103
 176 LET D=D-INT (RND*8)
 177 IF D<1 THEN GOTO 4000
 178 IF C>50 THEN LET D=D-3
 185 IF L=3 THEN PAUSE 50
 186 IF L=3 THEN CLS
 188 PRINT "YOU ";B$;" THE ";M$
 190 IF L=3 THEN LET L=0
 191 PRINT "THE ";M$;" HITS BACK

 195 GOTO 127
1000 LET M$="DEADLY RATTLESNAKE"
1010 LET R=8
1015 IF C>50 THEN LET R=12
1020 LET CASH=5
1030 RETURN
1100 LET M$="TARANTULA SPIDER"
1105 LET R=10
1110 IF C>50 THEN LET R=15
1120 RETURN
1200 LET M$="GIANT CENTIPEDE"
1210 LET R=7
1215 IF C>50 THEN LET R=11
1220 LET CASH=7
1230 RETURN
1300 LET M$="POISONOUS SNAIL"
1310 LET R=2
1315 IF C>50 THEN LET R=4
1320 LET CASH=1
1330 RETURN
1400 LET M$="CAVE BEAR"
1410 LET R=10
1415 IF C>50 THEN LET R=15
1420 LET CASH=9
1430 RETURN
1500 LET M$="VAMPIRE BAT"
1510 LET R=5
1515 IF C>50 THEN LET R=8
1520 LET CASH=4
1530 RETURN
1600 LET M$="GIANT RAT"
1610 LET R=7
1615 IF C>50 THEN LET R=11
1620 LET CASH=7
1630 RETURN
1700 LET M$="SABRE TOOTHED TIGER
"
1710 LET R=9
1715 IF C>50 THEN LET R=18
1720 LET CASH=7
1730 RETURN
1800 LET M$="FIERCE UNICORN"
1810 LET R=5
1815 IF C>50 THEN LET R=8
1820 LET CASH=7
1830 RETURN
1900 LET M$="ANGRY GORILLA"
1910 LET R=9
1915 IF C>50 THEN LET R=15
1920 LET CASH=3
1930 RETURN
```

```
2000 LET M$="CREEPING FUNGUS"
2010 LET R=6
2015 IF C>50 THEN LET R=9
2020 LET CASH=5
2030 RETURN
2500 CLS
2510 PRINT "££££££££££££££££££££££
££££££££££££"
2515 PRINT
2516 PRINT "CONGRATULATIONS,YOU
HAVE WON"
2517 PRINT
2518 PRINT "££££££££££££££££££££££
££££££££££££"
2519 PRINT AT 21,0;"PRESS NEWLIN
E TO CONTINUE"


2520 IF INKEY$="" THEN GOTO 2520
2530 IF INKEY$="A" THEN NEW
2535 CLS
2540 GOTO 10
3000 PRINT TAB 10;"ADVENTURE"
3010 PRINT
3020 PRINT
3030 PRINT "YOU ARE MAKING YOUR
WAY THROUGH A CAVE SYSTEM.YOUR O
BJECTIVE IS TO GAIN £100.  VARIO
US MONSTERS WILL ATTACK YOU AND
YOU WILL BE PAID IF YOU KILL THE
M."
3035 PRINT "THERE ARE ALSO PHYSI
CAL HAZARDS WHICH WILL DEPLETE Y
OUR STRENGTH "
3036 PRINT
3037 PRINT
3040 PRINT "PRESS NEWLINE TO CON
TINUE"
3045 PRINT "GOOD LUCK"
3050 IF INKEY$="" THEN GOTO 3050
3060 GOTO 5000
4000 CLS
4010 PRINT "UNFORTUNATELY,THE ";
M$;" HAS JUST KILLED YOU."
4012 PRINT AT 10,10;"▜O▛"
4013 PRINT AT 11,10;" █ "
4014 PRINT AT 12,10;" █ "
4015 PRINT AT 13,10;"▟ ▙"
4016 PAUSE 100
4020 PRINT AT 17,0;"HOWEVER,I LI
KED THE WAY YOU      PLAYED SO I
AM GOING TO OFFER TOREINCARNATE
YOU"
4021 PRINT "PRESS NEWLINE TO CON
TINUE"
4022 IF INKEY$="" THEN GOTO 4022
4023 IF INKEY$="A" THEN NEW
4040 CLS
4065 LET D=20
4066 LET C=0
4067 LET L=0
4068 LET M=0
4080 GOTO 10
5000 LET W=INT (RND*10)
5001 IF C>=100 THEN GOTO 2500
5002 IF W>5 THEN GOTO 114
5003 IF W<5 THEN GOTO 103
5005 GOTO 9200
6500 LET R=R-INT (RND*4)
6501 IF Q=1 THEN LET R=R-INT (RN
D*4)
6505 IF M>3 THEN GOTO 7000
6510 IF B$(1)="H" THEN PRINT "NE
ARLY GOT HIM
6515 IF B$(1)="S" THEN PRINT "YO
U HAVE BADLY WOUNDED HIM"
6520 IF B$(1)<>"H" AND B$(1)<>"S
" THEN PRINT "NICE TRY"
6530 GOTO 170
7000 IF M=4 THEN PRINT "YOU ARE
NOT DOING TOO WELL"
7010 IF M=5 THEN PRINT "YOUR STR
ENGTH IS GOING"
7020 IF M=6 THEN PRINT "I SHOULD
MOVE ON"
7030 IF M=7 THEN PRINT "WEAKLING
"
7035 PAUSE 50
7040 GOTO 170
8000 GOSUB 8000+(100*X)+100
8010 PRINT "YOUR PROGRESS IS IMP
EDED"
8015 PRINT "BY A";H$
8020 PRINT "WHAT ARE YOU GOING T
O DO?"
8021 LET J=1
8025 INPUT I$
8026 LET I=INT (RND*10)
8027 IF I$(1)="R" THEN GOTO 103
8030 PRINT "IF YOU ";I$;",IT WIL
L REDUCE YOUR  STRENGH BY ";I
8031 PRINT "YOUR AVAILABLE STREN
GTH IS ";D
8035 PRINT "WOULD YOU RATHER DO
SOMETHING    ELSE?"
8037 INPUT T$
8038 CLS
8039 IF T$(1)="R" THEN GOTO 103
8040 IF T$(1)="Y" THEN GOTO 8010
8041 IF D<I THEN PRINT "YOUR STR
ENGTH IS NOT ENOUGH"


8042 IF D<I THEN PRINT "WHAT ARE
 YOU GOING TO DO?"
8043 IF D<I THEN GOTO 8037
8050 LET D=D-I
8051 LET J=0
8060 GOTO 5000
8100 LET H$=" ROOF FALL"
8150 RETURN
8200 LET H$=" WIDE CHASM"
8250 RETURN
8300 LET H$="N UNDERGROUND RIVER
"
8350 RETURN
8400 LET H$=" SHARP FALL"
8450 RETURN
8500 LET H$=" DEAD END"
8560 RETURN
8600 LET H$=" PRECIPICE"
8650 RETURN
8700 LET H$=" FLOODED PASSAGEWAY
"
8750 RETURN
8800 LET H$=" ROCK SLIP"
8850 RETURN
8900 LET H$=" SHEER ROCK FACE"
8950 RETURN
9000 LET H$=" WATERFALL"
9050 RETURN
9100 LET H$="N UNDERGROUND LAKE"
9150 RETURN
9200 LET G=INT (RND*4)
9205 CLS
9210 IF G=0 AND F=1 THEN GOTO 92
00
9215 IF G=1 AND Q=1 THEN GOTO 92
00
9220 GOSUB 9300+(G*100)
9230 PRINT "PRESS NEWLINE TO CON
TINUE"
9231 IF INKEY$="" THEN GOTO 9231
9240 CLS
9250 GOTO 5000
9300 PRINT "YOU FIND A MAGIC RIN
G GIVING      YOU THE POWER OF IN
VISIBILITY"
9310 LET F=1
9320 PRINT "THIS ALLOWS YOU TO
ESCAPE FROM MONSTERS IN THE MIDD
LE OF A      BATTLE"
9330 RETURN
9400 PRINT "YOU FIND A MAGIC SWOR
D WHICH      DOUBLES YOUR FIGHTIN
G POWER"
9410 LET Q=1
9420 RETURN
9500 PRINT "YOU FIND £20"
9510 LET C=C+20
9520 RETURN
9600 PRINT "YOU FIND A MAGIC POT
ION WHICH     DOUBLES YOUR STRENGT
H"
9610 LET D=D*2
9620 RETURN
9700 CLS
9710 PRINT "ENTER MONEY TO BE CO
NVERTED TO  STRENGTH"
9720 INPUT S
9725 IF C<S THEN GOTO 9720
9730 LET C=C-S
9750 LET D=D+(3*S)
9760 CLS
9780 GOTO 191
9900 SAVE "QUEST"
9901 RUN
```

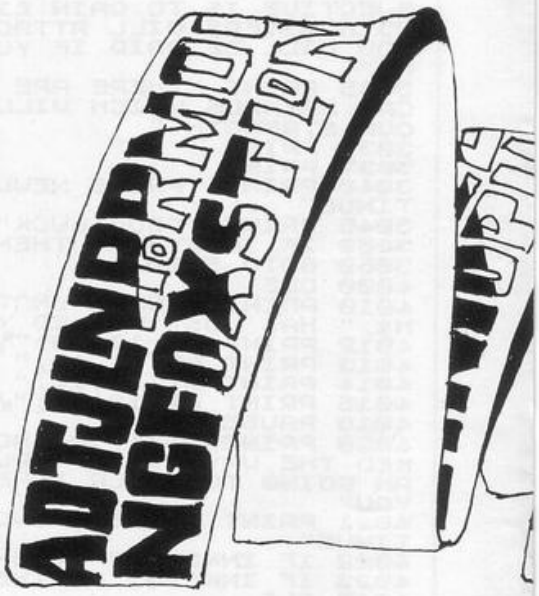
ZX BA

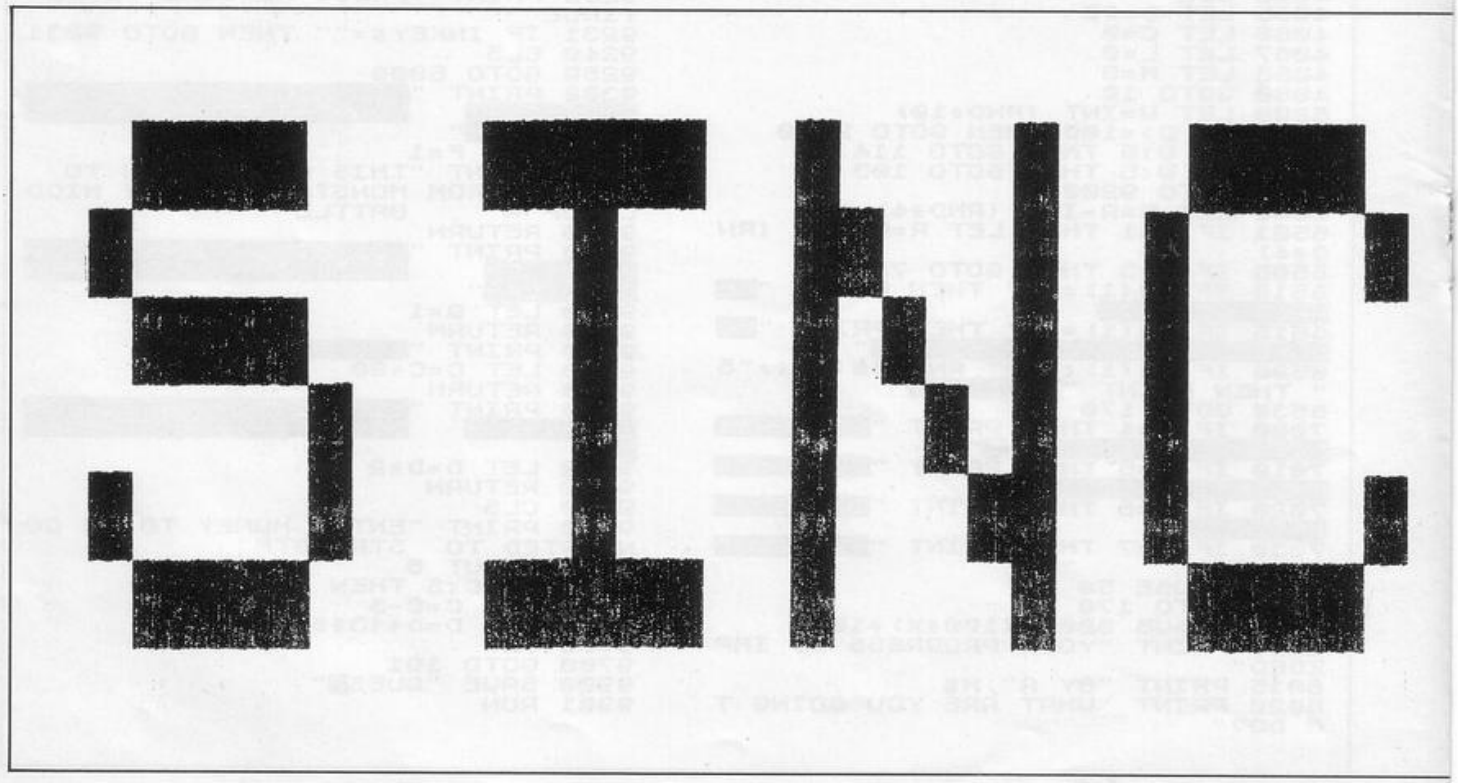
IF YOU are wondering what to do with your printer why not try *ZX Banners* which will print out banners of as many letters as you want each three inches high. Letters are printed sideways, so the length of a banner is restricted only by the amount of paper in the printer.

While letters and graphics will work, functions will not. The width of a letter can be changed by altering line 910—e.g., by inserting FOR F=1 to 4 would double the width.

ZX Banners was sent by Christopher Holt, of Gravesend, Kent.

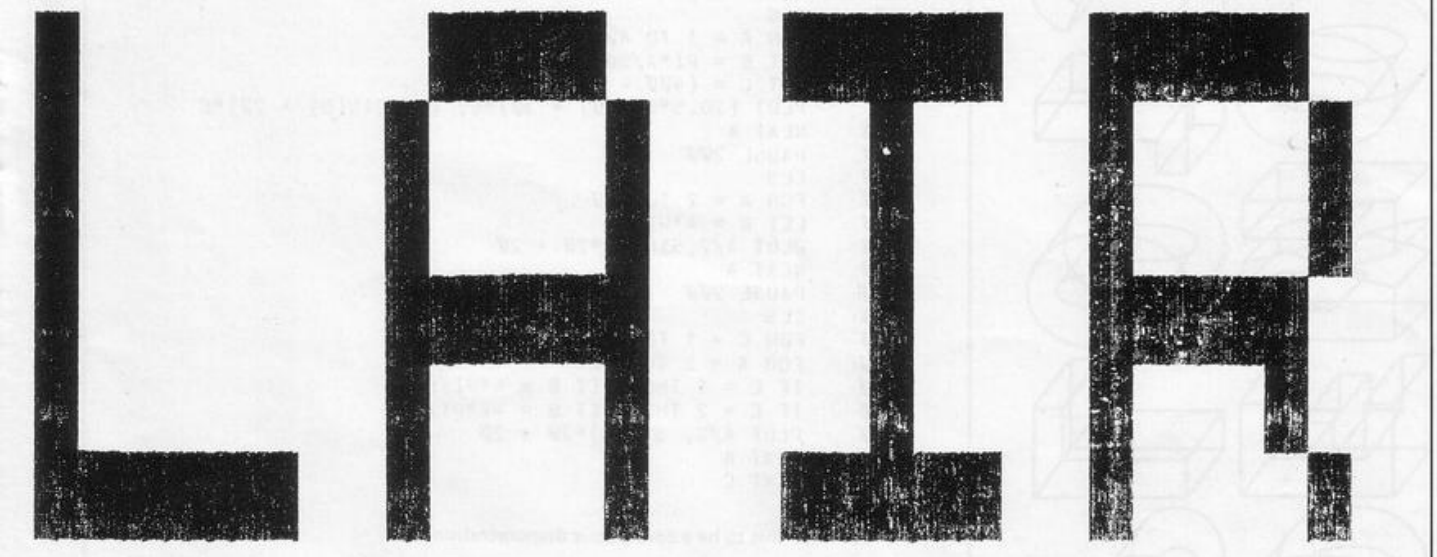
```
  1 REM "BANNERS"
 10 DIM D$(64)
 20 INPUT M$
 30 FAST
 40 FOR C=1 TO LEN M$
 50 LET A$=M$(C)
 60 IF CODE A$>63 THEN LET A$=C
HR$ (CODE M$(C)-128)
 65 FOR N=0 TO 7
 70 LET Z=PEEK (7680+N+8*CODE A
$)
 80 FOR X=1 TO 8
 90 LET Z=Z/2
100 IF Z<>INT Z THEN GOTO 500
110 LET D$(N*8+X)="0"
115 IF CODE M$(C)>63 THEN LET D
$(N*8+X)="1"
120 IF N*8+X=64 THEN GOSUB 900
130 LET Z=INT Z
140 NEXT X
150 NEXT N
160 NEXT C
170 SLOW
180 GOTO 1010
500 LET D$(N*8+X)="1"
```



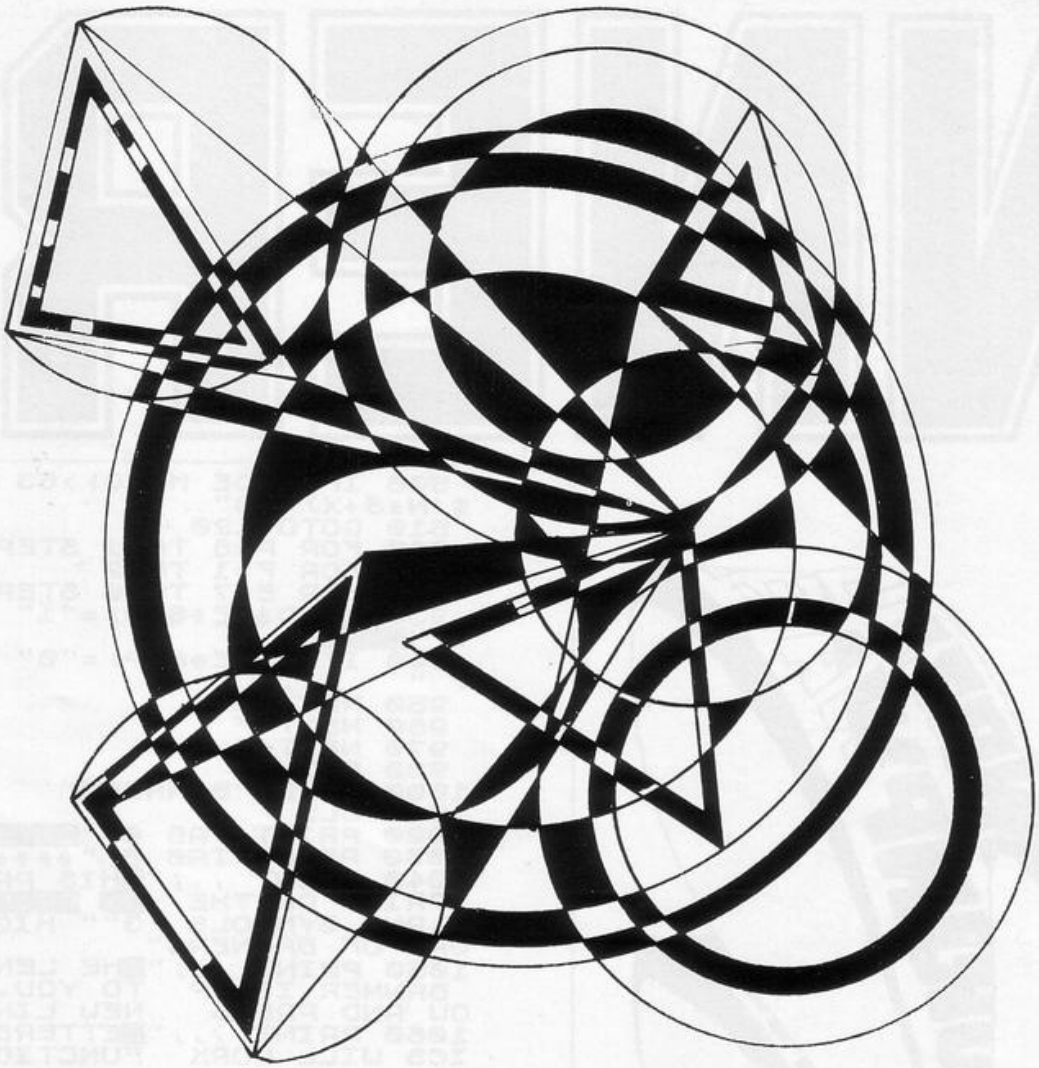


NNERS

```
  505 IF CODE M$(C)>63 THEN LET D
$(N*8+X)="0"
  510 GOTO 120
  900 FOR P=8 TO 1 STEP -1
  910 FOR F=1 TO 2
  920 FOR E=7 TO 0 STEP -1
  930 IF D$(E*8+P)="1" THEN LPRIN
T "■■■■■■";
  940 IF D$(E*8+P)="0" THEN LPRIN
T "      ";
  950 NEXT E
  960 NEXT F
  970 NEXT P
  980 RETURN
1000 SAVE "BANNER■"
1010 CLS
1020 PRINT TAB 8;"■X BANNERS■"
1030 PRINT TAB 8;"**********"
1040 PRINT ,,;"■HIS PROGRAM WILL
 PRINT ON THE  ■X ■RINTER■ LETTER
S AND SYMBOLS  3"" HIGH IN THE F
ORM OF BANNERS"
1050 PRINT ,,;"■HE LENGHT OF THE
 BANNER IS UP  TO YOU. ENTER BEL
OW AND PRESS  NEW LINE"
1060 PRINT ,,;"■ETTERS AND GRAPH
ICS WILL WORK  FUNCTIONS WILL NO
T"
1090 GOTO 10

 EXAMPLES OF THE PRINT ARE
ENCLOSED
THE WIDTH OF THE LETTER CAN BE
ALLTERED BY CHANGING LINE 910
EG. 910 FOR F=1 TO 4
WOULD DOUBLE THE WIDTH
```



DEMONSTRATION PLOTS



DEMONSTRATION PLOTS uses some of the extra functions available on the ZX-81. Using spirals and sines, the program can create an effective demonstration program if you have sufficient memory.
Run it in slow mode.

```
10      FOR A = 1 TO 100
20      LET B = PI*A/50
30      PRINT AT 9*COS(B) + 10, 14*SIN(B) + 15;"inverse
            space"
40      NEXT A
50      PAUSE 200
60      CLS
70      FOR A = 1 TO 400
80      LET B = PI*A/50
85      LET C = (400 - A)/400
90      PLOT (20.5*COS(B) + 30)*C, (20*SIN(B) + 20)*C
100     NEXT A
110     PAUSE 200
120     CLS
130     FOR A = 2 TO 120
140     LET B = A*PI/30
150     PLOT A/2,SIN(B)*20 + 20
160     NEXT A
170     PAUSE 200
180     CLS
190     FOR C = 1 TO 2
200     FOR A = 2 TO 120
210     IF C = 1 THEN LET B = A*PI/60
220     IF C = 2 THEN LET B = -A*PI/60
230     PLOT A/2, SIN(B)*20 + 20
240     NEXT A
250     NEXT C
```

If you wish this to be a continuous demonstration, add:

```
260     PAUSE 200
270     CLS
280     RUN
```

Ohm's Law

OHM'S LAW, by Ken North, allows you to use Ohm's law to work out the value of volts, amps or ohms when you know two but not the third. Enter the known values when prompted, using zero for the unkown value. The display is particularly effective.

```
  5 REM OHMS LAW   KEN NORTH
 10 LET I=0
 20 LET V=0
 30 LET R=0
 40 PRINT AT 2,10;"OHMS LAW"
 50 PRINT AT 4,0;"INPUT VALUES
AND 0 FOR UNKNOWN"
 60 PRINT AT 6,0;"VOLTS ";
 80 INPUT V
 90 PRINT V
100 PRINT AT 10,4;"AMPS ";
110 INPUT I
120 PRINT I
130 PRINT AT 14,8;"OHMS ";
140 INPUT R
150 PRINT R
160 IF V=0 THEN GOTO 300
170 IF I=0 THEN GOTO 400
180 LET R=V/I
190 PRINT AT 14,13;R
200 PAUSE 4E4
210 CLS
220 RUN
300 LET V=I*R
310 PRINT AT 6,6;V
320 GOTO 200
400 LET I=V/R
410 PRINT AT 10,9;I
420 GOTO 200
```

```
          OHMS LAW

INPUT VALUES AND 0 FOR UNKNOWN

VOLTS 240


     AMPS 7.0588235


          OHMS 34
```

THE ZX80 STRING SORT

THE ZX-80 String Sort routine, which occupies only 306 bytes, was written by John Edwards of Coventry. He writes: "The only place to store strings in the ZX-80 is in the VARS store, there being no DIM A$. So to sort strings into alphabetical order, it is necessary to work in that section".

Lines 7 to 18 allow you to enter eight strings, each called A$ at first and then POKEd to H$ to A$. Subroutine 48 looks through 110 bytes of VARS to find the address of A$ to H$ (134 to 141) and stores that numerical information in A (0 to 7). Subroutine 30 swaps the names of two adjacent strings.

Lines 71 to 80 are a bubble sort. The POKEs change the A and B in line 75 to BC, CD, DE and the like and I changes. That saves a good deal of space—and typing; 16675/8 is the number of bytes from the start of the program (+16424).

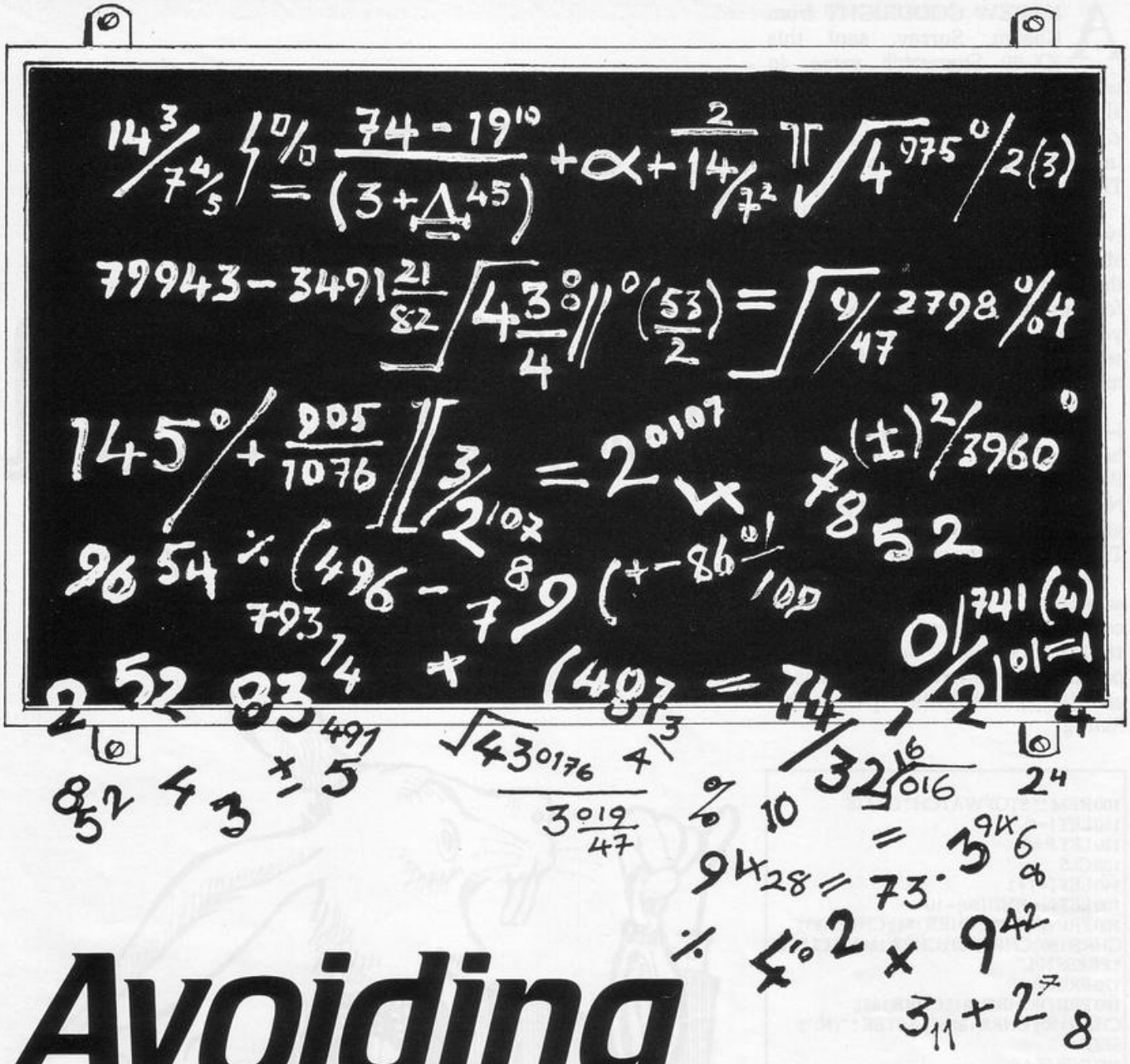
To search all the VARS section, use:

40 LET L = PEEK (16394) + PEEK (16395)*256

48 FOR Q = 0 TO L – V

Lines 73 and 74 will also need altering.

```
 5 DIM A(7)
 7 FOR J=0 TO 7
 8 LET V=PEEK (16392)+PEEK (16393)×256
10 INPUT A$
12 PRINT A$
14 GOSUB 48
16 POKE A(0), 141 – J
18 NEXT J
19 PRINT
20 GOTO 70

30 POKE A(I), 135 + I
32 POKE A(I+1), 134 + I
33 GOSUB 48
35 RETURN

48 FOR Q = V TO V + 110
50 LET Z = PEEK(Q)
51 IF Z > 133 AND Z < 142 THEN LET A(Z
–134) = Q
60 NEXT Q
65 RETURN

71 FOR J = 0 TO 6
72 FOR I = 0 TO 6 – J
73 POKE 16675, 84 + I
74 POKE 16378, 85 + I
75 IF A$ > B$ THEN GOSUB 30
79 NEXT I
80 NEXT J

100 PRINT A$, B$, C$, D$, E$, F$, G$, H$
```



Avoiding the ZX-80 Overflow

WITH MOST mathematical operations on the ZX-80, care must be taken to avoid arithmetic overflow. That can be done by defining input limits to avoid a program crash but it can involve a good deal of calculating.

This program, by G A Rooker of Hendon, demonstrates a better method of avoiding arithmetic overflow, in this case for an exponentiation calculation.

Lines 80 to 120 test to see if the expression 32767/A**B) is less than unity. If it is, then A**B is obviously greater than 32767 and the calculation at line 130 is avoided. The principle can be applied to other calculations.

The program fits in 1K.

```
10 PRINT "A TO THE POWER OF B"
20 PRINT
30 PRINT "A","B",,"RESULT"
40 INPUT A
50 PRINT A,
60 INPUT B
70 PRINT B,,
80 LET C=32767
90 FOR D=1 to B
100 LET C=C/A
110 NEXT D
120 IF C<1 THEN GOTO 160
130 LET E=A**B
140 PRINT E
150 GOTO 40
160 PRINT "TOO HIGH"
170 GO TO 40
```

STOP WATCH

ANDREW GOODRIGHT from Cheam, Surrey, sent this ZX-80 *Stopwatch* game, in which you have to guess the time elapsed from a starting-point, the ZX-90 naming a time and the playing, starting and stopping the clock. The computer also rates your efforts.

You get 10 points if you are within two seconds of the correct time, eight points for being within two to three seconds of the time, six points for four to six seconds, three points if you are between seven and 10 seconds, and no points if you are more than 10 seconds out.

The variables:

J—The number of tries the player had had.

P—The player's score.

N—The time for which the player is aiming.

TE—The time the player achieves.

Note that the program works by accessing the ZX-80 frame counter—addresses 16414 and 16415. Goodright has used the popular convention of an underlined asterisk (*) to indicate a space in this listing.

```
100 REM ** STOPWATCH * GAME
110 LET J=0
120 LET P=0
130 CLS
140 LET J=J+1
150 LET N=RND(50)+10
160 PRINT "TO *"; CHR$(184); CHR$(185);
CHR$(166); CHR$(183); CHR$(185); "* CLOCK
* PRESS N/L"
170 PRINT
180 PRINT CHR$(184); CHR$(185);
CHR$(180); CHR$(181); "* AFTER * "; N; "*
SEC"
190 INPUT A$
200 POKE 16414,0
210 POKE 16415,0
220 PRINT
230 PRINT "TO *"; CHR$(184); CHR$(185);
CHR$(180); CHR$(181); "* PRESS * N/L"
240 INPUT A$
250 CLS
260 LET T E=((PEEK(16415)*256+
PEEK(16414)-4)*2)/100
270 LET TD=ABS(N-TE)
280 IF 11>TD AND TD>7 OR TD=7 THEN
LET P=P+3
290 IF 7 >TD AND TD>4 OR TD=4 THEN
LET P=P+6
300 IF 4>TD AND TD>2 OR TD=2 THEN
LET P=P+8
310 IF TD>10 THEN PRINT "TERRIBLE"
320 IF 2>TD AND TD>0 OR TD=0 THEN
LET P=P+10
330 PRINT "YOU * STOPPED * THE * CLOCK
* AT *"; TE; "* SEC, ***"; TD; "* SEC * FROM
*"; N; "*SEC"
340 PRINT "DO * YOU * WISH * TO *
CONTINUE? * (Y/N)"
350 INPUT A$
360 IF A$="Y" THEN GOTO 130
370 IF NOT A$="N" THEN GOTO 350
380 CLS
390 PRINT "YOU * SCORED *"; P; "* PT * OUT
* OF * A1", "* POSSIBLE *"; J*10
400 STOP
```

The ZX81 Screen Invert

FIFTEEN-year-old John Miller, of Farlington, Portsmouth, has written a machine-code routine, *Invert*, to invert the whole screen of the ZX-81 with $3\frac{1}{2}$ or more K—or 1K, so long as 22 lines have been PRINTed to the screen. The routine takes 1/50 of a second in the FAST mode and 4/50 of a second in SLOW.

It is a very useful routine for game explosions, advertising displays and the like. The listing shows an Assembly listing, a hexadecimal dump and the Basic loader program.

Use RAND USR 32700 to call the routine. The routine returns the value of the remainder of the result of dividing the address where the routine starts. If loaded to 32700, the routine returns the remainder of 32700/256—that is 188. Therefore, RAND USR 32700 will, as well as inverting the screen, set the RANDOM seed to 188—i.e., RAND 188.

The routine uses only 20 bytes. Miller tried loading the routine to the last 20 bytes of RAM but that crashed the system, even though RAMTOP is set below those bytes. That should not cause the system to crash by a corruption of the Stack. We would be interested in hearing from anyone who can explain why the system crashes in that circumstance.

Z-80 ASSEMBLY LISTING

```
      LD HL,(D-FILE)
      LD B,23
      DEC HL
NEXT  INC HL
      LD A,(HL)
      CP 118
      JR NZ,INV
      DJNZ NEXT
      RET
INV   ADD A,128
      LD (HL),A
      JR NEXT
```

HEX. DUMP

```
2A  0C  40  06  17  28  23  7E
FE  76  20  03  10  F8  C9  C6
80  77  18  F2
```

```
POKE 16389,127
POKE 16388,188
  10 FOR C=32700 TO 32719
  20 INPUT N
  30 POKE C,N
  40 PRINT C;TAB 8;N,PEEK C
  50 NEXT C
```

WITH THE FOLLOWING DATA, USE THE ABOVE BASIC PROGRAM TO LOAD THE MACHINE CODE

```
42,12,64,6,23,43,35,126,254,118,
32,3,16,246,201,198,128,119,24,
242
```

(C) JOHN MILLER

COMPUTER COMBAT

THE FIRST question often asked about a new machine is "Does it play *Space Invaders?*". Though a 1K machine has considerable difficulty getting anywhere near, *Computer Combat* for 1K ZX-81 is a type of mini space invaders but with only one invader and one base and a much slower rate of firing.

The object of the game is to hit the invader as many times as possible before it lands or you run out of missiles. Twenty-five missiles normally are given but that can be altered by changing the value of B in line 5.

You receive five points for hitting it but lose one is you miss. Use keys 5 and 8 to move left and right respectively and key 0 to fire. The invaders' missiles are shown as an asterisk and yours as a cross. The program is good for beginners, as it is easy to understand the function of each line as there are none of the usual POKES and PEEKS or other complicated functions.

If you want to get more memory, enter in direct mode the following BEFORE entering the program:

POKE 16389,68 followed by NEWLINE
NEW followed by NEWLINE

The program will run continuously until the BREAK key is used.

Computer Combat was sent in by 15-year-old Anthony Wells, of totnes, Devon.

```
  5 LET B=VAL "25"
 10 LET S=PI-PI
 15 LET M=PI-PI
 20 LET X=VAL "16"
 25 LET Y=PI-PI
 30 LET M=M+2
 35 IF M>VAL "20" THEN GOTO VAL
"100"
 40 CLS
 45 LET R=INT (RND*5)
 50 IF R=3 THEN GOSUB 155
 55 PRINT AT M,Y;"▀▀▀"
 60 LET Y=Y+VAL "2"
 65 IF Y=VAL "30" THEN GOTO 25
 70 PRINT AT 21,X;" ▄ "
 75 LET X=X+(INKEY$="8")*3-(INK
EY$="5")*3
 80 IF INKEY$="0" THEN GOSUB 11
5
 85 IF B<=VAL "0" THEN GOTO VAL
"100"
 95 GOTO VAL "40"
100 PRINT AT 12,10;"SCORE=";S
105 PAUSE VAL "300"
110 RUN
115 PRINT AT M,X;"+"
120 IF X+1<>Y THEN LET S=S-1
125 IF X+1=Y THEN PRINT AT M,X-
1;"***"
130 IF X+1=Y THEN LET S=S+5
135 LET B=B-VAL "1"
140 RETURN
145 PAUSE VAL "50"
150 GOTO VAL "40"
155 PRINT AT 21,Y;CHR$ 23
160 IF X=Y THEN GOSUB VAL "170"
165 RETURN
170 PRINT AT 21,Y;"<*>"
175 PAUSE VAL "40"
180 LET S=S-VAL "5"
185 RETURN
```

Cricket Averages

A PROGRAM designed to be useful with other cricket games, e.g., the Video Software *Test Match* and the Emvee Software *Mini Cricket* is *Cricket Averages*, submitted by G Evans of Dartford, Kent.

The program is far too long to input—about three hours—and the description may or may not need to include the listing of variables included by the writer. So it it completely untested.

```
  5 REM
 10 PRINT TAB 5;"CRICKET AVERAG
ES"
 15 PRINT TAB 5;"
 20 PRINT AT 3,0;"HOW MANY TEAM
S DO YOU WISH TO   FIND AVERAGES
 FOR?"
 30 INPUT TEAMS
 35 PRINT TEAMS
 37 PRINT
 40 DIM A$(TEAMS,15)
 50 DIM B$(16,TEAMS,8)
 60 DIM I(16,TEAMS)
 65 DIM N(16,TEAMS)
 70 DIM R(16,TEAMS)
 75 DIM H(16,TEAMS)
 80 DIM F(16,TEAMS)
 85 DIM C(16,TEAMS)
 90 DIM A(16,TEAMS)
 95 DIM A(16,TEAMS)
100 FOR L=1 TO TEAMS
110 PRINT "ENTER TEAM ";L;"""S
NAME"
120 INPUT A$(L)
125 PRINT A$(L)
127 PRINT
130 PRINT "NO. OF PLAYERS (MAX.
OF 16)?";
140 INPUT PLAYERS
145 PRINT PLAYERS
150 FOR Z=1 TO PLAYERS
160 CLS
170 PRINT "NAME NO.";Z;"=";
180 INPUT B$(Z,L)
190 PRINT B$(Z,L)
200 PRINT "NO. OF INNINGS ?";
210 INPUT I(Z,L)
215 PRINT I(Z,L)
230 FOR Y=1 TO I(Z,L)
240 PRINT AT 2,0;"SCORE ";Y;" (
* REPRESENTS NOT OUT)"
250 INPUT M$
255 PRINT M$
260 IF M$(LEN M$)="*" THEN LET
N(Z,L)=N(Z,L)+1
270 IF M$(LEN M$)="*" THEN LET
M$=M$( TO LEN M$-1)
280 LET R(Z,L)=R(Z,L)+VAL M$
290 IF Y=1 THEN LET H(Z,L)=R(Z,
L)
300 IF VAL M$>H(Z,L) THEN LET H
(Z,L)=VAL M$
310 IF VAL M$)=50 AND VAL M$<10
0 THEN LET F(Z,L)=F(Z,L)+1
320 IF VAL M$)=100 THEN LET C(Z
,L)=C(Z,L)+1
330 NEXT Y
340 LET A(Z,L)=R(Z,L)/(I(Z,L)-N
(Z,L))
345 LET A(Z,L)=INT (A(Z,L)*10+0
.5)/10
370 NEXT Z
380 GOSUB 950
390 CLS
400 PRINT A$(L)
405 PRINT AT 2,8;"I  NO RUNS HS
F  M   AV"
410 FOR Z=1 TO PLAYERS
430 PRINT B$(Z,L);TAB 8;I(Z,L);
TAB 11;N(Z,L);TAB 14;R(Z,L);TAB
19;H(Z,L);TAB 22;F(Z,L);TAB 25;C
(Z,L);TAB 28;A(Z,L)
440 NEXT Z
450 PRINT AT 20,0;"DO YOU WANT
A PRINT-OUT OF THIS TABLE(Y/N)?"
460 INPUT L$
470 PRINT AT 20,0;"    (43 SPACES)
"
480 IF L$="Y" THEN COPY
490 PAUSE 200
495 POKE 16437,255
500 CLS
510 PRINT "DO YOU WANT BOWLING
AVERAGES    FOR ";A$(L);" (Y/N)?
"
520 INPUT L$
530 IF L$="Y" THEN GOSUB 3000
540 NEXT L
550 STOP
950 FAST
1000 FOR H=1 TO PLAYERS-1
1010 FOR J=1 TO PLAYERS-H
1020 IF A(J,L)=A(J+1,L) THEN GOT
O 1040
1030 GOSUB 2000
1040 NEXT J
1050 NEXT H
1055 SLOW
1060 RETURN
2000 LET X=A(J+1,L)
2010 LET A(J+1,L)=A(J,L)
2020 LET A(J,L)=X
2030 LET X=I(J+1,L)
2040 LET I(J+1,L)=I(J,L)
2050 LET I(J,L)=X
2060 LET X$=B$(J+1,L)
2070 LET B$(J+1,L)=B$(J,L)
2080 LET B$(J,L)=X$
2090 LET X=N(J+1,L)
2100 LET N(J+1,L)=N(J,L)
2110 LET N(J,L)=X
2120 LET X=R(J+1,L)
2130 LET R(J+1,L)=R(J,L)
2140 LET R(J,L)=X
2150 LET X=H(J+1,L)
2160 LET H(J+1,L)=H(J,L)
2170 LET H(J,L)=X
2180 LET X=F(J+1,L)
2190 LET F(J+1,L)=F(J,L)
2200 LET F(J,L)=X
2210 LET X=C(J+1,L)
2220 LET C(J+1,L)=C(J,L)
2230 LET C(J,L)=X
2240 RETURN
3000 CLS
3010 PRINT "HOW MANY BOWLERS?"
3020 INPUT BOWLERS
3030 DIM C$(BOWLERS,12)
3031 DIM O(BOWLERS)
3032 DIM W(BOWLERS)
3033 DIM S(BOWLERS)
3035 DIM L(BOWLERS)
3040 FOR Z=1 TO BOWLERS
3050 PRINT "BOWLER NO.";Z;"=";
3060 INPUT C$(Z)
3065 PRINT C$(Z)
3070 PRINT "TOTAL NO. OF OVERS "
;
3075 INPUT O(Z)
3080 PRINT O(Z)
3090 PRINT "TOTAL NO. OF WICKETS
";
3095 INPUT W(Z)
3100 PRINT W(Z)
3110 PRINT "TOTAL NO. OF RUNS ";
3115 INPUT S(Z)
3120 PRINT S(Z)
3130 CLS
3140 LET L(Z)=S(Z)/(Z)
3150 LET L(Z)=INT (L(Z)*10+0.5)/
10
3160 NEXT Z
3165 FAST
3170 FOR P=1 TO BOWLERS-1
3180 FOR M=1 TO BOWLERS-P
3190 IF L(M)>L(M+1) THEN GOTO 32
10
3200 GOSUB 3500
3210 NEXT M
3220 NEXT P
3230 SLOW
3240 CLS
3250 PRINT AT 1,12;" O   RUNS  W
 AV"
3260 FOR M=1 TO BOWLERS
3270 PRINT C$(M);TAB 13;O(M);TAB
 18;S(M);TAB 23;W(M);TAB 27;L(M)
3280 NEXT M
3290 PRINT AT 20,0;"DO YOU WANT
A PRINT-OUT OF THIS TABLE(Y/N)?"
3300 INPUT X$
3310 PRINT AT 20,0;"  (43 SPACES)
"
3320 IF X$="Y" THEN COPY
3330 PAUSE 200
3340 RETURN
3345 POKE 16437,255
3500 LET X=O(M+1)
3510 LET O(M+1)=O(M)
3520 LET O(M)=X
3530 LET X=W(M+1)
3540 LET W(M+1)=W(M)
3550 LET W(M)=X
3560 LET X=S(M+1)
3570 LET S(M+1)=S(M)
3580 LET S(M)=X
3590 LET X=L(M+1)
3600 LET L(M+1)=L(M)
3610 LET L(M)=X
3620 LET X$=C$(M+1)
3630 LET C$(M+1)=C$(M)
3640 LET C$(M)=X$
3650 RETURN
```

PROGSAVE AND PROGRETRIEVE

FOR THE more technically-minded, here are two useful machine code routines for the ZX-81. If you have ever been annoyed at having to lose a program in memory when wanting to load another from tape, even though both could fit easily, then *Progsave* and *Progretrieve* could be the answer.

The routine copies the program presently in RAM to above RAMTOP. Though RAMTOP is relocated to make room, nothing already above RAMTOP is changed. If there is not sufficient memory, the program will return to Basic.

Using the routine, any program can be disassembled—many disassemblers needing to be in RAM, not above RAMTOP. To load programs from tape without losing the program already in RAM, *Progsave* must be used in conjuction with *Progretrieve*. That routine will restore a program from above RAMTOP to address 16509 and thus any program already in memory will be moved up in memory; you may need to re-number after use. The copy above RAMTOP is erased and RAMTOP is re-set to the value it had before running *Progsave*.

To use the routines the following instructions may help:

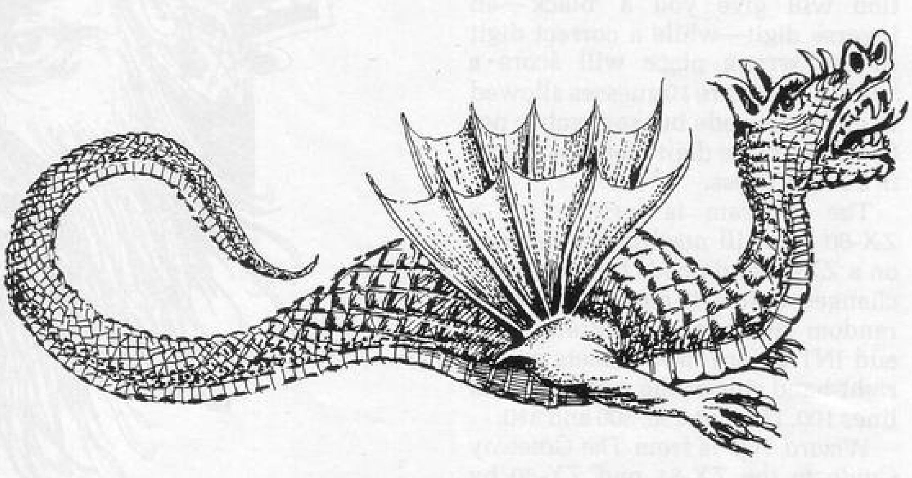
Write main section of program; run *Progsave*; load subroutines needed from tape; run *Progretrieve*; re-number if necessary.

After completing that the program will be the main program followed by the subroutines. If any line numbers clash, the only method of re-numbering is to use a re-number routine—using the EDIT key will not work.

Progsave and *Progretrieve* were sent by John Hardman, of Welling, Kent.

```
4082                    ORG 16514
4082 2A0C40             LD HL,(16396)
4085 117D40             LD DE,16509
4088 A7                 AND A
4089 ED52               SBC HL,DE
408B E8                 EX DE,HL
408C D5                 PUSH DE
408D 2A0440             LD HL,(16388)
4090 A7                 AND A
4091 ED52               SBC HL,DE
4093 EB                 EX DE,HL
4094 2A1040             LD HL,(16400)
4097 A7                 AND A
4098 ED52               SBC HL,DE
409A D1                 POP DE
409B F0                 RET P
409C 2A0440             LD HL,(16388)
409F A7                 AND A
40A0 ED52               SBC HL,DE
40A2 2B                 DEC HL
40A3 2B                 DEC HL
40A4 220440             LD (16388),HL
40A7 72                 LD (HL),D
40A8 23                 INC HL
40A9 73                 LD (HL),E
40AA 23                 INC HL
40AB 42                 LD B,D
40AC 4B                 LD C,E
40AD 117D40             LD DE,16509
40B0 EB                 EX DE,HL
40B1 EDB0               LDIR
40B3 C9                 RET

4082                    ORG 16514
4082 2A0440             LD HL,(16388)
4085 46                 LD B,(HL)
4086 23                 INC HL
4087 4E                 LD C,(HL)
4088 23                 INC HL
4089 117D40             LD DE,16509
408C EB                 EX DE,HL
408D E5                 LABEL:PUSH HL
408E C5                 PUSH BC
408F 1A                 LD A,(DE)
4090 13                 INC DE
4091 D5                 PUSH DE
4092 ED530440           LD (16388),DE
4096 CD2605             CALL 0526H
4099 D1                 POP DE
409A C1                 POP BC
409B E1                 POP HL
409C 23                 INC HL
409D 0B                 DEC BC
409E 78                 LD A,B
409F B1                 OR C
40A0 20EB               JR NZ,LABEL
40A2 C9                 RET
```

SMAUG



SMAUG is an *Adventure* game based on a circular maze of rooms.

The object is obviously to find a dragon called Smaug and then kill it. On the way you risk being transported to other caves by Orcs or catching sight of a dreaded Balrog, which is fatal instantly.

Having slain the dragon, you must steal the Arkenstone which assists you by protecting you from Orc-porting and also warns of impending Balrogs.

Smaug has no graphics built in yet but perhaps that could be the next development for interested readers.

The program requires 5K and was submitted by Mrs C M Corns of Enfield.

```
  10 REM "SMAUG"
  15 REM C M CORNS
  20 LET X=0
  30 RAND
  40 PRINT TAB 3;"SMAUG AND THE [illegible]"
  50 PRINT AT 7,0;"DO YOU NEED A
N EXPLANATION OF","THE STORY?  Y
 OR N"
  60 INPUT Q$
  70 IF Q$="Y" THEN GOTO 110
  80 IF Q$="N" THEN GOTO 120
  90 PRINT AT 10,0;"MAKE UP YOUR
 MIND..."
 100 GOTO 60
 110 GOSUB 1000
 120 CLS
 130 GOSUB 2000
 135 SLOW
 140 CLS
 145 GOTO 3000
 150 IF X<>0 THEN GOTO 140
 160 IF Y=E AND ARK=0 THEN GOTO
7000
 164 IF Y=E AND ARK=1 THEN GOTO
 170
 166 IF Y<>E THEN GOTO 200
 170 PRINT TAB 4;"[illegible]"
 180 PRINT ,,TAB 2;"YOU HAVE THE ARKENSTONE"
 185 PRINT ,,"GANDALF WILL MAKE
YOU AN","HONORARY HOBBIT.",,,"BU
T YOU WERE LUCKY - SMAUG","WILL
GET YOU NEXT TIME."
 190 GOTO 230
 200 IF Y<>BALROG THEN GOTO 230
 210 PRINT ,,TAB 9;"AAAAARRRRGH"
 215 PRINT ,,TAB 5;"YOU MET THE [illegible]"
 230 PRINT
 240 PRINT ,,"ANOTHER GAME? (Y O
R N)"
 250 INPUT Q$
 260 IF Q$="Y" THEN GOTO 120
 270 PRINT ,,TAB 13;"BYE"
 280 STOP
1000 CLS
1010 PRINT ,,"YOUR AIM IS TO FIN
D SMAUG AND","KILL HIM SO THAT Y
OU CAN TAKE","THE ARKENSTONE."
1020 PRINT ,,"SMAUG LIVES IN A N
ETWORK OF 20","INTERCONNECTING C
AVES - EACH","CAVE HAS 3 EXITS L
EADING FROM IT"
1030 PRINT ,,"THERE ARE DANGERS
THOUGH - THREE";"CAVES CONTAIN O
RCS WHO CAN","MAGICALLY TRANSPOR
T YOU TO","ANOTHER CAVE AT RANDO
M."
1040 PRINT ,,"YOU ONLY HAVE 5 AR
ROWS WITH","WHICH TO KILL SMAUG
- USE","THEM WISELY."
1050 PRINT ,,"PRESS NEWLINE TO C
ONTINUE"
1060 INPUT Q$
1070 CLS
1080 PRINT ,,"WHEN YOU SHOOT AT
SMAUG YOU","MIGHT BE LUCKY AND K
ILL HIM,","OR HE MIGHT RUN AWAY
(TAKING","THE ARKENSTONE WITH HI
M) OR HE","MAY ATTACK YOU"
1170 PRINT ,,"OH, I NEARLY FORGO
T - "
1190 PRINT ,,"ONE CAVE HAS A BAL
ROG IN IT.","THIS IS AN [illegible]
THING","WHICH WILL KILL YOU ON S
IGHT"
1200 PRINT ,,"PRESS NEWLINE TO C
ONTINUE"
1210 INPUT Q$
1230 RETURN
2000 LET S=5
2005 FAST
2010 LET B$="BCJADEADNBCGBGH"
2020 LET B$=B$+"LRSDELELAMRSANP"
2030 LET B$=B$+"NOPFGHIQTCJKKQT"
2040 LET B$=B$+"JKTMOSFHIFIQOPM"
2050 LET A$=B$
2060 GOSUB 2500
2070 LET Y=R
2080 GOSUB 2500
2090 LET E=R
2100 IF E=Y THEN GOTO 2080
2110 GOSUB 2500
2120 LET ORC1=R
2130 IF ORC1=Y OR ORC1=E THEN GO
TO 2110
2140 GOSUB 2500
2150 LET BALROG=R
2160 IF BALROG=Y OR BALROG=E OR
BALROG=ORC1 THEN GOTO 2140
2170 GOSUB 2500
2180 LET ORC2=R
2190 IF ORC2=Y OR ORC2=BALROG OR
 ORC2=ORC1 OR ORC2=E THEN GOTO 2
170
2200 GOSUB 2500
2210 LET ORC3=R
2220 IF ORC3=Y OR ORC3=E OR ORC3
=BALROG OR ORC3=ORC1 OR ORC3=ORC
2 THEN GOTO 2200
2230 GOSUB 2500
2240 LET SMAUG=R
2250 IF SMAUG=Y OR SMAUG=E OR SM
AUG=ORC1 OR SMAUG=ORC2 OR SMAUG=
ORC3 OR SMAUG=BALROG THEN GOTO 2
230
2270 LET ARK=0
2300 LET X=X+1
2400 RETURN
2500 LET R=INT (RND*20)+1
2510 RETURN
3000 IF Y=E OR Y=BALROG THEN GOT
O 3230
3020 IF Y=SMAUG THEN GOTO 3270
3030 IF Y=ORC1 OR Y=ORC2 OR Y=OR
C3 THEN GOTO 3250
3060 PRINT "YOU ARE IN ROOM ";Y
3080 GOSUB 8000
3110 PRINT "TUNNELS LEAD TO ";R1
;", ";R2;", ";R3
3112 IF ARK=1 THEN GOSUB 3500
3115 IF R1=E OR R2=E OR R3=E THE
N GOTO 3150
3140 GOTO 3160
3150 PRINT "[illegible]"
3160 PRINT "WHERE WILL YOU MOVE
TO? ";
3170 INPUT Y
3175 PRINT Y
3180 IF Y=R1 OR Y=R2 OR Y=R3 THE
N GOTO 3240
3210 PRINT "YOU CANNOT - TRY AGA
IN"
3220 GOTO 3160
3230 LET X=0
3240 GOTO 150
3250 GOTO 4000
3260 GOTO 3000
3270 IF S>0 THEN GOTO 3310
3280 PRINT "[illegible]","[illegible]"
3300 GOTO 3230
3310 GOSUB 5000
3320 IF Q$="R" THEN GOTO 3060
3330 GOTO 3240
3500 IF R1=BALROG OR R2=BALROG O
R R3=BALROG THEN GOTO 3550
3510 GOTO 3560
3550 PRINT ,,"[illegible]",,"THE A
RKENSTONE IS WARNING YOU","THAT
BALROGS ARE NEAR....."
3560 RETURN
4000 PRINT TAB 4;"[illegible]"
4005 IF ARK=1 THEN GOTO 4027
4010 LET G=INT (RND*20)+1
4020 LET Y=G
4325 PRINT ,,"YOU HAVE BEEN ORC-
PORTED TO","ROOM ";G
4026 GOTO 4030
4027 PRINT ,,"BUT YOU HAVE THE A
RKENSTONE","ORC MAGIC IS NO GOOD
 NOW"
4028 GOTO 3060
4030 GOTO 3260
5000 PRINT ,,TAB 5;"THIS IS SMAUG'S DEN"
5010 PRINT ,,"SHOOT OR RUN?","RE
PLY S OR R"
5020 INPUT Q$
5030 IF Q$="S" THEN GOTO 5080
5040 IF Q$="R" THEN GOTO 5070
5050 PRINT "ANSWER QUICKLY"
5060 GOTO 5010
5070 RETURN
5080 PRINT ,,TAB 12;"SHOT"
5090 LET Q=RND
5100 IF Q<=.33 THEN GOSUB 6000
5110 IF Q<=.66 AND Q>.33 THEN GO
TO 6100
5120 IF Q>.66 THEN GOSUB 6200
5130 RETURN
6000 PRINT ,,TAB 8;"MISSED [illegible]",TAB 5;"SMAUG GOT YOU [illegible]"
6010 GOTO 230
6020 RETURN
6100 PRINT ,,"YOU MISSED, SMAUG
RAN AWAY","HE HAS TAKEN THE ARKE
NSTONE","WITH HIM"
6110 GOSUB 8000
6140 LET SMAUG=R2
6150 IF SMAUG=E OR SMAUG=BALROG
THEN GOTO 6160
6155 GOTO 6190
6160 LET SMAUG=R1
6170 IF SMAUG=E OR SMAUG=BALROG
THEN GOTO 6180
6175 GOTO 6190
6180 LET SMAUG=R3
6190 GOTO 3060
6200 PRINT ,,TAB 4;"YOU HAVE KILLED SMAUG",,,TAB 3;"THE ARKENSTONE IS YOURS"
6210 PRINT ,,"BUT CAN YOU ESCAPE
 TO THE EXIT?"
6220 LET SMAUG=0
6230 LET ARK=1
6260 GOTO 3060
6270 RETURN
7000 PRINT TAB 10;"THE EXIT"
7010 PRINT ,,"YOU HAVE NOT GOT T
HE","ARKENSTONE. IF YOU RETURN",
"WITHOUT IT GANDALF WILL TURN",
YOU INTO A BEETLE. GO BACK AND",
"FETCH IT."
7020 LET X=1
7030 GOTO 3060
8000 FOR I=1 TO Y
8010 LET R1=CODE (A$)-37
8020 LET A$=A$(2 TO )
8030 LET R2=CODE (A$)-37
8040 LET A$=A$(2 TO )
8050 LET R3=CODE (A$)-37
8060 LET A$=A$(2 TO )
8070 NEXT I
8080 LET A$=B$
8100 RETURN
```

Wizard-Wiz

WIZARD WIZ, or a plastic version of it, is better known as *Mastermind* marketed by Invicta. The computer picks a three-digit code using the numbers one to nine, without repeating any digits. You enter your guess for the number—as one three-digit number—and then press NEWLINE.

A correct digit in the correct location will give you a 'black'—an inverse digit—while a correct digit in the wrong place will score a 'white'. There are 10 guesses allowed to crack the code but remember not to use the same digit more than once in a single guess.

The program is written for a ZX-80 but will need more memory on a ZX-81 and needs the following changes. In line 40 alter the way the random number is generated and add INT before the brackets on the right-hand side of the equals sign in lines 100, 110, 120, 290, 300 and 310.

Wizard Wiz is from *The Gateway Guide to the ZX-81 and ZX-80* by Mark Charlton, published by Inferface of 44-46 Earls Court Road, London W8 6EJ.

```
10    DIM A(3)
20    DIM B(3)
30    FOR Z = 1 TO 3
40    LET A(Z) = RND(9)
50    NEXT Z
60    IF A(1) = A(2) OR A(1) = A(3)
      OR A(2) = A(3) THEN GOTO 30
70    LET A = 100*A(1) + 10*A(2)+A(3)
80    FOR C = 1 TO 10
90    INPUT B
100   LET B(1) = B/100
110   LET B(2) = (B - 100*B(1))/10
120   LET B(3) = B - 100*B(1) - 10*B(2)
130   IF A = B THEN GOTO 360
140   LET D = A
150   LET N = 156
160   LET W = 0
170   FOR E = 1 TO 3
180   IF NOT A(E) = B(E) THEN GOTO 210
190   LET N = N + 1
200   LET A(E) = 0
210   NEXT E
220   FOR F = 1 TO 3
230   IF A(F) = 0 THEN GOTO 280
240   FOR E = 1 TO 3
250   IF NOT B(F) = A(E) THEN GOTO 270
260   LET W = W + 1
270   NEXT E
280   NEXT F
290   LET A(1) = D/100
300   LET A(2) = (D - 100*A(1))/10
310   LET A(3) = D - 100*A(1) - 10*A(2)
320   PRINT B, CHR$(N), W
330   NEXT C
340   PRINT ,A
350   STOP
360   PRINT "YOU GOT IT IN ";C
```

DOGFIGHT

```
  1 REM "DOGFIGHT"
  2 LET A=32
  3 LET B=0
  4 LET C=INT (RND*20)
  5 LET D=0
 10 LET Z=INT (RND*3)
 15 PRINT AT 11,15;"<+>"
 20 PLOT A,B
 25 PRINT AT C,D;"▒▒▒"
 30 LET C=C+Z
 35 LET D=D+1
 40 IF D>=30 THEN GOTO 4
 45 IF INKEY$="8" THEN LET C=C-
2
 50 IF C=11 AND D=16 THEN GOTO
90
 55 IF C>=21 THEN GOTO 4
 60 IF INKEY$="7" THEN LET C=C-
2
 65 IF INKEY$="0" THEN LET B=B+
20
 70 IF B=22 THEN LET B=0
 75 IF INKEY$="5" THEN LET D=D-
-2
 80 CLS
 85 GOTO 10
 90 IF A=32 AND B=20 THEN GOTO
105
 95 PRINT AT 9,14;"▛    ▜";AT 1
3,14;"▙    ▟"
100 GOTO 10
105 PRINT AT 11,15;"▒▒▒▒"
110 PAUSE 10
115 PRINT AT 11,15;"▒WHAM";AT 1
0,16;"▒▒";AT 11,12;"▒"
```

THE GRAPHICS on *Dogfight* are fairly impressive considering that it will run on 1K machines. The screen becomes the windshield of an aircraft with your gunsights indicated by the symbols. An enemy aircraft files on a random course across the screen, moved inexorably rightwards and downwards.

Using certain cursor keys, e.g., upward arrow, the course of the aircraft can be altered in an attempt to put it in front of the sights. When that is done, pressing the O key will fire your gun.

Program author Robert Graves of London explained that he limited the amount of cursor control deliberately; you cannot move the aircraft downwards. The result is a game which it is not so easy as it sounds.

WANDER

```
   5 LET R=RND
  10 LET J=SGN PI
  20 LET F=CODE "W"
  30 LET H=J
  40 LET T=J+J
  50 LET Y=T
  60 LET X=T
  66 LET Q=R+CODE "M"*Y+X+X
  70 CLS
  80 LET L=(X+Y<>T*INT ((X+Y)/T)
)
  90 PRINT "▛▀▜"
 100 PRINT "▌ ▐";AT J,J;"▣" AND
L
 110 PRINT "▙▄▟"
 120 PRINT AT J,NOT J;" " AND AB
S (Q-J)**PI-INT (ABS (Q-J)**PI)<
COS J
 130 PRINT AT NOT J,J;" " AND AB
S Q**PI-INT (ABS Q**PI)>COS J
 140 PRINT AT T,J;" " AND ABS (Q
+CODE "M")**PI-INT (ABS (Q+CODE
"M")**PI)>COS J
 150 PRINT AT J,T;" " AND ABS (Q
+J)**PI-INT (ABS (Q+J)**PI)<COS
J
 160 LET Q=ABS INT VAL "X*Y*L*(P
I*Q-INT (PI*Q))"
 170 LET H=H+Q
 180 PRINT AT T+T,NOT J;"▣";Q;"▣
";H;"▣";F;".LRFB?"
 190 IF X*X+Y*Y>CODE "COS " THEN
 PRINT "▣▣▣▣";TAB -T
 200 INPUT I$
 210 PRINT AT (I$="L" OR I$="R")
+T*(I$="B"),(I$="F" OR I$="B")+T
*(I$="R");
 220 LET Q=VAL "16398"
 230 IF PEEK (PEEK Q+(256*PEEK (
Q+J)))<>NOT J THEN LET F=F-CODE
"▒"
 240 LET X=X+(I$="R")-(I$="L")
 250 LET Y=Y+(I$="B")-(I$="F")
 260 LET F=F-J
 270 IF F>-J THEN GOTO CODE "Z"
```

AN ADVENTURE game, *Wander*, uses limited graphics which will run on 1K machines. It is set in a circular maze with the usual interconnecting square rooms. Only one room—the one you are in—is displayed and alternate rooms contain gold, with your position in the maze being estimated from the amount of gold in nearby rooms.

The object of the game is to amass as much gold as possible and find an exit to the maze but with only 60 units of food—allowing up to 60 moves—you could well starve before finding an exit.

If you are desperate, walls can be clawed through but so exhausting is that operation that it uses 10 food units. One room is dialled at a time, showing the possible direction of exit and inputting, L, R, F, B indicates whether movement is required in a left, right, forward or backward direction.

The letters G, W and F indicate the amount of gold in the room, the total wealth accumulated so far, and the amount of food remaining.

To repeat the same maze in a subsequent game, set R to a particular value between 0 and 1.

Wander was submitted by Michael Orwin of London who intends to include it in a forthcoming book called *1K Wonders*. He also sells games cassettes for the ZX-81 and can be contacted at 26 Brownlow Road, Willesden, London NW10 9QL.

SUBJECT INDEX

SUBJECT INDEX sets up a Mini ZX-81 database designed to keep an index of magazine and book articles but it can be changed easily for other applications. The options available are to add a record, delete the last entry, list the records, search for a record and exit from the program.

On running the program, the screen displays a menu of commands, after having asked for a title for the index to be created. Using the Add option allows an item of information to be added to the index and prompts individually for article title, publication name, date and page reference.

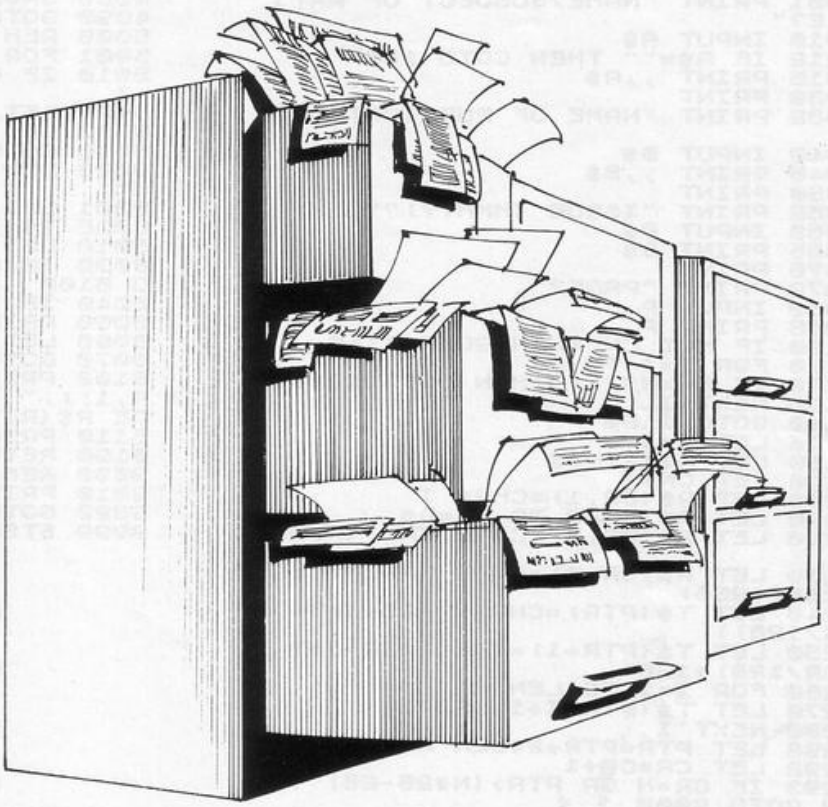
To return to the menu, enter an empty string for the title. When using List to display the contents of a file, the CONT instruction is required each time the screen is full and report code 5 occurs.

Using Exit offers the option of saving the file to cassette or ending the program. The Search option requests a keyword which in this version of the program is the article title. Search will also work on the first character or characters of the title.

The number of items which may be stored is governed by the value of N in line 15. A value of 350 is about the maximum which can be accommodated in 16K of memory but if a smaller number is used saving and loading time will be reduced.

Names of publications are limited to eight characters, so an abbreviation is required for longer names. Titles may be of any length but the array is dimensioned for an average of 25 characters per item.

Subject Index was sent in by Julian Moss of London.



```
  1 REM **************************
  2 REM *    SUBJECT   INDEX     *
  3 REM * AUTHOR: J. V. MOSS *
  4 REM **************************
 10 REM INITIALISE PROGRAM
 12 REM N IS NUMBER OF ITEMS
 15 LET N=350
 20 DIM R$(N,8)
 30 DIM T$(N*25)
 40 DIM N$(10,8)
 44 DIM B$(8)
 45 DIM X$(12)
 50 PRINT "SUBJECT?"
 60 INPUT S$
 80 LET PTR=1
 82 LET CN=0
 84 LET CR=1
100 REM DISPLAY MENU
105 CLS
110 PRINT TAB 8;S$;" INDEX"
120 PRINT AT 3,8;"A - ADD"
130 PRINT AT 6,8;"D - DELETE LA
ST ENTRY"
```

SUBJECT INDEX

```
  140 PRINT AT 9,8;"L - LIST"
  150 PRINT AT 12,8;"S - SEARCH"
  160 PRINT AT 15,8;"X - EXIT"
  200 PRINT AT 21,0;"?"
  210 INPUT C$
  215 CLS
  220 IF C$="A" THEN GOTO 1000
  230 IF C$="L" THEN GOTO 2000
  240 IF C$="S" THEN GOTO 3000
  250 IF C$="X" THEN GOTO 4000
  260 IF C$="D" THEN GOTO 5000
  290 GOTO 100
 1000 REM ADD ITEMS
 1001 PRINT "NAME/SUBJECT OF ARTI
CLE?"
 1010 INPUT A$
 1012 IF A$="" THEN GOTO 100
 1015 PRINT ,,A$
 1030 PRINT
 1032 PRINT "NAME OF PUBLICATION?
"
 1040 INPUT B$
 1045 PRINT ,,B$
 1050 PRINT
 1052 PRINT "ISSUE (MMMYY)?",
 1060 INPUT D$
 1065 PRINT D$
 1070 PRINT
 1072 PRINT "PAGE?",
 1080 INPUT P
 1085 PRINT P
 1100 IF NOT CN THEN GOTO 1145
 1110 FOR I=1 TO CN
 1120 IF B$=N$(I) THEN GOTO 1200
 1130 NEXT I
 1140 GOTO 1150
 1145 LET I=1
 1150 LET N$(I)=B$
 1190 LET CN=I
 1200 LET R$(CR,1)=CHR$ I
 1210 LET R$(CR,2 TO 6)=D$
 1220 LET R$(CR,7)=CHR$ INT (P/25
6)
 1230 LET R$(CR,8)=CHR$ (P-INT (P
/256)*256)
 1240 LET T$(PTR)=CHR$ (128+INT (
CR/128))
 1250 LET T$(PTR+1)=CHR$ (CR-INT
(CR/128)*128)
 1260 FOR I=1 TO LEN A$
 1270 LET T$(PTR+I+1)=A$(I)
 1280 NEXT I
 1290 LET PTR=PTR+2+LEN A$
 1292 LET CR=CR+1
 1293 IF CR=N OR PTR>(N*25-25) TH
EN GOTO 9000
 1295 CLS
 1298 GOTO 1000
 2000 REM LIST ROUTINE
 2005 LET I=1
 2010 GOSUB 8000
 2020 IF I<PTR THEN GOTO 2010
 2025 PRINT "PRESS N/L TO RETURN
TO MENU"
 2030 PAUSE 4E4
 2040 GOTO 100
 3000 REM SEARCH ROUTINE
 3010 PRINT "KEYWORD?"
 3020 INPUT C$
 3030 CLS
 3100 FOR K=1 TO PTR
 3110 IF T$(K)<>C$(1) THEN GOTO 3
190
 3120 FOR J=1 TO LEN C$-1
 3130 IF T$(K+J)<>C$(J+1) THEN GO
TO 3180
 3140 NEXT J
 3150 FOR I=K TO 1 STEP -1
 3152 IF CODE T$(I)<128 THEN NEXT
 I
 3160 GOSUB 8000
 3165 LET K=I-1
 3170 GOTO 3190
 3180 LET K=K+J
 3190 NEXT K
 3192 PRINT
 3193 PRINT "PRESS N/L TO RETURN
TO MENU"
 3195 PAUSE 4E4
 3198 GOTO 100
 4000 REM SAVE/EXIT ROUTINES
 4001 PRINT "SAVE (Y/N)?"
 4010 INPUT C$
 4020 IF C$="N" THEN GOTO 9999
 4030 LET X$=S$+"INDEX"
 4040 PRINT "TYPE NEWLINE WHEN RE
ADY"
 4050 INPUT C$
 4060 SAVE X$
 4090 GOTO 100
 5000 REM DELETE LAST ITEM
 5001 FOR I=PTR-1 TO 1 STEP -1
 5010 IF CODE T$(I)<128 THEN NEXT
 I
 5020 LET PTR=I
 5030 LET CR=CR-1
 5090 GOTO 100
 8000 REM SUBROUTINE "PRINT AN IT
EM"
 8001 LET R=128*(CODE T$(I)-128)+
CODE T$(I+1)
 8010 LET I=I+2
 8030 IF CODE T$(I)>=128 THEN GOT
O 8100
 8040 IF I>=PTR THEN GOTO 8100
 8050 PRINT T$(I);
 8060 LET I=I+1
 8070 GOTO 8030
 8100 PRINT TAB 8;"(";N$(CODE R$(
R,1));" ";R$(R,2 TO 6);", P.";CO
DE R$(R,7)*256+CODE R$(R,8);")"
 8110 PRINT
 8190 RETURN
 9000 REM ARRAYS FULL
 9010 PRINT "STORAGE FULL"
 9020 GOTO 4000
 9999 STOP
```

```
        INDEX

        A - ADD

        D - DELETE LAST ENTRY

        L - LIST

        S - SEARCH

        X - EXIT
```

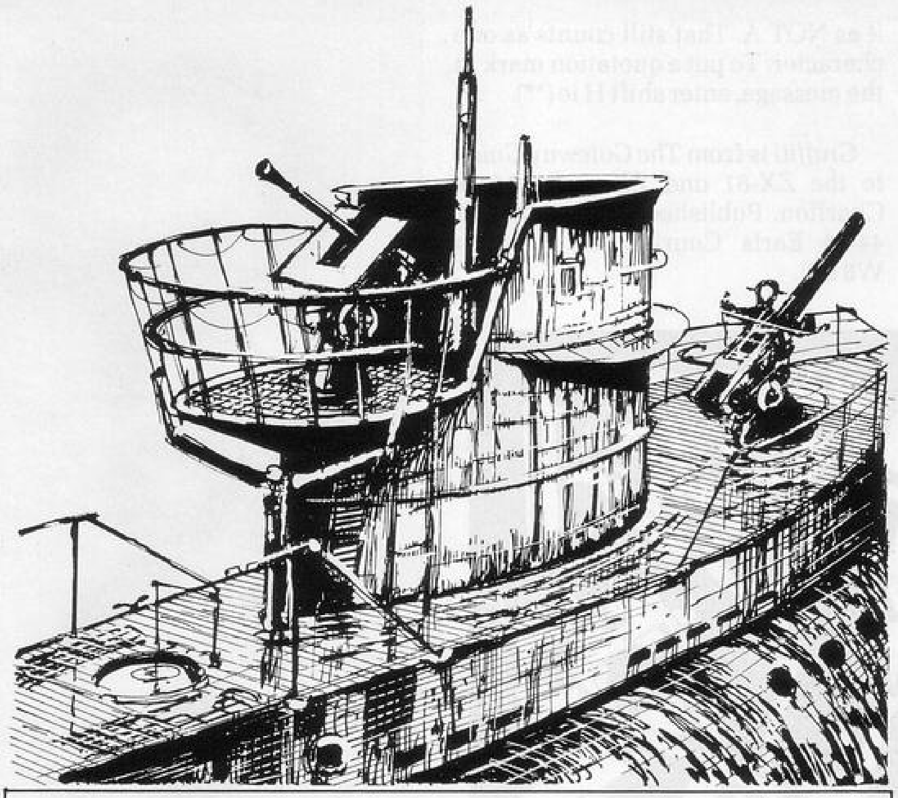
```
NAME/SUBJECT OF ARTICLE?
ADVENTURE PROGRAM
NAME OF PUBLICATION?
SINCLAIR
ISSUE (MMMYY)?  05/82
PAGE?           34


ADVENTURE PROGRAM
      (SINCLAIR 05/82, P.34)

PRESS N/L TO RETURN TO MENU
```

S UB CHASE is another 1K program submitted by the Lookers father and son team. In this, you are given a static destroyer in the top left-hand corner of the screen, while an enemy submarine travels from left to right across the screen.

Using the F key drops a depth charge and it must be dropped at precisely the right moment so that it scores a direct hit on the conning tower of the submarine.

Sub Chase gives you 10 submarines before the game ends and your score is displayed on the screen.

SUB CHASE



```
SUB CHASE       SCORE=0 OUT OF 1
 -▄█/ ▄/
_▀▀▀▀▀_____________________________



            O

          ▄▄█▄▄

   1 LET A=CODE " "
   5 LET B=CODE "█"
  10 LET C=CODE "▀ "
  15 LET D=CODE "?"
  20 LET P=B
  30 LET Q=CODE "▛"
  40 LET S=A
  50 PRINT "SUB CHASE"
  60 FOR Z=C TO Q+B
  70 FOR Y=CODE ";" TO B STEP -C
  80 PRINT AT B,A;"-▀▀▀▀▀▀▀▀------
--------------------";AT B-C,A;"
-▄█/ ▄/";AT D,Y-B;" ▄▄█▄▄ "
  90 IF P>B AND P<D THEN LET P=P
+C
 100 IF INKEY$="F" AND P=B THEN
LET P=P+C
 110 IF P=D AND Y=Q THEN GOTO CO
DE "COS "
 120 IF P>B THEN PRINT AT P-C,Q;
" ";AT P,Q;"O"
 130 IF P=D THEN PRINT AT P,Q;"
"
 140 IF P=D THEN LET P=B
 150 NEXT Y
 160 GOTO CODE ">="
 200 PRINT AT P-C,Q;" ";AT D,Y-B
;"BOOOOM"
 205 LET S=S+C
 210 LET P=B
 220 PRINT AT D,Y-B;"        ";AT
A,D;"SCORE=";S;" OUT OF ";Z
 230 NEXT Z
 240 PRINT AT D,Q+B;"GAME OVER"
```

GRAFFITI is written for a 1K ZX-80 and fills the screen with large letters; a 32-letter message can be fitted on to a 1K machine with four lines of eight characters each.

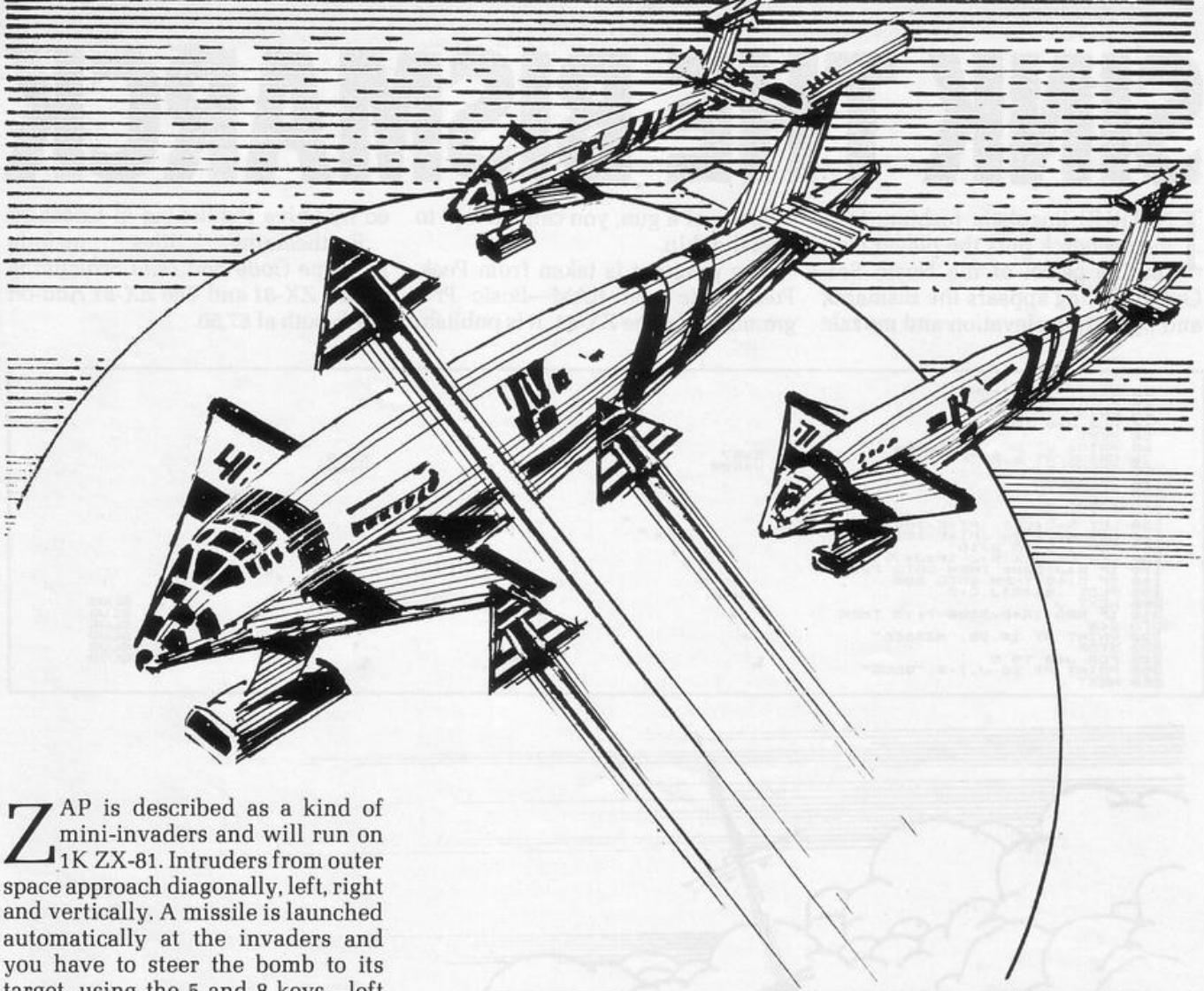
Messages are entered eight characters at a time and if an inverse letter is wanted, for example A, enter it as NOT A. That still counts as one character. To put a quotation mark in the message, enter shift H ie (**).

Graffiti is from *The Gateway Guide to the ZX-81 and ZX-80* by Mark Charlton. Published by Interface of 44-46 Earls Court Road, London W8 6EJ.

```
1Ø REM ØØØ5Ø483Ø7828886Ø6Ø8Ø287Ø384858Ø191A111
       ØØØ12131415ØØØ1161718ØØØØ14FE
3Ø FOR I=Ø TO 33
4Ø POKE 16427+I,16*PEEK(16427+2*I)+PEEK(16428+2*I)+36
5Ø NEXT I
6Ø POKE 16457,118
```

RUN this, then enter:

```
2Ø INPUT A$
3Ø POKE 16421,24
4Ø IF A$="" THEN STOP
5Ø FOR I=Ø TO 3
6Ø LET C=Ø
7Ø FOR J=1 TO 8
8Ø LET X=Ø
9Ø LET C=C+1
1ØØ LET L=PEEK(16719+C)
11Ø IF L-219 THEN GO TO 14Ø
12Ø LET X=128
13Ø GO TO 9Ø
14Ø IF L>99 THEN LET L=PEEK(16227+L)
15Ø FOR K=Ø TO 3
16Ø PRINT CHR$(PEEK(16427+((PEEK(2*I+8*L+3584)
    /4**(3-K) AND 3)+(PEEK(2*I+8*L
    +3585)/4**(3-K) AND 3)*4))+X);
17Ø NEXT K
18Ø NEXT J
19Ø NEXT I
2ØØ RUN
```



ZAP

ZAP is described as a kind of mini-invaders and will run on 1K ZX-81. Intruders from outer space approach diagonally, left, right and vertically. A missile is launched automatically at the invaders and you have to steer the bomb to its target, using the 5 and 8 keys—left cursor and right cursor.

Ten invaders are launched and then the program tells you how many you stopped. When familiar with the game try changing line 130 to IF C + H AND M = P THEN GOTO 200.

Zap is from *The Gateway Guide to the ZX-81 and ZX-90* by Mark Charlton. Published by Interface of 44-46 Earls Court Road, London W8 6EJ.

```
10    LET S = 0
20    LET M = 14
30    FOR Z = 1 TO 10
40    LET C = 20
50    LET R = INT(RND*3)
60    LET P = 13 - (12 AND R = 0) +
      (12 AND R = 2) + INT(RND*5)
70    LET P$ = "P" +("+1" AND R = 0)
      +  ("- 1" AND R = 2)
80    FOR H = 4 TO 21
90    LET P = VAL P$
100   LET M = M +(1 AND INKEY$ = "8") -
      (1 AND INKEY$ = "5")
110   CLS
120   PRINT AT 21, M - 1;"graphic shift three
      graphic space graphic shift four";AT H,
      P - 1;"graphic shift three graphic shift
      seven graphic shift four";AT C,M;"*"
130   IF C = H AND M > P - 2 AND M < P + 2
      THEN GOTO 200
140   LET C = C - 1
150   NEXT H
160   CLS
170   NEXT Z
180   PRINT AT 10,0;LANDED:10",,"STOPPED:";S
190   STOP
200   LET S =  S + 1
210   PRINT AT H - 1,P;"*";TAB P - 1;
      "***";TAB P;"*"
220   LET Z = Z - 1
230   LET C = 20
240   GOTO 170
```

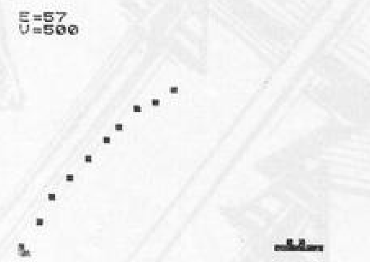
SINK THE BISMARCK

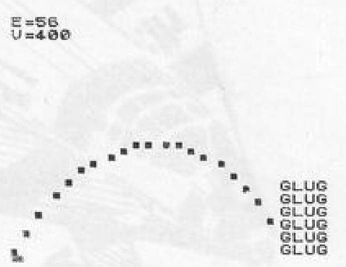
IN TRUE jingoistic fashion, *Sink the Bismarck* puts the player on a routine patrol of the North Sea. Out of the fog appears the Bismarck and by setting elevation and muzzle velocity of a gun, you can attempt to sink the ship.

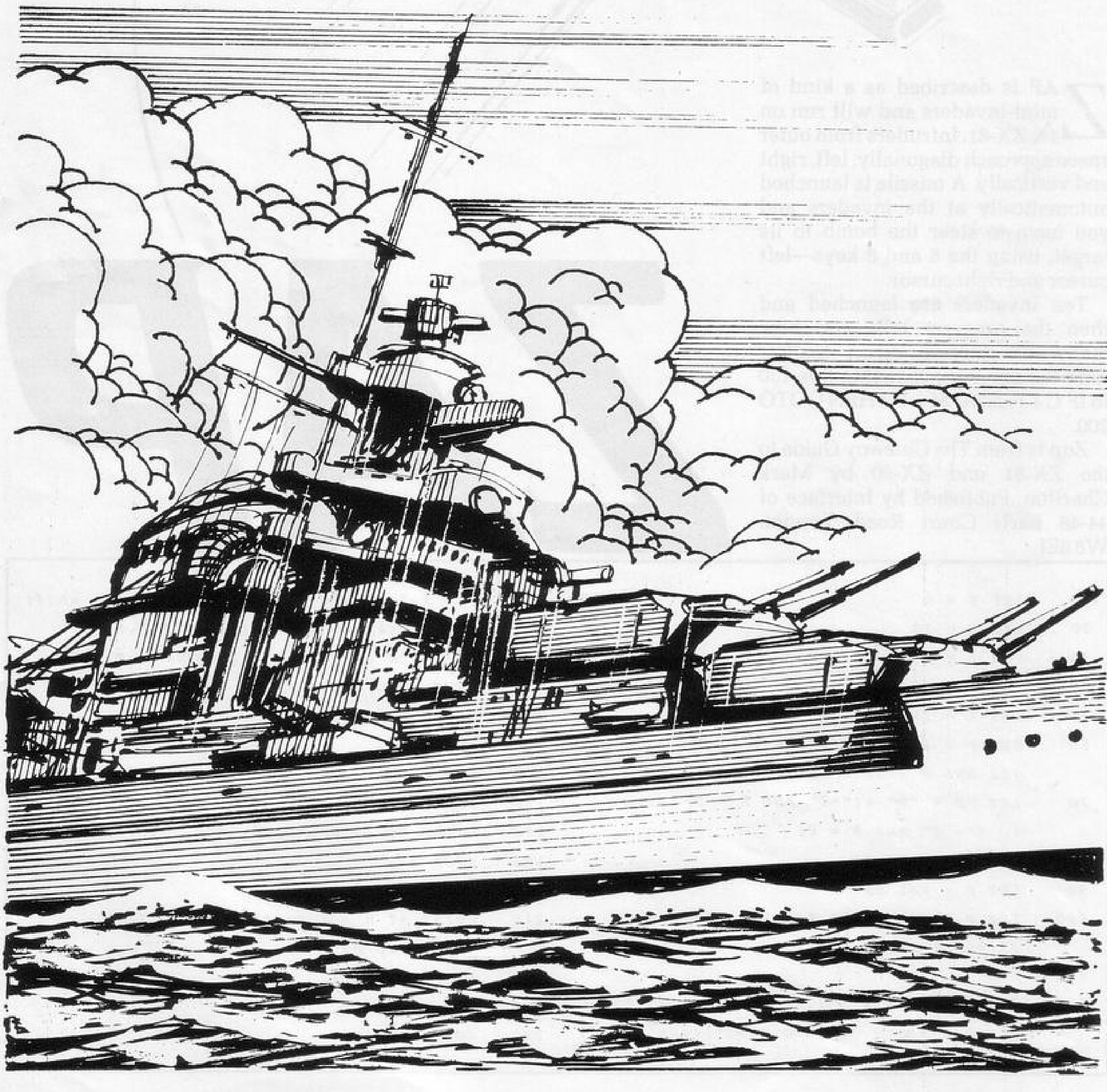
The program is taken from *Peek, Poke, Byte and RAM—Basic Programming for the ZX-81*. It is published by Shiva Publishing of Cheshire.

Forthcoming titles include *Machine Code and Data Structuring for the ZX-81* and *The ZX-81 Add-on Book*, both at £7.50.

```
 10 LET T=13*(1+RND)
 20 PRINT AT 21,0;
 40 PRINT "▀▀";
 45 FOR J=0 TO 5
 50 NEXT J
 60 PRINT AT 20,T-2;"▄█▄▄"
 70 PRINT AT 2,0;"E=";
 80 INPUT E
 90 PRINT E
100 PRINT "V=";
110 INPUT V
120 PRINT V
130 LET A=V*COS (PI*E/180)
140 LET B=V*SIN (PI*E/180)
150 FOR J=0 TO B/16
160 LET C=.01*(B*J-16*J*J)
170 IF A*J>6200 THEN GOTO 220
180 IF C>40 THEN GOTO 200
190 PLOT .01*A*J,C+2
200 NEXT J
210 IF ABS (A*B/3200-T)<3 THEN
GOTO 240
220 PRINT AT 10,20;"MISSED"
230 STOP
240 FOR J=0 TO 5
250 PRINT AT 20-J,T-2;"GLUG"
260 NEXT J
```







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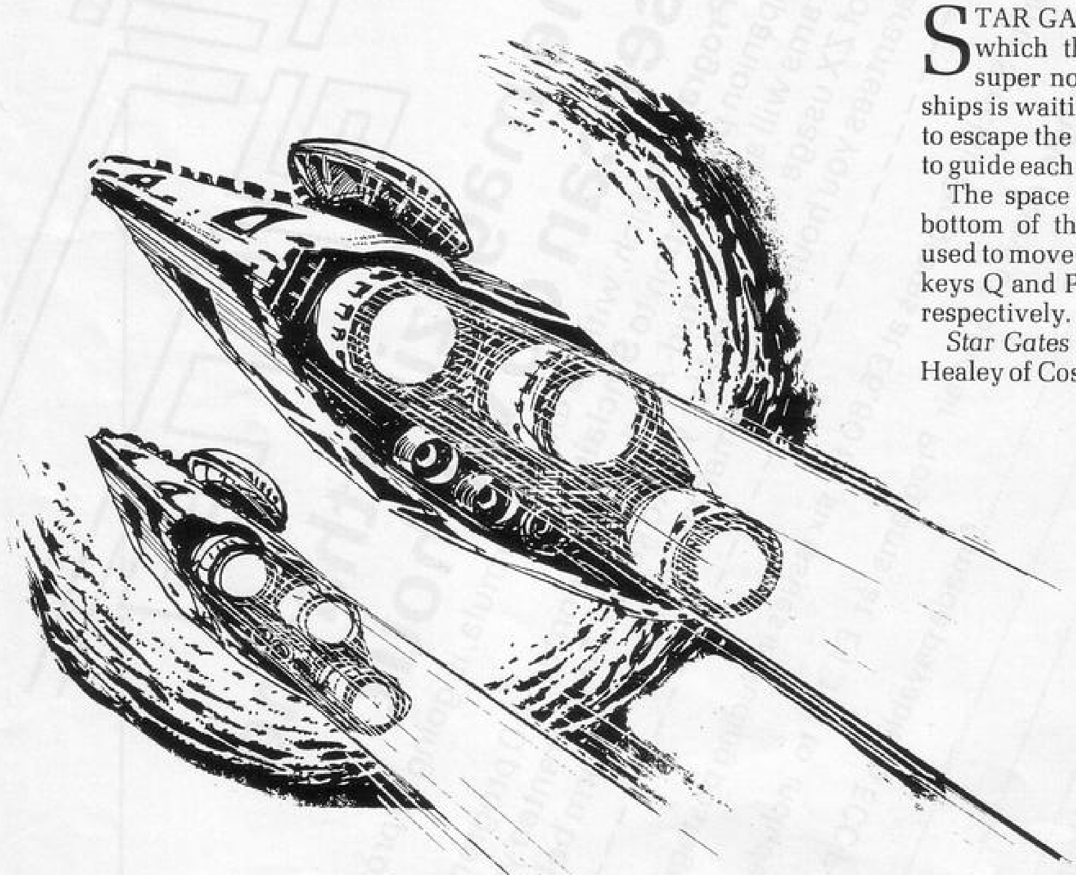
```
 10 LET A=PI/PI
 20 LET B=PI-PI
 30 LET R=B
 40 LET V=600
 50 LET S=20
 60 LET T=15
 70 LET Y=15
 80 CLS
 90 LET X=INT (RND*25)
100 PRINT AT Y,X;"[illegible]"
110 PRINT AT S,T;"[illegible]"
120 PRINT AT  S+A,T+A;"[illegible]"
130 LET V=V-A
140 IF INKEY$="Q" THEN LET T=T-
A
150 IF INKEY$="P" THEN LET T=T+
A
160 IF INKEY$="1" THEN LET S=S-
A
170 IF T<B THEN LET S=S-A
180 IF T>25 THEN LET T=25
190 IF V=B THEN GOTO 500
200 IF S=B THEN GOTO 350
210 IF T=X AND S=Y-A THEN GOTO
300
220 IF S=Y-A AND T<>X THEN GOTO
50
230 GOTO 110
300 LET Y=Y-5
310 GOTO 80
350 LET R=R+A
360 GOTO 50
500 CLS
510 PRINT AT 10,11;"GAME OVER"
520 PRINT AT 12,11;R
```

STAR GATES

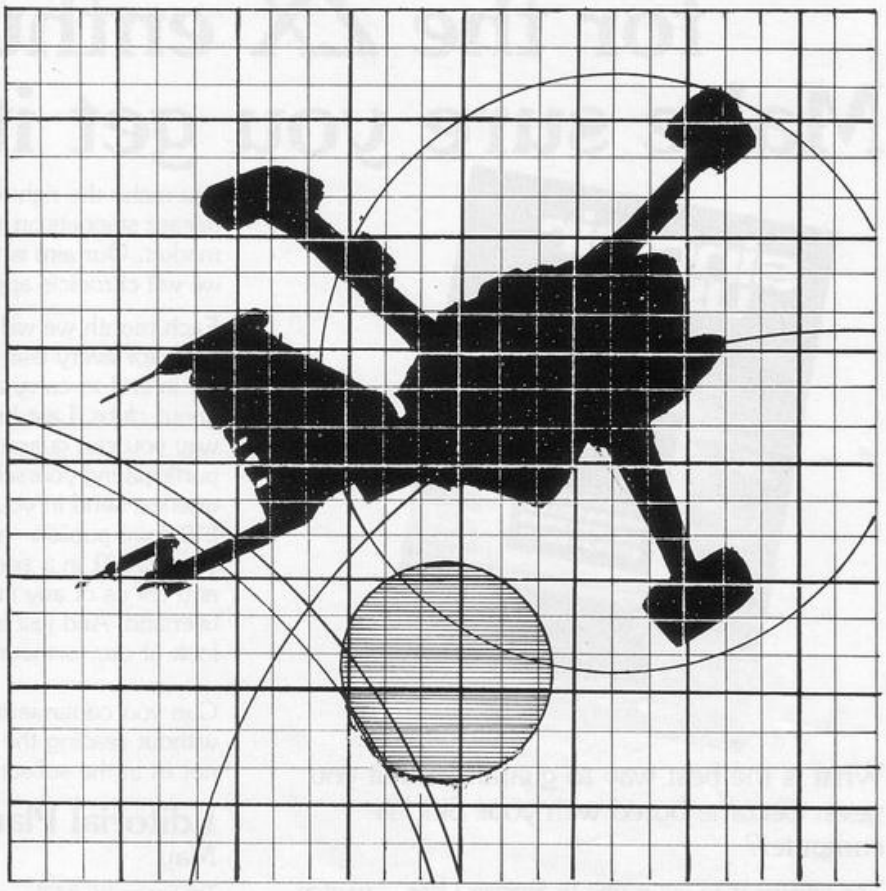


STAR GATES is a 1K program in which the sun is about to go super nova and a fleet of space ships is waiting to depart from Earth to escape the holocaust. The object is to guide each ship through star gates.

The space ship is situated at the bottom of the screen and key 1 is used to move vertically upwards and keys Q and P to move left and right respectively.

Star Gates was submitted by D E Healey of Coseley, West Midlands.

Space Shootdown



SPACE SHOOTDOWN, by G L J Tily, provides a test of your skill in estimating distance and angles. Play the game a few times and you will be amazed at how clever you become at estimating correctly.

Your base is at the bottom left of the screen. The invader is the black piece. Your task is to shoot it down in as few shots as possible. First enter the angle of the ship from your base, or as good a guess as you can estimate, then enter the distance from your base. Remember that the screen is 63 units across. You will get a satisfying BOOM when you get the two figures correct.

```
 10 LET C=0
 20 LET K=0
 30 LET X=INT (RND*50)
 40 LET Y=INT (RND*37)
 50 PLOT X,Y
 60 PRINT AT 21,0;"
                   "
 70 PRINT AT 21,1;"■"
 80 IF K=1 THEN GOTO 270
 90 INPUT A
100 LET A=A/180*PI
110 INPUT R
130 LET C=C+1
140 LET X1=INT (R*COS A)
150 LET Y1=INT (R*SIN A)
170 PRINT AT 1,1;"A: ";A*180/PI
;" R: ";R;" SHOTS ";C
180 FOR U=-2 TO 2
190 FOR Z=-2 TO 2
200 IF X1+U=X AND Y1+Z=Y OR X1+
Z=X AND Y1+U=Y THEN LET K=1
210 IF K=1 THEN GOTO 60
220 NEXT Z
230 NEXT U
240 UNPLOT X1-1,Y1-1
250 PRINT "*"
260 GOTO 60
270 UNPLOT X-1,Y-1
280 PRINT " BOOM"
```

This runs on a 1K ZX-81, and the program is copyright © G Tily, 1981.

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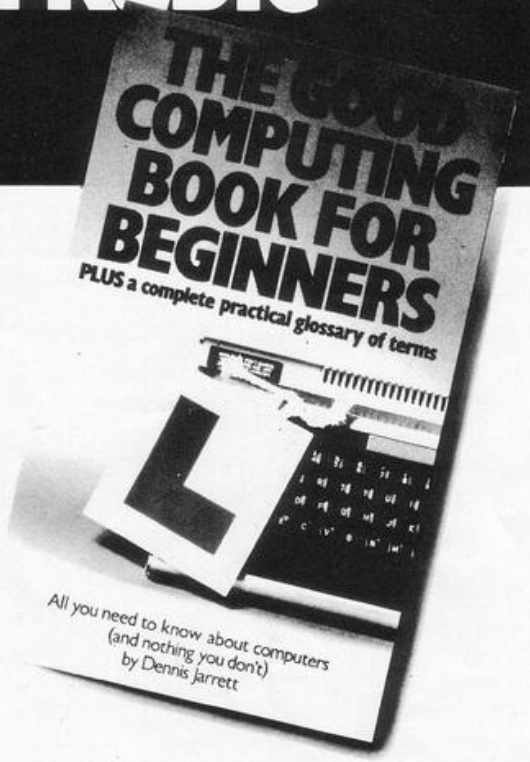

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