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Contents

[illegible]

ZX-81 16K

8 SURROUND
12 KNIGHT'S MOVE
12 CHANNEL CROSSING
16 BARRIERS
20 SHOOTING RANGE
27 ALIEN LURE
28 UNIVERSAL PATTERNER
33 TRUE OR FALSE
38 BINOMIAL DISTRIBUTION
41 CHESSBOARD
42 GOLF
44 MULTIPLICATION TRAIN
46 TREASURE HUNT
50 ALPHABET
51 MEMORY
56 PHYSICS
58 MIS-WIRED
60 TWO'S UP
67 HORSE RACE
70 HANGMAN
72 TOAD IN THE HOLE
74 ONE-ARMED BANDIT
76 COVER THE BOX
78 GHOST TRIGGER
80 DIAMETERS
84 OUTLAW
86 LINEAR REGRESSION
88 CONSTELLATIONS
92 GRUB RACE
96 [illegible]
100 KINGDOM
101 3D NOUGHTS AND CROSSES
105 SCROLLS
107 HIGHER LOWER
108 WORD PUZZLER
110 BREAKOUT
111 CHORDS
114 SMASH
116 PONTOON
118 SPEARMAN'S RANK
122 [illegible]
125 WORD PROCESSOR
126 ADDING MACHINE
127 UTILITY DRAW

XZ-80

14 HANGMAN
40 HEXLOADER
42 OL' FAITHFUL
46 BEAN CUP
128 NUMBERBOARD

ZX-81 1K

10 LASER CANNON
14 ROCKET ATTACK CLOCK
15 SHARP SHOOTER
19 TREASURE HUNT
22 COMPOUND INTEREST OWZAT
27 BOMB
36 CLIMBER
39 STAR GATE
43 BOMB RUN
53 HOT PURSUIT FRUIT GUARD
58 AIR SEA RESCUE
61 BUILDER SKITTLES
64 ALPHABET
66 KEYBOARD STICKS AND STONES
69 QUADRATIC EQUATION
72 3D HUNT
73 CHARACTER MAKER
75 STOPPING DISTANCE
82 MUSIC MACHINE
90 I FACTORS BLACK HOLES
94 U.K. MAP
99 SIMON
110 WIPE OUT GRIPS
117 COMPUTER COMBAT
118 MONSTER MATHS
120 JACKPOT
130 BOWLING

SPECTRUM

8 BIORHYTHMS
17 PAINTPAD
19 SKY SHOOT
20 SPIDERS
27 CLOCKMAN
40 KALEIDOSCOPE
49 GRAPHIC GENERATOR
54 DROP 4
59 15 PUZZLE
66 WORM GAME
75 PIE CHART
80 JELLYBEANS
82 JUGGLER
48 CUBE
100 SHOPPING LIST
111 MAKING WAVES
124 ROCKET ATTACK

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[illegible]

[illegible]

[illegible]

ZX SPECTRUM: 16/48K

[illegible]

3D TUNNEL [illegible]

3D TANX [illegible]

WINGED AVENGER [illegible]

GROUND ATTACK [illegible]

CENTIPEDE [illegible]

ESCAPE [illegible]

GULPMAN [illegible]

COSMOS [illegible]

FAUST'S FOLLY [illegible]

OTHELLO [illegible]

ZX81 OWNERS!

[illegible]

WINGED AVENGER	[illegible]	PIMANIA	[illegible]
OTHELLO	[illegible]	[illegible]	[illegible]
BLACK CRYSTAL	[illegible]	GREAT BRITAIN LTD	[illegible]

[illegible]

48K SPECTRUM ONLY

[illegible]

PIMANIA [illegible]

TIMEGATE [illegible]

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[illegible]

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[illegible]

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[illegible]

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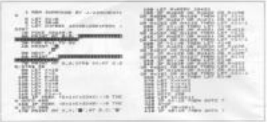


SURROUND

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

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

Black uses keys 1-4 to move up, Z/X to move down, [illegible] for right and A/G for left. Grey uses the keys 8,9 for up, Y,P for right, B,M for down and H,ENTER/NEWLINE for left. After a crash the other player scores one, the winner is the first to reach 11.

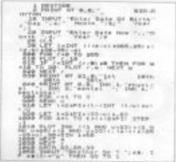
This routine involving two players is particularly [illegible] for use in many graphics games. [illegible] of London [illegible] submitted the program for the ZX-81.

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

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

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

The program was submitted by R. Clark of [illegible].



```
   1 RESTORE
   2 PRINT AT 0,0;"          BIO-R
HYTHMS"
  10 INPUT "Enter Date Of Birth"
'"Day ";a;"   Month ";b;"   Year
";c
  20 INPUT "Enter Date Now ";"M
ONTH ";d;"   Year ";e
  25 CLS
  30 LET l=INT ((e-c)*365.25)+(
[illegible]
 500 FOR r=0 TO 255
 510 PLOT r,10
 515 IF r=INT (r/8)*8 THEN FOR w
=10 TO 20: PLOT r,w: NEXT w
 540 NEXT r
 550 PRINT AT 21,0;"1st        10th
      20th       30th"
 600 PRINT AT 0,0; INK 1;"physical
 ";   INK 2;"mental  "; INK 4;
"emotional"
 900 FOR c=1 TO 3
 905 READ u
 910 LET t=2*PI*(l/u-INT (l/u)*u
)/u
 920 LET s=2*PI*(33-u)/8.8
1000 FOR x=t TO t+(4*PI) STEP
.1
1010 PLOT INK (1 AND u=23)+(2 AND
 u=28)+(4 AND u=33);[illegible]
-[illegible]
1020 NEXT x
1030 NEXT c
1040 DATA 23,28,33
1050 INPUT "Another Go ? ";a$: I
F a$(1)="y" THEN GO TO 1
```

BIO-RHYTHMS

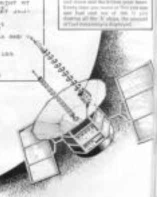
LASER CANNON

```
  10 LET A=0
  20 LET J=300
  30 LET X=10
  40 LET U=0
  50 LET X=INT (RND*8)+3
  60 LET A=A+1
  70 IF A=21 THEN GOTO 260
  80 LET Y=10
  90 PRINT AT X,0;CHR$ 128;CHR$
135;AT X,Y;"X"
 100 IF Y<0 THEN GOTO 150
 110 IF INKEY$="7" THEN LET X=X-
1
 120 IF INKEY$="6" THEN LET X=X+
1
 130 IF INKEY$="0" THEN PRINT AT
X,1;"++++++++++++++++++++"
 140 IF INKEY$<>"" THEN LET J=J-
5
 150 LET Y=Y-1.5
 160 IF Y<0 THEN LET U=U+1
 170 IF U=5 THEN GOTO 240
 180 IF Y<1 THEN GOTO 50
 190 IF INKEY$="0" AND X=A AND Y
>=1 THEN GOTO 220
 200 CLS
 210 GOTO 50
 220 PRINT AT X,Y+1;CHR$ 189
 230 GOTO 60
 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 [illegible] of Moortown. "You must destroy at least 15 of them or be destroyed."

The cannon moves across you up and down and the 0 fires your laser. Every time you move or fire you use one fuel unit out of 300. If you destroy all the 'X' ships, the amount of fuel remaining is displayed.



KNIGHT'S MOVE

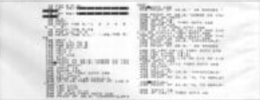
KNIGHT'S MOVE uses the movement pattern of the Knight in chess to try to cover every space in a square. The program asks where you wish to start on the board, giving the vertical coordinate first, and then marks the moves as you make your way round the board.

There is a check routine to make sure you cannot cheat by making an incorrect move or land more than once on the same square. When no more squares can be visited, [illegible] is the number for the next square.

Press NEW LINE to replay the game or any other key and NEW LINE to end the game.

The graphics in line 26 are the capital C inversed with two inversed [illegible] between each. In line 40 the dashes are replaced by inversed spaces.

Knight's Move was sent by K W [illegible], of [illegible], Cornwall, and needs 16K RAM.



TWO GERMAN readers have sent us excellent game inspired by a trip across the Channel on the way to a holiday in England.

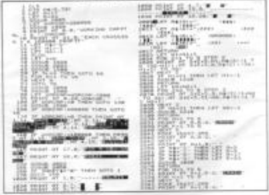
You are the manager of a ferry company. You have a working capital of £100,000 and your job is to double it. Running costs are steadily depleting your resources, but you make a profit of £10,000 on every trip.

As our two readers noticed, the Channel is extremely crowded and one of the major hazards you face is the frequent collisions which return you immediately to your point of departure. Only a steady hand on the tiller—that is, keys 5 to 8—can save your time and money.

A great game which has fascinated half the office for days. Take care, as you will, as our German readers have phrased it, "have to declare the bankrupt".

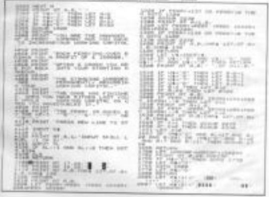
Channel Crossing was sent in by Sparre and Henrik Walter of Hanover.

CHANNEL



OAN!
GROO!
MOAN!
BARF!

CROSSING

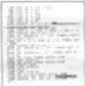


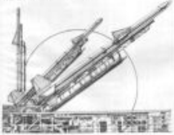
ROCKET ATTACK

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 F 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 [illegible] Healey of Coseley, West Midlands.



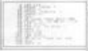


CLOCK

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 10.00 will appear as [illegible].

According to author [illegible] of [illegible] the clock is accurate to a few seconds a day. To start, type [illegible] and when prompted, put in the hour and then the minutes. Line [illegible] is not part of the program. It will run on 1K machines.

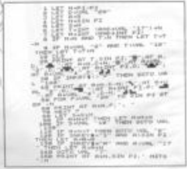


SHARP SHOOTER

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

You are the black-hatted villain confronting a posse of lily-livered bounty hunters. An inverted U represents the deputy badge on their trembling chests. You are armed with a Colt six-shooter (what?) which you fire with the F key. When the gun is fired the outlaw falls into a very effective crouching position.

Manoeuvre the cowpoke up with key I and down with A. (16K ZX-81)



HANGMAN

G. CELL of Westerham, Kent has produced a game of **Hangman** which can be played on the ZX-80. The program, as written, contains a set of 13 six-letter words which it chooses at random and the player has to guess it, losing one life out of 16 each time an incorrect guess is made.

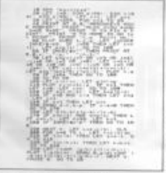
If the player guesses correctly, the screen shows "Well done, that is it". If you run out of lives it says "You are dead".

The line of words can include a total of about 78 letters, so that other combinations, such as 14 words of five letters each, can be used. If other groups are used it is necessary to change line 6. If the case of 14 words of five letters it would read
15 LET A=20*RND(14)-17.

```
[illegible]
```

[illegible]

PAINTPAD



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 50 vertices but that limit can be changed by altering the number 50 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 140 and PAUSE 0 in line 120 are omitted, a complex shape can be built up in successive runs, as it resets itself at the end of each run.

With the two comments 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 SCREEN$.

Submitted by John McKenna of Upminster, Essex.

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, [illegible] will not. The width of a letter can be changed by altering line 80 e.g. by inserting FOR [illegible] the width.

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

```
   1 REM "BANNERS"
  10 DIM Q$(64)
  20 INPUT M$
  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$(C)-128)
  65 FOR Y=1 TO 7
  70 LET J=PEEK (7680+(8*CODE A$)+
Y)
  80 FOR X=1 TO 8
  90 LET Z=J/2
 100 IF Z=INT Z THEN GOTO 800
 110 LET Q$((X*8)+Y)="■"
 115 IF CODE M$(C)>63 THEN LET Q
$(X*8+Y)=" "
 120 IF X*8+Y=64 THEN GOSUB 900
 130 LET J=INT Z
 140 NEXT X
 150 NEXT Y
 160 NEXT C
 170 SLOW
 180 GOTO 1010
 800 LET Q$((X*8)+Y)=" "
```

```
 800 IF CODE A$(C)>63 THEN LET C
$=A$(C)+"@"
 810 GOTO 120
 900 FOR G=8 TO 1 STEP -1
 910 FOR F=1 TO 8
 920 FOR E=7 TO 0 STEP -1
 930 IF D$(E*8+F)="1" THEN LPRINT
 "[illegible]";
 940 IF D$(E*8+F)="0" THEN LPRINT
 " ";
 950 NEXT E
 960 NEXT F
 970 NEXT G
 980 RETURN
1000 SAVE "BANNER"
1010 CLS
1020 PRINT TAB 8;"[illegible]"
1030 PRINT TAB 8;"**********"
1040 PRINT ,,"THIS PROGRAM WILL
 PRINT ON THE ZX PRINTER LETTER
S AND SYMBOLS 8" HIGH IN THE F
ORM OF BANNERS"
1050 PRINT ,,"THE LENGHT OF THE
 BANNER IS UP TO YOU. ENTER BEL
OW AND PRESS NEW LINE"
1060 PRINT ,,"LETTERS AND GRAPH
ICS WILL WORK. FUNCTIONS WILL NO
T"
1090 GOTO 10
```

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

SHOOTING RANGE

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

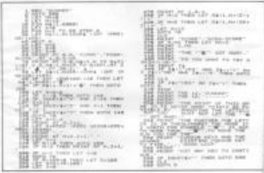
The letters have values ranging from one for A to 26 for Z and the aim is to achieve as high a score as possible. A time limit is imposed by a grey square which travels along the row of letters and the game ends if it is not shot down before reaching the end of the row.

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 [illegible].

The gun is moved to the right and left by the cursor keys and the upward cursor key [illegible] is used for firing. Graphics users.

Line [illegible] is a shifted Q with a space on either side and shifted [illegible] with a space on either side; the grey square is a [illegible] and the double quotes throughout have a space between them except for line [illegible].



TREASURE HUNTER

TREASURE HUNTER is a clever little game in which a hunter, directed by an asterisk, has to find treasure which is hidden at a random position on the screen. The only assistance given to the hunter is that he is told when he is getting warmer.

It can be very annoying when, [illegible], you seem to be getting warmer but cannot find the exact location of the treasure. When the correct spot is found the number of steps taken is shown on the screen, along with the program's view of the optimum number.

The first attempt by the Sinclair Programs reviewer resulted in [illegible] steps taken against an optimum of [illegible]. That later improved to an optimum of [illegible].

The hunter is moved by using the cursor keys but no arrow [illegible] so that if you go to the edge of the screen you bounce back so that the left and right keys and the up and down keys can become reversed.

Treasure Hunter was sent by P Brown of Chesterfield, Derbyshire.

```
  10 REM TREASURE HUNT BY P BRO
WN
  20 LET P=PI-PI
  30 LET Q=PI-PI
  40 LET L=INT (RND*VAL "15")+VA
L "1"
  50 LET C=INT (RND*VAL "31")+VA
L "1"
  60 LET S=0
  70 LET UP=P
  80 LET DN=Q
  90 LET P=P+(INKEY$="6")-(INKEY
$="7")
 100 LET Q=Q+(INKEY$="8")-(INKEY
$="5")
 110 CLS
 120 PRINT AT P,Q;"*"
 130 LET S=S+PI/PI
 140 IF P=L AND Q=C THEN GOTO VA
L "210"
 150 LET G=L-P
 160 LET H=C-Q
 170 LET F=L-UP
 180 LET J=C-DN
 190 IF ABS G+ABS H<ABS F+ABS J
THEN PRINT AT 0,0;"WARMER"
 200 GOTO VAL "70"
 210 PRINT AT L,C;"X"
 220 PRINT "LOOT FOUND IN ";S;"
STEPS"
 230 PRINT "OPTIMUM ";L+C-VAL "1
```

COMPOUND INTEREST

```
   5 CLS
  10 PRINT "ENTER PRINCIPLE IN P
OUNDS"
  20 INPUT P
  30 PRINT "ENTER TIME IN YEARS"
  40 INPUT T
  50 PRINT "ENTER RATE PER ANNUM
"
  60 INPUT R
  70 PRINT
  80 PRINT "ENTER ""SI"" FOR SIM
PLE INTEREST"
  90 PRINT
  95 PRINT "ENTER ""CI"" FOR COM
POUND INTEREST"
 100 INPUT A$
 105 CLS
 110 IF A$="SI" THEN GOTO 150
 120 LET I=P*((1+R/100)**T)-P
 130 GOTO 200
 150 LET I=P*R*T/100
 200 PRINT "INTEREST=£";I
 202 PRINT
 205 PRINT "TOTAL=£";I+P
 208 PRINT
 210 PRINT "IS THAT ALL? Y OR N
"
 220 INPUT B$
 230 IF B$="N" THEN RUN
```

IF YOU dread having to work out compound interest, this program is for you. It works out the compound interest automatically once it has been told the principal, the rate of interest and the number of years to be considered. It can also work out simple interest problems.

A short program, fitting into the 1K ZX-81, it was sent by Stephen Smith, of Barnsley, South Yorkshire. He says it is useful helping him with his homework.

OWZAT

A SIMPLE GAME based on the famous cricket dice game, Owzat, simulates a simple form of the complex national game. Once running, it runs automatically through until a team of 10 bats [illegible] players is out and gives the total score. The game is repeated to find the score of the opponents.

The problem which [illegible] is to find a way of simulating Owzat and not-out once an appeal has been made. Because of this it is not known which [illegible] until one is allowed and the total [illegible] is given.

Owzat fits into 1K ZX-81 and was sent by Nick Crisp of Burton-on-Trent, Staffordshire.

```
   1 LET T=0
   2 LET W=0
  10 FOR I=1 TO 10
  20 PRINT AT I+1,0;I;"   ";W;TAB
[illegible]
  30 LET S=INT (RND*6)+1
  40 IF S=6 THEN GOTO 100
  50 LET W=W+S
  60 LET T=T+S
  62 PRINT
  65 PRINT
  70 GOTO 20
  75 LET W=0
  80 NEXT I
  90 STOP
 100 PRINT "OWZAT"
 110 LET U=INT (RND*6)+1
 115 FOR X=1 TO 50
 117 NEXT X
 120 IF U=1 OR U=6 THEN PRINT "N
OT OUT"
 140 IF U=2 OR U=4 OR U=5 OR U=3
THEN PRINT "OUT"
 145 IF U=1 OR U=6 THEN GOTO 30
 150 SCROLL
 151 SCROLL
 155 IF U=2 OR U=4 OR U=5 OR U=3
THEN GOTO 75
```

ALIEN LURE

A GAME which links the frog-hopping type of program with a battle against alien invaders has been produced by [illegible] of [illegible], [illegible].

When the game begins, the player is asked for a skill level, A or P, which stand for amateur or professional. It is advisable to start on the amateur level while the player begins to understand this complex game.

A small grid is shown at the bottom left-hand corner of the screen in which three and four aliens, shown as X and I, with a soldier (*). The soldier has to dig a hole (O) and then lure the aliens into it, scoring 100 points for every X and 200 for every I.

The hole is dug by going into dig mode, pressing 5 and pressing the cursor key for which side of the soldier you wish to place the hole. The soldier can then be moved by pressing 0 to return to movement mode and using the cursors in their normal directions.

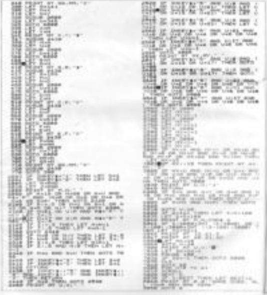
A soldier can be killed either by falling into his own hole or being eaten by an alien. The game lasts for the lives of three soldiers, although an extra soldier can be gained by scoring more than 1,000.

Two other limitations are that only one hole can be dug at a time and a hole cannot be dug beneath an alien. Once an alien has fallen into a hole it is filled immediately and the game continues.

Even after playing for more than an hour at the amateur level, neither of Sinclair Programs managed to score more than 1,000.

```
[illegible]
```

```
[illegible]
```



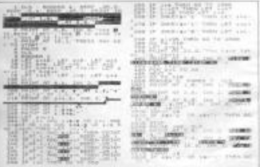
SKY SHOOT

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

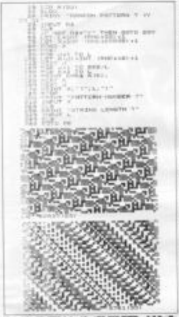
You have four targets — which you must destroy in as economically short time.

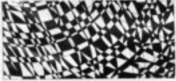
Move left with 1, right with q and fire with [illegible].

A challenging game from David Pryce of [illegible], [illegible], which proved too difficult for [illegible] [illegible] reviewers.



UNIVERSAL PATTERNER





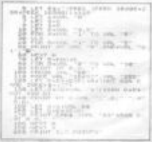
UNIVERSAL PATTERNER for the ZX-81 generates and pr designs patterns at random. Author W. S. Hearn of Elford, Essex states that more than two million designs can be printed on the screen.

Each pattern has a number and string length printed at the bottom so can be recalled and adjusted later those numbers. Answer Y for when asked if a random pattern is required and then input the numbers.

BOMB

THE IDEA of Bomb is to bomb [illegible] 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 [illegible] may be removed by deleting lines 100 and 110. Bomb was submitted by David [illegible].



DIGGE

```
[illegible]
```

R!

```
N 4
 TH
D 4
 THE

N 4

N 4

N 1
N 1
 IN

PAPER

:  IN

SET
   IN
 CHR
 AT)

, FLA
  INK
TO PAP

 TO 5:

T 4
1,207,
08,24,
200,10
7,187,5
,60,60
```

DIGGER is an excellent arcade-style game for the 16K Spectrum. It is based on an already popular routine and requires you to take your user-defined man up several ladders to the treasure chamber on the top floor.

When you arrive, the CARRYING sign will flash, indicating that the man has picked up a bag of gold. There are three bags to retrieve, but it will be a very skilful player who can grab them all, because there is a snag — a hungry but stupid beast concerned to eat you.

Evade the monster if you can, or dig a hole which you can trap, but be careful, by pressing the 0 key. Meanwhile your oxygen supply is diminishing rapidly.

This is a very professional-looking routine, though there are two possible improvements to keep the interest increased. It was submitted by Stephen Latimer, of Beaconsfield, Bucks.

Graphics notes:
100—Graphic A
130—Graphic H
160—Graphic D
330—Graphic B
500—Graphic C
760—Graphic shifted 5

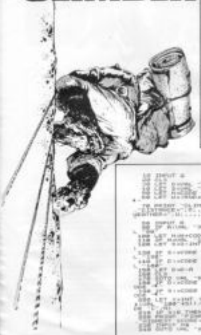
CLIMBER

YOUR AIM is to climb a 1,000-metre mountain in 10 days. If you fail to finish in the allotted time or you 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 15 to zero, and the weather on a scale of [illegible] up to 10.

As group leader you must enter the distance you wish to travel on that day, the maximum being 100 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, suggests that his best result is 311. The program runs on a 1K ZX81. Graphics notes: [illegible]



```
  10 INPUT A
  20 CLS
  30 LET D=VAL "1000"
  40 LET S=VAL "15"
  50 LET M=CODE "[illegible]"
  60 LET W=INT (RND*CODE "[illegible]")+CODE "
[illegible]"
  70 PRINT "CLIMBING DAY ";M,,"
DISTANCE=";D,,"SUPPLY=";S,,"
WEATHER=";W,,,,"ENTER DISTANCE"
  80 INPUT R
  90 IF R>VAL "100" THEN GOTO VAL
 "80"
 100 LET M=M+CODE "[illegible]"
 110 IF M=VAL "11" THEN STOP
 120 LET S=S-INT ((R+W)/CODE "C"
)
 130 IF S<=CODE " " THEN GOTO VAL
 "180"
 140 IF D<=CODE " " THEN GOTO VAL
 "180"
 150 LET D=D-R
 160 CLS
 170 GOTO VAL "50"
 180 IF D<=CODE " " THEN LET D=C
ODE "[illegible]"
 190 IF S<=CODE " " THEN LET S=C
ODE "[illegible]"
 200 LET X=INT (((VAL "1000"-D)
*VAL "100"+S))/VAL "100000")*CO
DE "E"/M)
 210 IF X>A THEN LET A=X
 220 PRINT "FINAL SCORE= ";X,,,
"HIGHEST SCORE= ";A
 230 INPUT A$
 240 GOTO VAL "20"
```

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[illegible]

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[illegible]

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CS AND
EACE

BANG!
SPLUTTER!

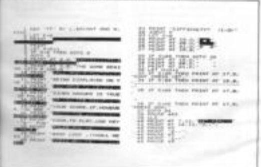
TRUE OR FALSE

WE FEEL that many of the [illegible] ignore the visual plane of [illegible] graphics in the interest of the [illegible].

True or False is a program for [illegible] mathematics. The authors, Neil Holt and Ron Bryant of [illegible], obviously worked hard to accompany the deduction with a lively display and a bus in classy [illegible].

The operator has a very limited time in which to judge the displayed arithmetic as true or false and to input T or F accordingly. Errors 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:

14—Inverse space graphic 1 inverse space.
100—Graphic T graphic 1.
[illegible]—Inverse [illegible].
[illegible]—Inverse [illegible].



```
[illegible] PRINT AT 6,0;"[illegible]"
[illegible] PRINT AT 7,0;"[illegible]"
[illegible] PRINT AT 8,0;"[illegible]"
[illegible] PRINT AT 9,0;"[illegible]"
[illegible] PRINT AT 10,0;"[illegible]"
[illegible] PRINT AT 11,0;"[illegible]"
[illegible] PRINT AT 12,0;"[illegible]"
[illegible] PRINT AT 13,0;"[illegible]"
[illegible] PRINT AT 14,0;"[illegible]"
[illegible]
```

```
[illegible]
[illegible] PRINT AT 8,0;"[illegible]"
[illegible] PRINT AT 10,0;"[illegible]"
[illegible] PRINT AT 11,0;"[illegible]"
[illegible] PRINT AT 12,0;"[illegible]"
[illegible] PRINT AT 13,0;"[illegible]"
[illegible]
```

CLOCKMAN

CLOCKMAN is a very quick reaction type game for the 16K Spectrum. [illegible]

[illegible]

[illegible]

```
[illegible]
```

```
[illegible]
```

BINOMIAL DISTRIBUTION

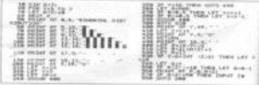
BINOMIAL DISTRIBUTION might be the first of a new style of program. It was submitted by F R Scott, of Godalming, Surrey, who believes that there are many fundamental scientific principles which could profitably be illustrated on Sinclair machines.

This program for the 16K ZX81 serves to illustrate the principle of binomial distribution. The display shows a ball falling through a triangular matrix of pegs. When the ball hits one of the pegs it rebounds to the left or right, entirely at random.

Its final position is recorded and a further ball produced. The distribution of final positions is the binomial distribution, familiar to most O level mathematics candidates. You may not know that this characteristic pattern is also of importance in [illegible] [illegible] and [illegible] transformations.

An excellent program. Fairly [illegible] pieces of [illegible] can be [illegible] and students of mathematics. Graphics mode.

16K ZX81. Four spaces, [illegible]



```
[illegible] LET [illegible]
[illegible] LET [illegible]
[illegible] LET [illegible]
[illegible] LET [illegible]
[illegible] LET [illegible]
[illegible] LET [illegible]
[illegible]
[illegible] LET [illegible]
[illegible] PRINT AT [illegible]
[illegible] PRINT AT [illegible]
[illegible] PRINT AT [illegible]
[illegible] LET [illegible]
[illegible] IF [illegible] THEN LET [illegible]
[illegible] IF [illegible] THEN LET [illegible]
[illegible] IF [illegible] THEN LET [illegible]
[illegible] IF [illegible] THEN LET [illegible]
[illegible] IF [illegible] THEN LET [illegible]
[illegible] IF [illegible] THEN GOTO [illegible]
[illegible] IF [illegible] THEN GOTO [illegible]
[illegible] IF [illegible] AND [illegible] THEN GOTO [illegible]
[illegible]
[illegible] IF [illegible] AND [illegible] THEN GOTO [illegible]
[illegible]
[illegible] GOTO [illegible]
[illegible] LET [illegible]
[illegible] GOTO [illegible]
[illegible] LET [illegible]
[illegible] GOTO [illegible]
[illegible]
[illegible] PRINT AT [illegible]
[illegible] PRINT AT [illegible]
```

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 5 and 8 to move left and right respectively.

Star Gates was submitted by D.S. Healey of [illegible], West Midlands.

```
 120 POKE 16418,0
 130 PRINT AT 23,0;"TYPE C  TO R
UN,Z TO COPY DESIGN"
 140 IF INKEY$="" THEN GOTO 140
 150 IF INKEY$="Z" THEN GOTO 180
 160 IF INKEY$="C" THEN RUN
 170 GOTO 140
 180 PRINT AT 23,0;"(32 SPACES)"
 190 COPY
 200 GOTO 130
```

Kaleidoscope

```
 10 LET N=INT (RND*250)+200
 20 FOR A=1 TO N
 30 LET V=INT (RND*22)
 40 LET H=INT (RND*32)
 50 LET BV=21+(22-V)
 60 LET BH=31+(32-H)
 70 PLOT H,V
 80 PLOT BH,V
 90 PLOT BH,BV
100 PLOT H,BV
110 NEXT A
```

THE AUTHOR of **Kaleidoscope**, Matthew Calvdey of Lytham, Lancs, claims amazing results with this ZX-81 program. It will generate a random number of [illegible] points on the bottom left of the screen and then inversely the pattern on the other quarters of the screen. All the patterns created will be symmetrical.

Kaleidoscope occupies 1.1K of memory but can be expanded into [illegible] by inserting lines 120 onwards [illegible] [illegible]

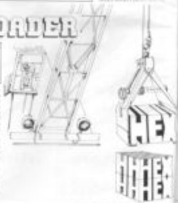
HEXLOADER

```
[illegible]
```

HEXLOADER works on the ZX-81 which is something of a rarity. The REM in line one must contain more characters than there are bytes in the machine code program. The number [illegible] to load all machine code routines or all kinds of strange things will start to happen to the listing.

To remove the REM statement from line one, POKE 16402,16. This program will help many people who still need a ZX-81 to obtain more success in using machine code. Machine code programming is something which [illegible] with the ZX-81.

The **Hexloader** was sent by A. Goodright of Sutton, Surrey.

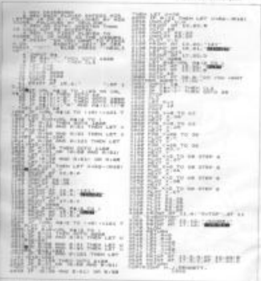


CRIBBOARD

CRIBBOARD, as the name suggests, is a scoring system to use while playing cribbage. A board is displayed on which the state of the game is shown by the blanked out holes on the board and the numerical total is shown. The result or the number of games is also given.

When run the players are asked if they are playing a best of ... game and the game is recorded as required. A maximum score of 29 is allowed on each turn and the impossible figure of 19 cannot be entered. The score is entered by giving the initial of the player, followed by his score.

The program was sent by M J Bennett of Jeddah, Saudi Arabia. It requires the 16K RAM pack.



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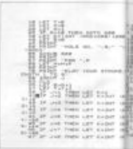


ON THE RARE occasions when the weather is too bad to play **Golf**, fanatics may care to try the computer version. It requires the 16K RAM pack and can be as frustrating as the real thing—but not as tiring or expensive.

For each of nine holes the program selects a random distance between 200 and 600 yards and displays it with the par value. The player is invited to play strokes of strengths from one to nine and after each stroke the distance remaining is displayed, with the number of strokes taken at the hole and a further request to choose a shot.

That continues until the ball is in the hole, when the comparison with par is shown.

At the end of the nine holes the par for the course is shown, with the score for that game and some advice about the future of your game.

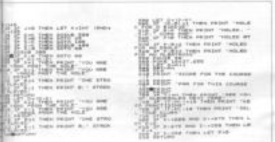
The numbers for strength of shot do not correspond to the numbers of real clubs. The best guide to the distance which can be expected can be obtained from lines 50 to 90. Although each distance is chosen at random, they are in the region of the last figures. The exception is shot one, which always moves the ball one yard.

That random element is the cause of the frustration, particularly when the ball is less than four yards from the hole. The choice must always be between taking the safe method and playing a series of one-yard shots, and the two, which can give two, three or four yards.

With a little concentration, a good level of skill can be achieved and you can avoid being told to sell your clubs at the end of the nine holes.

Golf was sent by H. S. Lees of St Austell, Cornwall.

GOLF



MULTIPLICATION TRAIN

A GOOD simple game for testing a variety of abilities with multiplication sums has been sent by James Howell of Knutsford, Cheshire. The aim is to move a train to the end of a track by giving the correct answers to multiplication problems given at random.

The program makes good use of the random function to produce different problems and it contains alternative levels of difficulty.

To start the game, press RUN and NEWLINE; the player is asked which level of difficulty is wanted, either one or two. A problem is then shown to which the player gives an answer. If correct, a train moves along a track with a puff of smoke from its funnel.

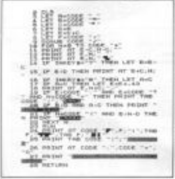
When the train reaches the end of the track, a further message says "Well done".

Alternative difficulties can be obtained by changing the lines 50 to 80.

To help with the graphics in line 100 they are all shifted, keys [illegible] space, [illegible] and [illegible]; in line 110 they are [illegible] spaces [illegible] and in line 120 R, R, space, R, T. In line 130 there are [illegible].

```
  10 LET Y=10
  20 LET X=0
  30 PRINT AT 3,0;"SKILL 1 OR 2?
  40 INPUT A$
  50 LET A=INT (RND*20)
  60 LET B=INT (RND*20)
  70 LET C=INT (RND*10)
  80 LET D=INT (RND*10)
  90 CLS
 100 PRINT AT Y,X;"
 110 PRINT AT Y+1,X;"
 120 PRINT AT Y+2,X;"
 130 PRINT AT 13,0;"
 140 PRINT AT 0,0;"GET TO THE EN
D"
 150 IF A$="1" THEN PRINT AT 5,0
;C;"*";D
 160 IF A$="2" THEN PRINT AT 5,0
;A;"*";B
 170 LET H=A*B
 180 LET J=C*D
 190 INPUT Z
 200 IF A$="1" AND Z=J THEN GOTO
 250
 210 IF A$="2" AND Z=H THEN GOTO
 250
 220 PRINT AT 15,0;"WRONG"
 230 PAUSE 100
 240 GOTO 50
 250 PRINT AT Y,X+2;"  "
 260 LET X=X+1
 270 IF X<20 THEN GOTO 300
 275 PRINT AT 13,18;"
 280 PRINT AT 13,18;"█ WELL DONE
"
 290 STOP
 300 PAUSE 100
 310 GOTO 50
```

BOMB RUN



```
 2 CLS
 3 LET A=CODE "[illegible]"
 4 LET B=CODE "[illegible]"
 5 LET C=CODE "[illegible]"
 6 LET D=B
 7 LET E=[illegible]
 8 LET F=CODE "[illegible]"
 9 [illegible] CODE "[illegible]"
10 FOR H=0 TO CODE "[illegible]"
11 PRINT AT [illegible]
12 PRINT AT [illegible]
13 PRINT AT [illegible]
14 IF INKEY$="7" THEN LET B=B-
1
15 IF B=D THEN PRINT AT B+C,H;
[illegible]
16 IF INKEY$="0" THEN LET A=C
17 IF A=C THEN LET E=E+1.0
18 PRINT AT F,H;[illegible]
19 IF E=CODE "[illegible]" AND E=CODE "+
" AND H=CODE "[illegible]" THEN PRINT TAB
CODE "[illegible]"
20 IF B=D AND A=C THEN PRINT "
[illegible]"
21 IF H=CODE "[illegible]" AND E+H=D THE
N PRINT "[illegible]"
22 NEXT H
23 RUN
24 PRINT AT CODE "[illegible]",F;"[illegible]";TAB
F;"[illegible]";TAB F;"[illegible]"
25 PRINT TAB CODE "[illegible]";"[illegible]
"
26 PRINT AT CODE "[illegible]",CODE "[illegible]";
"[illegible]"
27 PRINT "[illegible]
[illegible]"
28 RETURN
```

YOUR MISSION is to fly at wave-top height and launch your bomb with the 0 key at a submarine lurking 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 Kelsey of [illegible], Worcestershire, says that removing lines 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:

14—Graphic shifted [illegible]; graphic shifted [illegible].

19—Inverse BANG.

20—Inverse DIRECT HIT.

21—Inverse CRASH.

24—Graphic shifted [illegible], two graphic shifted [illegible], graphic shifted [illegible], two graphic shifted [illegible].

26—Eight graphic shifted [illegible].

27—Twenty-five graphic shifted [illegible].

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 roaming into the [illegible] and deposit it in Cave [illegible]. You cannot carry more than five bags of treasure at a time and even one will slow your progress.

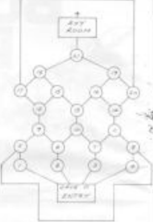
The display is of the current cave—see the illustration. You are able to move around with the cursor keys and the exits are represented by the areas of graphics at the top and bottom of the screen. It is not possible to return to the previous cavern.

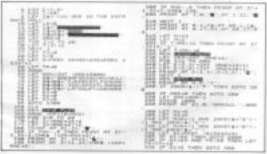
To protect yourself against monsters and to clear a path through the fungoids you can shoot an arrow, with F followed by the appropriate cursor key. Remember, though, that arrows are obtainable only at the entrance cave in exchange for captured treasure.

In Cave [illegible] there is a hoard of treasure guarded by a growing serpent which will attempt to seal off [illegible] a hole in it is usually only a temporary measure, unless you also shoot at something else, in which case the serpent will attack itself to the other [illegible].

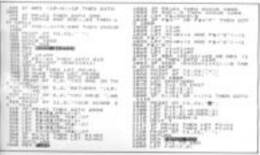
The score is calculated by Monsters killed × 5, treasure captured × 10, arrows bought × 5. Reincarnation is granted if you score more than 50 between deaths.

A free program, to be typed and taped, from Paul [illegible] of [illegible], Cleveland [illegible].

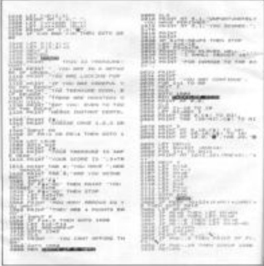




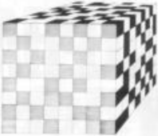
Treasure Hunt



[illegible]



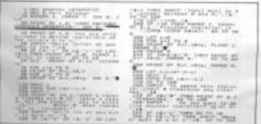
GRAPHIC GENERATOR



TO EASE the problem of generating graphics on the Spectrum, Mark Bateman of [illegible], 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 image.

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



ALPHABET

ALPHABET is a teaching aid for students (as 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 base 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 [illegible] of Rotherham. It runs on an unexpanded ZX-81.

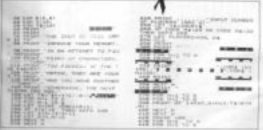
```
[illegible]
```

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

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

Submitted by Jack Andersson of [illegible] Denmark.

MEMORY



```
[illegible]
```

HOT PURSUIT

YOU ARE hurtling along the tagged trail of the Red Baron, trying to manoeuvre him into your gunsights in **Hot Pursuit**. You control your trusty Sopwith Camel with the cursor keys and [illegible] P to fire.

If the game is too difficult alter the 4 in line 110 to a higher number and be careful not to move too close to the edge of the screen or the [illegible] will crash.

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

Graphics notes:

[illegible] — Graphic shifted [illegible] inverse asterisk, graphic shifted [illegible].

```
[illegible]
```

FRUIT GUARD

FRUIT GUARD is a game for the 1K ZX-81, submitted by C. [illegible] of London [illegible]. The object is for your (graphic shifted [illegible]) to [illegible] the fruit (graphic shifted [illegible]) and take it home (inverse [illegible]) by evading the monster (graphic shifted F).

The best way to make sure you are [illegible] something instead of being disturbed is to keep to the sides, then you can [illegible] to cross the screen but the monster cannot. It is fun but perhaps a little too easy.

Graphics notes:

[illegible] — Graphic shifted [illegible].

[illegible] — Graphic shifted [illegible], graphic shifted [illegible] inverse [illegible].

```
[illegible]
```

DROP 4 simulates a well-known parlour game in which you are required to complete a row of four counters. The display simulates neatly the frame used to hold the counters and the slow-motion fall of the counters down the screen.

An enjoyable and diverting game of tactics from Arthur Douglas, of London E4 (48K Spectrum).

DROP 4

```
[illegible]
```

AIR SEA RESCUE

```
 10 LET L=VAL "10"
 20 LET C=VAL "20"
 30 LET B$=""
 40 FOR F=VAL "0" TO VAL "50"
 50 CLS
 60 LET X=INT (RND*4)+10
 65 PRINT AT 18,0;"----------------"
 70 [illegible] PRINT AT L,C;"[illegible]";AT L+1,C;"[illegible]";AT L+2,C;"[illegible]"
 75 IF B$="" THEN PRINT AT 18,X
 80 IF INKEY$="7" AND L>VAL "10" AND C=X-1 THEN LET B$="X"
100 IF B$="X" AND L=VAL "0" THEN GOTO 180
110 IF L=VAL "18" THEN GOTO 160
120 LET C=C+(INKEY$="8")-(INKEY$="5")
130 LET L=L+(INKEY$="6")-(INKEY$="7")
140 NEXT F
150 PRINT "OUT OF FUEL"
160 PRINT "CRASH"
170 STOP
180 PRINT "SAVED ";F
```

THE OBJECT of **Air Sea Rescue** is to rescue a sailor bobbing around below your helicopter. You must hoist 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. He did not manage anything better than 46. [OK ZX-81] Graphic notes

80—Graphic F (inverse space) [illegible] graphics 7A.

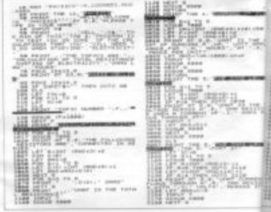
DO YOU teach physics or study it? **Physics** is a program for the 16K ZX-81 which tests you on some of the calculations necessary in basic electrical physics.

There are four topics in the listings but two of them are divided into subsections giving a total of seven types of problem. After each question you are told whether you are correct, incorrect or close enough and your score is displayed at the end of every section.

As each new topic is introduced every 1,000 lines, new sections could easily be included by changing the 4 in line 110 and by moving lines 9020-9070 to the end of the last topic.

Sent by Michael Crowther of Newport, Gwent.

PHYSICS



```
[illegible]
```

```
[illegible]
```

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 5 and 8.

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

```
[illegible]
```

PUZZLE

THIS DISPLAY will show a grid of 16 squares. The grid contains the first 15 letters of the alphabet and one space. Slide the letters around in the grid, using the space, and the puzzle is solved when the letters are in their correct order.

The letters are moved with the usual cursor controls and a count is kept of the moves taken. Your task is to complete the re-arrangement in as few moves as possible. A diverting little routine, worth having on tape. Submitted by W C Davies of Hereford for the 16K Spectrum.

```
[illegible]
```

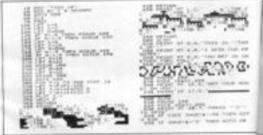
TWOS UP

TWOS UP is an Australian gambling game in which two coins are held on the tips of the first and second fingers and then spun. Bets are laid on how the coins fall, usually whether odd or even.

T S Newham of Worcester Park, Surrey, who submitted the program, suggests that the game has real possibilities as a fund-raiser if the four possibilities of head-tail, tail-head, head-head and tail-tail are taken into account.

"Odds of 3-2 against a correct selection should earn a fair percentage," he writes, "though it might be wise to have either a fixed or maximum stake—otherwise a sporting gent from [illegible] could retire with a pocketful of [illegible] and [illegible] the school fund."

A neat game for two people with excellent graphics—16K ZX-81



BUILDER

AT LAST there is a program which takes only five minutes to key in but which will provide you with hours of amazing 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.

There is 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 [illegible] of Maidstone, Kent.

```
  1 GOTO 10
  2 SAVE "BUILDER"
 10 FOR I=0 TO 21
 20 PRINT AT I,20;"■"
 30 FOR J=0 TO 19
 40 PRINT AT I,J;"[illegible]" AND INKEY$
="" 
 50 NEXT J
 60 PRINT AT I,20;" "
 70 NEXT I
 80 GOTO [illegible]
```

SKITTLES

```
  5 REM "SKITTLES"
 10 PLOT [illegible]
 20 PLOT [illegible]
 30 PLOT [illegible]
 40 PLOT [illegible]
 50 PLOT [illegible]
 60 PLOT [illegible]
 70 PLOT [illegible]
 80 PLOT [illegible]
 90 PLOT [illegible]
100 PLOT [illegible]
110 PLOT [illegible]
120 PLOT [illegible]
130 PLOT [illegible]
140 PLOT [illegible]
150 FOR [illegible]
160 LET [illegible]
170 LET [illegible]
180 FOR [illegible] TO 0 STEP -1
190 PLOT [illegible]
200 LET [illegible]INKEY$
210 UNPLOT [illegible]
220 PLOT [illegible]
230 UNPLOT [illegible]
240 IF [illegible] THEN LET B=B+1
250 LET [illegible]
260 NEXT [illegible]
```

WE WILL say nothing about being bowled over by this game, or about going down like nine pins, or about it being right up your alley. It is a 1K game for the ZX-81 called **Skittles** but the title is somewhat misleading, since the eight balls are moved after they are released, just before.

They are amazingly responsive, manoeuvred with the 5 and 7 keys to a target of [illegible].

It is a highly enjoyable game submitted by Philip [illegible] of Bristol.

HORSE

```
    1 DIM W$(6)
    2 DIM P(6)
    3 LET F=0
    4 FOR N=1 TO 6
    5 LET [illegible]
    6 NEXT N
    7 LET [illegible]
    8 LET [illegible]
   10 DIM [illegible]
   20 DIM [illegible]
  100 PRINT "TYPE NAME OR INITIAL
S"
  [illegible]
  [illegible]
  [illegible]
  [illegible]
  [illegible]
  [illegible]
  [illegible]
  [illegible]
  [illegible]
```

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

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

Horse by C. Wise for the expanded ZX-81.

RACE

```
[illegible]
```

ALPHABETICAL SORTING

ALPHABETICAL SORTING is a fast routine for sorting A$ into alphabetical order. Alter the numbers in lines 9510 and 9770 according to the number of elements in A$. For example, if you DIM A$ (100,10), the number in those lines should be 100.

Michael Gorton of St Edmund's, Canterbury, who sent the program, says that it is the fastest sort of which he knows for the ZX81.

```
9500 FAST
9505 LET A=1
9510 LET N=100
9520 IF A+A>N THEN GOTO 9560
9530 LET A=A+A
9540 GOTO 9520
9550 LET F=2*A-1
9560 LET F=INT (F/2)
9570 IF NOT F THEN GOTO 9750
9580 LET E=N-F
9590 LET B=N-A
9600 LET D=B
9610 LET E=D+F
9620 IF A$(D)<A$(E) THEN GOTO 97
00
9650 LET D=D+SGN B
9670 GOTO (D>0 AND 9580)+(9620 A
ND D<=0)
9700 LET B$=A$(D)
9710 LET A$(D)=A$(E)
9720 LET A$(E)=B$
9730 LET D=D-F
9740 GOTO (9660 AND D<1)+(9620 A
ND D>=1)
9750 SLOW
9760 CLS
9770 FOR F=1 TO 100
9780 SCROLL
9790 PRINT A$(F)
9800 NEXT F
9810 RETURN
```

OL' FAITHFUL

THIS IS one of two programs included in this collection for ZX-80 users. It is a very simple, user-friendly program intended for young children.

R Spencer of Chatham, Kent, who wrote it, said he did it because after two years of owning a ZX-80 he thought it was time he bought a better machine, probably the Spectrum. He wanted to hand his old faithful to his children with something useful for them to do with it.

The listing includes lines to allow the person using the machine to input their name: lines 100, 640, 730. When run, it asks what kind of sum is to be attempted and then shows the required problem. An answer is given and that is judged correct or incorrect, giving the correct answer. Press NEWLINE for another attempt.

In the case of division the answer is given in terms of a whole number and then the remainder, both of which are input separately.

```
[illegible]
```

The WO

THE WORM GAME for the 16K Spectrum was just too difficult for your Sinclair-Programs reviewer, who could reach only the sixth of its seven stages. The game is of the familiar type but there is only one player and you must avoid not only your own tail but also aim to hit certain objects in the field of play.

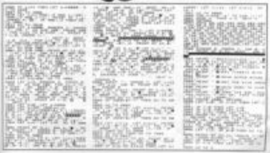
In the first section, for example, your targets are contained in the bad area here; in the second they are the dandelions among the deadly clocks. In the third, fourth, fifth, sixth and—we suppose—seventh, they are different again.

This listing represents an original concept in computer games, brilliantly executed. Michael Andreasen, of [illegible], who wrote the program, reports a staggering best score of 150,000. We wonder if he has considered marketing the game commercially?

Controlled is by the usual cursor keys, there is a high score facility and list of instructions.

Graphics notes:
1—Graphic D, graphic C, graphic E, graphic B
2—Graphic A
3—Graphic A, graphic H, graphic F
1000—Graphic I
1005—Graphic O
2000—Graphic I

RM Game



KEYBOARD

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

Submitted by Graham Woods of [illegible] for the ZX-81.

```
[illegible]
```

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

Movement is the top stick with keys 1 and [illegible], the middle stick with [illegible] and P and the bottom one with A and NEWLINE. A small but [illegible] routine for the 1K ZX-81 from Timothy Taylor of Petersfield, Hampshire. Graphics notes:

[illegible]

[illegible]

[illegible]

STICKS AND STONES

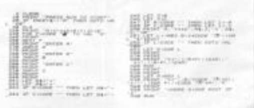
```
[illegible]
```

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:
140—Graphic shifted [illegible]
160—Graphic shifted [illegible]
180—Two graphic shifted [illegible]

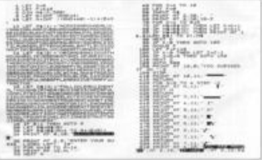


HANGMAN II is an improved and updated version of U Gill's ZX-80 Hangman game in the July/August issue of Sinclair User. This version makes the game more of showing a display of the gallows, advanced one stage for every incorrect guess.

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

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

HANGMAN II



TOAD · in · the HOLE

TOAD IN THE HOLE is a program to demonstrate random translations. Its use of moving graphics to illustrate a mathematical concept is reminiscent of the listing on Binomial Distribution in our last issue and should similarly be useful for teachers and students of mathematics.

The program was sent by David Hawson, a mathematics teacher at [illegible] Preparatory School [illegible].

```
  10 PRINT AT 0,6;"TOAD IN THE H
OLE"
  20 PRINT AT 1,8;"(sixteen grap
hic 7s)"
  30 PRINT AT 2,15;"BY"
  40 PRINT AT 3,10;"DAVID HAWSON
"
  50 PAUSE 100
  60 PRINT AT 7,0;"IN THIS GAME,
 YOU MAKE THE TOAD MOVE INTO THE
 HOLE, BY PRESSING THE CORRECT N
UMBER KEYS.         PRESS NEWLINE
 TO CONTINUE."
  70 PAUSE 500
  75 CLS
  80 LET E=1
  90 FOR D=2 TO 19
 100 PRINT AT E,D;"(graphic 6)"
 110 NEXT D
 120 LET E=20
 130 FOR D=3 TO 19
 140 PRINT AT E,D;"(graphic 7)"
 150 NEXT D
 160 LET D=1
```

```
 170 FOR E=2 TO 19
 180 PRINT AT E,D;"(graphic 8)"
 190 NEXT E
 200 LET D=20
 210 FOR E=2 TO 19
 220 PRINT AT E,D;"(graphic 5)"
 230 NEXT E
 240 LET E=20
 250 FOR D=4 TO 18 STEP 3
 260 PRINT AT E,D;"(graphic 8)"
 270 NEXT D
 280 LET D=1
 290 FOR E=5 TO 17 STEP 3
 300 PRINT AT E,D;"(graphic 8)"
 310 NEXT E
 320 PRINT AT 1,1;"(graphic 3)";
AT 1,20;"(graphic 4)";AT 20,1;"(
graphic 2)";AT 20,20;"(graphic 1
)"
 330 PRINT AT 20,0;"0";AT 17,0;"
1";AT 14,0;"2";AT 11,0;"3";AT 8,
0;"4";AT 5,0;"5";AT 2,0;"6"
 340 PRINT AT 21,1;"0  1  2  3
4  5  6"
 350 LET A$="(graphic Y;inverse
ASTERISK;graphic T)"
 360 LET B$="(graphic 3;inverse
SPACE;graphic 4)"
 370 LET C$="(graphic 8;SPACE;gr
aphic 8)"
 380 LET D$="   "
 390 LET E$="(graphic 3;three gr
aphic 6s;graphic 4)"
 400 LET F$="(graphic 8;graphic
8;graphic 5)"
 410 LET G$="(graphic 2;three gr
aphic 7s;graphic 1)"
 500 LET H=INT (RND*3)+2
 510 LET I=INT (RND*3)+2
 520 LET J=(3*I)+1
 530 LET K=3*H
 600 PRINT AT 17,2;A$;AT 18,2;B$
;AT 19,2;C$
 610 PAUSE 50
 650 PRINT AT 20-K,J;C$;AT 19-K,
J;F$;AT 18-K,J;F$;AT 17-K,J;F$;A
T 16-K,J;E$
 700 PRINT AT 0,21;"HOW MANY"
 710 PRINT AT 1,21;"SPACES "
 720 PRINT AT 2,21;"RIGHT ?"
 730 INPUT P
 735 IF P>5 OR P<0 THEN GOTO 730
 740 PRINT AT 4,21;"RIGHT ";P
 750 PAUSE 100
 760 PRINT AT 2,21;"UP ?   "
 770 INPUT Q
 775 IF Q>5 OR Q<0 THEN GOTO 770
 780 PRINT AT 5,21;"UP    ";Q
 790 PAUSE 100
 800 PRINT AT 17,2;D$;AT 18,2;D$
AT 19,2;D$
 810 LET R=(3*P)+1
 815 LET S=3*Q
 820 PRINT AT 19-S,R+1;C$
 830 PRINT AT 18-S,R+1;B$
 840 PRINT AT 17-S,R+1;A$
 850 PAUSE 100
 870 PRINT AT 1,21;"          "
 880 PRINT AT 2,21;"          "
 890 PRINT AT 4,21;"          "
 900 PRINT AT 5,21;"          "
 910 IF S<>K OR J<>R THEN PRINT
AT 9,21;"HARD LINES"
 915 IF K=S AND J=R THEN PRINT A
T 9,21;"WELL DONE"
 920 PRINT AT 2,21;"THE TOAD"
 930 PRINT AT 3,21;"HAS TO "
 940 PRINT AT 4,21;"MOVE "
 950 PRINT AT 5,21;"ACCORDING"
 960 PRINT AT 6,21;"TO THE "
 970 PRINT AT 7,21;"VECTOR"
 980 PRINT AT 8,21;"TRANSLATION"
 990 PRINT AT 10,24;"(graphic 8;
SPACE;graphic 5)"
1000 PRINT AT 11,24;"(graphic 8;
SPACE;graphic 5)"
1010 PRINT AT 10,25;H
1020 PRINT AT 11,25;I
1030 PRINT AT 16,21;"PRESS RUN"
1040 PRINT AT 17,21;"AND THEN"
1050 PRINT AT 18,21;"NEWLINE"
1060 PRINT AT 19,21;"FOR ANOTHER
"
1070 PRINT AT 20,21;"TRY"
```

3-D HUNT

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

The display is of a 6 by 6 numbered board representing the front of the cube. Beneath it is a strip representing depth, the right-hand end of the strip being the front of the cube. The computer has a choice of 216 positions in which to hide itself.

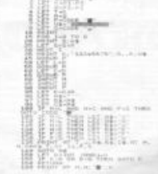
Enter a number for the line, another for the column, and a third for the depth. Your position will be displayed and an arrow will show below to show the relative position of the computer.

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

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

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

6—Inverse hyphen
7—Three graphic As
8—Graphic D
148—Inverse D
188—Inverse space



```
   1 LET J=CODE "[illegible]"
   2 LET [illegible]
   3 LET [illegible]
   4 LET T=0
   5 LET B=0
   6 LET [illegible]
   7 LET [illegible]
   8 LET [illegible]
  10 PRINT
  15 FOR I=0 TO 8
[illegible]
 100 IF H=L AND V=C AND F=D THEN
 GOTO [illegible]
[illegible]
 135 PRINT AT [illegible]
 140 GOTO 90
 150 LET [illegible] INT (RND*[illegible])
 155 IF [illegible] THEN GOTO [illegible]
 160 [illegible]
 190 PRINT AT [illegible]
```

ONE-ARMED BANDIT

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

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

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

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

Graphics notation:

[illegible]—inverse [illegible]

1020—All inverse spaces, except for inverse [illegible] after [illegible] and [illegible]

```
   1 REM "ONE ARMED BANDIT"
   2 PRINT "1 ARMED BANDIT BY A.
JACKSON"
   4 PAUSE 100
  10 CLS
  20 LET [illegible]
  30 LET [illegible]
  50 LET [illegible]
  60 IF [illegible] THEN GOTO [illegible]
  65 GOTO [illegible]
  70 LET [illegible]
  80 LET [illegible]
  85 GOSUB [illegible]
  90 LET [illegible]
  95 IF [illegible] THEN GOSUB [illegible]
 100 IF [illegible] AND [illegible]
[illegible] THEN GOSUB [illegible]
 105 IF [illegible] AND [illegible]
[illegible] THEN GOSUB [illegible]
 106 IF [illegible] AND [illegible]
[illegible] THEN GOSUB [illegible]
 107 LET [illegible]
 1000 IF [illegible] THEN PRINT AT [illegible]
 1005 IF [illegible] THEN STOP
 1010 GOTO [illegible]
 2000 REM [illegible]
 2001 LET [illegible]
 2010 PRINT "[illegible]"
 2020 PAUSE 100
 2030 CLS
 2040 RETURN
 3000 REM [illegible]
 3005 PRINT AT [illegible] "JACKPOT"
 3010 LET [illegible]
 3020 PRINT AT [illegible]
 3030 PAUSE [illegible]
 3040 PRINT AT [illegible] "GAMBLE ?";
 3050 PRINT AT [illegible]
 3055 IF INKEY$="N" THEN LET [illegible]
[illegible]
 3060 IF INKEY$="N" THEN RETURN
 3065 IF INKEY$="Y" THEN GOTO [illegible]
 3066 GOTO [illegible]
 3068 LET [illegible]
 3069 IF [illegible] THEN LET [illegible]
 3070 IF [illegible] THEN LET [illegible]
 3071 IF [illegible] THEN LET [illegible]
 3072 IF [illegible] THEN RETURN
 3080 IF [illegible] THEN LET [illegible]
 3085 GOTO [illegible]
 4000 REM START OF NUDGE
 4001 LET [illegible]
 4005 PRINT AT [illegible] "NUDGE ?"
 4006 IF INKEY$="N" THEN [illegible]
 4010 IF INKEY$="[illegible]" THEN [illegible]
 4015 IF INKEY$="1" THEN LET [illegible]
[illegible]
 4016 IF INKEY$="Q" THEN LET [illegible]
[illegible]
 4017 IF INKEY$="W" THEN LET [illegible]
[illegible]
 4018 IF INKEY$="E" THEN LET [illegible]
[illegible]
 4020 IF INKEY$="Q" THEN LET [illegible]
[illegible]
 4025 IF INKEY$="[illegible]" THEN LET [illegible]
[illegible]
 4030 IF INKEY$="[illegible]" THEN LET [illegible]
[illegible]
 4040 IF INKEY$="[illegible]" THEN GOSUB [illegible]
[illegible]
 4050 IF [illegible] THEN RETURN
 4055 GOTO [illegible]
 [illegible]
 10000 LET [illegible]
 [illegible]
 [illegible] PRINT AT [illegible]
 [illegible]
 [illegible]
 [illegible]
 [illegible] PRINT AT [illegible]
 10[illegible] RETURN
```

CHARACTER MAKER

CHARACTER MAKER changes the character set of the 1K ZX-81. It will even change the letters in program listings into blocks of strange patterns.

The main program is a machine code section set up using the POKE command. After running the main routine remove it line by line but do not use NEW.

When the program is in memory, type in one of the demonstration programs. They will show random patterns on the screen. You can also make your own programs which create patterns on the screen which change at random.

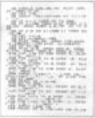
The program was sent by [illegible] of Stratford Lines.

```
10 POKE 17000,62          1 REM DEMO PROGRAMS     10 LET A=[illegible]
20 POKE 17002,237        10 FOR A=0 TO 255        20 PRINT CHR$ A;
30 POKE 17003,71         20 PRINT CHR$ A;         30 GOTO 10
40 POKE 17004,201        30 NEXT A
50 POKE 17001,[illegible]
60 LET Z=USR (17000)
```

PIE CHART will provide you with a means of displaying your percentages in a really professional way. A circle is drawn on screen; you are asked to input your percentages and the computer will divide the pie into appropriately sized pieces. When you have finished, INPUT "-1" and the program will move to labelling the different slices. A grid is drawn around the screen and you enter your label and then its x and then its y co-ordinates. An entry of 1c for the y co-ordinate will move you to the next stage of the routine which enables you to title your display.

This useful program was submitted by Paul Smith of North Harrow for the 16K Spectrum.

PIE CHART



COVER T

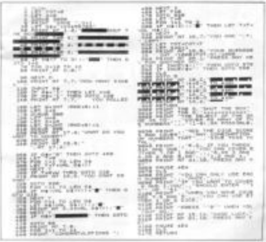
THE BOX

A GOOD, interesting game, which takes slightly less than 2K of memory on the ZX-81 is sent by John Ellis of Wimborne, Dorset. He says it is based on an old French game known as **Shut the Box**.

The aim is to eliminate each of numbers from one to nine by throwing two dice. The total thrown can then be used to eliminate numbers which add to the same total. For example, if a three and a five are thrown, any combination of two numbers adding to eight can be eliminated.

The chosen numbers are entered together and the program checks for illegal moves. The game continues until it is impossible to make a move; no number can be eliminated twice. To end the game, press zero and the total of the numbers remaining is displayed. After a number of plays, a running average of the remaining totals is shown. Ellis says that after much practice his average for 10 games was 8.2. The program is user-friendly.

To help with the graphics, in lines 30 and 50 there are 27 inverse spaces; in 40 there are 25 spaces; in 240 there are 17 spaces and 28 spaces.



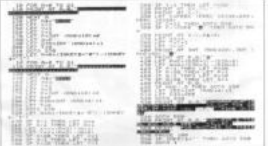
GHOST TREKKER is a genuinely challenging game requiring quick thinking and quick cursor fingers as you chase a ghost around the haunted house.

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

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

110—Thirty-two inverse full stops.
150—Inverse A graphic shifted M, inverse C graphic shifted G.
310 & 400—Inverse full stop.
440—Graphic A.
540—Inverse "Congratulations, you have caught the ghost. It took you........Seconds.
550—You hit a trail and have been killed.
580—For another go, press any key.

GHOST TREKKER



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

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

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

STOPPING DISTANCE

```
[illegible]
```

JELLYM

R[illegible] of [illegible], [illegible] **Jellymen**, which [illegible] in a Spectrum [illegible] but has a character of its own.

The [illegible] is controlled by the small cursor keys and must [illegible] the maze [illegible], with a bonus of 50 points for the larger [illegible]. Jellymen [illegible] to attack you, though [illegible] a [illegible] to [illegible].

A [illegible] in [illegible] and the game [illegible] Spectrum Graphics mode:
1—Graphic [illegible], graphic A.
90—Larger [illegible] should be entered as graphics:
117—Graphic B.
120—Graphic C.
125—Graphic D.
135—Graphic E.

EN

```
[illegible]
```

JUGGLER

W. L. [illegible] of [illegible] has sent a [illegible] game for the 16K Spectrum. It is called **Juggler** and requires you to keep [illegible] in the air by manoeuvring the juggler's [illegible] arms with keys 1 and 0.

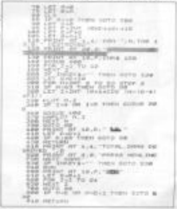
The listing is complete with sound effects and a running score. It would be ideal for keeping children entertained on wet winter afternoons.

For graphics in lines [illegible] and [illegible] enter it in graphics mode.

```
[illegible]
```

```
[illegible]
```

DAM BUSTERS

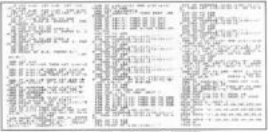


A DAMBUSTERS game for the ZX-81. Droning over Hamburg in the flak-riddled Lancaster, the bomb-aimer tensed over his sights, the Barnes Wallis special already spinning in the bomb bay—and everybody humming the tune.

You have 16 dams to hunt and the bombs are bounced by the usual cursor-controlled routine to the left. The position of the dam is randomised and the bomb is released with any key.

The program uses only 1K and there should be plenty of room for elaboration of the graphics.

Submitted by R Latham, of Chatteris, Cambridgeshire. The reviewer managed to account for only seven. Graphics notes: 400—Graphic shifted A, inverse asterisk, graphic shifted A.



LURE

LURE is a game in which you, hopeful mammal with the opposable thumb and wrinkled cortex, attempt to prove your evolutionary superiority over a dumb dinosaur.

You are trapped in a maze with the beast, whose minimal intelligence is sufficient to track you down. As you flee the creature you are able to consume power pills. All of them give you sufficient energy to dig a trap. Then employ that cerebral brilliance to 'lure' the muscle-head into the hole.

Q and A send you up and down; O and P manoeuvre you left and right and you dig with M. You have three holes per maze and your supply of holes and pills is renewed if you can trap the beast. If the dinosaur catches you he will exact a little crunch and you lose one of your three lives.

This game was sent by R. Ward of [illegible], West Midlands. 16K Spectrum. Graphic notes:
130—Graphic A, graphic B
605—Graphic H
700—Graphic G.

MUSIC MACHINE

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

The scale is to be found on keys 1 to 4 and is the kind of bass [illegible] associated usually with Count Dracula hunched over the organ keys in the crypt at midnight. Tune the dial slightly off station to start the background hum, turn up the volume and shake to that [illegible]. [illegible]

[illegible]

```
    5 FAST
    6 SLOW
    7 FAST
   [illegible] IF INKEY$="[illegible]" THEN GOTO [illegible]
   [illegible] IF INKEY$="[illegible]" THEN GOTO [illegible]
   [illegible] IF INKEY$="[illegible]" THEN GOTO [illegible]
   [illegible] IF INKEY$="[illegible]" THEN GOTO [illegible]
   [illegible] GOTO [illegible]
   [illegible] FAST
   [illegible] SLOW
   [illegible] SLOW
   [illegible] FAST
   [illegible] IF INKEY$="[illegible]" THEN GOTO [illegible]
   [illegible] IF INKEY$="[illegible]" THEN GOTO [illegible]
   [illegible] IF INKEY$="[illegible]" THEN GOTO [illegible]
   [illegible] IF INKEY$="[illegible]" THEN GOTO [illegible]
   [illegible] GOTO [illegible]
   [illegible] FAST
   [illegible] FAST
   [illegible] SLOW
   [illegible] SLOW
   [illegible] SLOW
   [illegible] FAST
   [illegible] IF INKEY$="[illegible]" THEN GOTO [illegible]
   [illegible] IF INKEY$="[illegible]" THEN GOTO [illegible]
   [illegible] IF INKEY$="[illegible]" THEN GOTO [illegible]
```

```
   [illegible] IF INKEY$="[illegible]" THEN GOTO [illegible]
   [illegible] GOTO [illegible]
   [illegible] FAST
   [illegible] SLOW
   [illegible] SLOW
   [illegible] SLOW
   [illegible] SLOW
   [illegible] FAST
   [illegible] IF INKEY$="[illegible]" THEN GOTO [illegible]
   [illegible] IF INKEY$="[illegible]" THEN GOTO [illegible]
   [illegible] IF INKEY$="[illegible]" THEN GOTO [illegible]
   [illegible] IF INKEY$="[illegible]" THEN GOTO [illegible]
   [illegible] GOTO [illegible]
   [illegible] FAST
   [illegible] FAST
   [illegible] SLOW
   [illegible] SLOW
   [illegible] SLOW
   [illegible] SLOW
   [illegible] SLOW
   [illegible] FAST
   [illegible] IF INKEY$="[illegible]" THEN GOTO [illegible]
   [illegible] IF INKEY$="[illegible]" THEN GOTO [illegible]
   [illegible] IF INKEY$="[illegible]" THEN GOTO [illegible]
   [illegible] IF INKEY$="[illegible]" THEN GOTO [illegible]
   [illegible] GOTO [illegible]
```

OUTL

SOME OF the best graphics we have seen are the striking figures of this reaction game for the 16K ZX81.

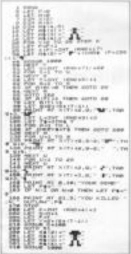
G. G. Lomas, of Stalybridge, Cheshire, who submitted **Outlaw**, has managed to achieve something approaching the effect of a slow animated film by drawing and re-drawing the outlaws as they fall dead.

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

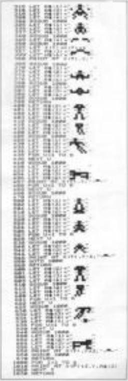
Graphic listing:

100 — Graphic shifted 1, graphic shifted 6

6010 — PRINT AT [illegible]



AW



BEAN CUP

```
[illegible]
```

SOMETIMES, when the usual finger is worn to the knuckle and we are blinking at 16 cycles per second, nothing pleases us like a game where thinking is not just something between you and a ZX81 screen. When the game works on a ZX-80, we are really happy.

Beancup is a fun 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, anticlockwise 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 input any number from 1 to 6.

If you can beat the machine you are better than we are. Submitted by Paul Marshall of Ilford, Essex.

LINEAL REGRESSION

```
   1 REM "LR"
  10 LET [illegible]=0
  20 LET [illegible]=0
  30 LET [illegible]=0
  40 LET [illegible]=0
  50 LET [illegible]=0
  80 LET [illegible]
  90 PRINT "HOW MANY POINTS OF [illegible]
[illegible]"
 100 INPUT N
 105 CLS
 110 PRINT "INPUT X THEN Y."
 120 INPUT X
 130 INPUT Y
 140 CLS
[illegible]
 IF [illegible] THEN GOTO [illegible]
[illegible]
 PRINT "CORRELATION COEFFICI
ENT [illegible]"
 PRINT "[illegible]
 PRINT "STANDARD ERROR OF ES
TIMATE"
 PRINT "[illegible]
 PRINT "[illegible]
```

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

From Marion [illegible] of Rotherham, South Yorkshire.

√5 FACTORS

JASON MINETT of Birkenhead, Merseyside, has sent two programs for calculating factors. The first will find all the factors of a given number and the second will provide its prime factors.

In both cases the machine waits for a number to be input and then prints the appropriate answers (1K ZX-81).

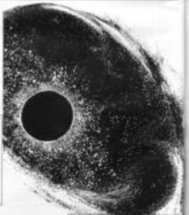
```
   1 REM FACTORS
  10 FAST
  20 INPUT N
  30 PRINT N
  40 FOR A=N/2 TO 1 STEP -1
  50 IF N/A=INT (N/A) THEN PRINT [illegible]
  60 NEXT A
  70 PRINT [illegible]
  80 RUN

   1 REM PRIME FACTORS
  10 INPUT A
  20 PRINT A;[illegible]
  30 LET B=2
  40 IF A/B=INT (A/B) THEN GOTO
 60
  60 GOSUB 190
  70 GOTO [illegible]
  80 FOR B=3 TO A STEP 2
  90 FOR C=3 TO [illegible] STEP 2
 100 IF B/C=INT (B/C) THEN GOTO
[illegible]
 110 NEXT C
 120 IF A/B=INT (A/B) THEN GOTO
 150
 130 GOSUB 190
 140 GOTO 120
 150 NEXT B
 160 POKE [illegible]
 170 [illegible]
 180 RUN
 190 PRINT B;"*";
 200 LET A=A/B
 210 RETURN
```

BLACK HOLES

BLACK HOLES is an amazingly-[illegible] game for the ZX-81 in which you are required to manoeuvre your speeding spacecraft through a whole cosmos of the [illegible].

Change course with keys 8 and 5 and when you crash the length of time you survived will be displayed. Sent by James Marshall of Guildford, Surrey.

```
  10 LET [illegible]
  20 LET [illegible]
  30 LET [illegible]
  40 LET [illegible]
  50 PRINT AT [illegible]
  60 PRINT AT [illegible]
  70 IF [illegible] THEN LET [illegible]
  80 IF [illegible] THEN LET [illegible]
  90 PRINT AT [illegible]
 100 POKE [illegible]
 110 LET [illegible]
 120 LET [illegible]
 130 LET [illegible]
[illegible]
 135 SCROLL
 150 IF [illegible] THEN LET [illegible]
 160 IF PEEK [illegible] THEN GOTO
 180
 170 GOTO 40
 180 PRINT [illegible]
```



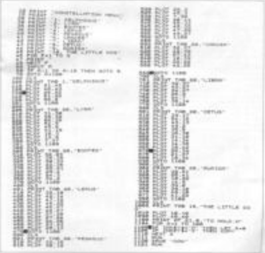
CONSTELLATIONS

CONSTELLATIONS is a program specially for all avid stargazers. After the lengthy process of entering it, press RUN and NEW LINE and a menu is provided, listing 10 groups of stars. Pick which one you wish to see and the group of stars is shown, along with its name.

The list available is the same as that used by the writer of the program but others can be added or substituted according to taste.

The main idea is to provide some kind of record of a particular constellation, so it is essential to save the program on cassette.

Kieran Cheyne, aged 14, of Hartlepool, Cleveland, wrote the program for a school project on stars. No doubt the next project will be to draw a picture of Patrick Moore.



GRUB RACE

GRUB RACE involves a race between three good representations of caterpillars. The progress of the race is decided by random elements in the program and the player places bets on the likely winner, starting with a total of £100.

The race is complicated by the fact that at any moment the caterpillars may turn into butterflies which, after fluttering on the screen for a time, return to being caterpillars and have to start again. Constant instructions are included in the program once it is run.

The graphics in lines 4 to 15, and 50 are in shifted 8s and two shifted 5s and the butterflies in lines 1005, 1075 and 1085 include two shifted 8s.

Grub Race was sent by Ben Kay of Wirral, Merseyside and requires a 16K RAM pack.

```
[illegible]
```

```
[illegible]
```

```
[illegible] LET [illegible]
[illegible] RETURN
[illegible] FOR [illegible]
[illegible] PRINT AT [illegible]
[illegible] NEXT [illegible]
[illegible] LET [illegible]
[illegible] LET [illegible]
[illegible]
[illegible] PRINT AT 10,0;"YOU HAVE UP [illegible]
[illegible]
[illegible] PRINT AT 10,0;"FIRST ENTER [illegible]
[illegible]
[illegible] INPUT [illegible]
[illegible] IF [illegible] AND [illegible] AND
[illegible] THEN GOTO [illegible]
[illegible] PRINT AT 10,0;"ROUND ";[illegible]
[illegible]
[illegible] PRINT AT 10,0;"YOU [illegible]
[illegible]
[illegible] INPUT [illegible]
[illegible] IF [illegible] THEN GOTO [illegible]
[illegible] GOSUB [illegible]
[illegible] GOTO [illegible]
[illegible] LET [illegible]
[illegible] LET [illegible]
[illegible] LET [illegible]
[illegible] IF [illegible] AND [illegible] THEN LET
[illegible]
[illegible] IF [illegible] AND [illegible] THEN GOT
[illegible]
[illegible] IF [illegible] AND [illegible] THEN GOT
[illegible]
```

```
[illegible] LET [illegible]
[illegible] IF [illegible] THEN GOTO [illegible]
[illegible] PRINT AT 10,0;"BAD LUCK...
[illegible]
[illegible] PRINT AT 10,0;"A NEW RACE [illegible]
[illegible]
[illegible] PAUSE 100
[illegible] PRINT AT [illegible]
[illegible]
[illegible] GOSUB [illegible]
[illegible] GOTO [illegible]
[illegible] LET [illegible]
[illegible] PRINT AT 10,0;"YOU GOT [illegible]
[illegible]
[illegible] PRINT AT 10,0;"YOU NOW HAVE [illegible]
[illegible]
[illegible]
[illegible] PAUSE 100
[illegible] PRINT AT [illegible]
[illegible]
[illegible] GOSUB [illegible]
[illegible] GOTO [illegible]
[illegible] PRINT AT 10,0;"YOU HAVE NO [illegible]
[illegible]
[illegible] PRINT AT 10,0;"PRESS ANY [illegible]
[illegible]
[illegible] PAUSE [illegible]
[illegible] CLS
[illegible] GOTO [illegible]
[illegible] PRINT AT 10,0;[illegible]
[illegible] PRINT AT 10,0;[illegible]
[illegible] RETURN
```

U.K. MAP

A USEFUL program for holiday-makers, pilots and long-distance drivers is here. P. G. Chapman describes his **U.K. Map** routine for the 16K ZX81. AA handbooks and the like generally list towns with a four-figure reference number which refers to the 10-kilometre squares which make up the National Grid.

Input a pair of these numbers—e.g. 3843/5914—and the computer will calculate the distance in miles between the south-west corners of the relevant squares.

```
  10 LET A$="[illegible]
[illegible]
[illegible]
[illegible]"
  20 INPUT B$
  30 LET C$=B$(CODE "[illegible]" TO CODE
 [illegible]
  40 GOSUB CODE "[illegible]"
  50 LET [illegible]
  60 LET [illegible]
  70 LET C$=B$(CODE "[illegible]" TO CODE
 [illegible]
  80 GOSUB CODE "[illegible]"
  90 LET [illegible]
[illegible]
 100 LET [illegible]
[illegible]
 140 PRINT [illegible]
[illegible]
[illegible]
 190 STOP
 200 FOR N=CODE "[illegible]" TO LEN A$ STEP
 CODE "[illegible]"
 210 IF C$=A$(N TO N+CODE "[illegible]") T
HEN GOTO 250
 230 NEXT N
 240 FOR [illegible]
 250 IF [illegible] THEN GOTO [illegible]
 260 LET [illegible]
 270 NEXT [illegible]
 280 RETURN
```

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[illegible]

R & R SOFTWARE [illegible]

ZX SPECTRUM

SPECTRUM 16/48K — ZX81 16K

ZUCKMAN
ZX81 (16K)

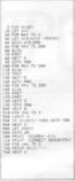
[illegible]

FROGGER
ZX81 (16K)

[illegible]

DJL SOFTWARE

[illegible]
TRADE ENQUIRIES WELCOME

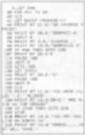


SIMPLE SIMON

SIMON may be simple but the game for the unsuspected ZX-81 is complex; you must increase the volume of your television set to hear the ZX-81 make its noises. Then you must guess, using keys 1 to 4 on the keyboard, the correct pitch and order of the notes played.

You must select key 1 for the highest note and key 4 for the lowest. When you have guessed which notes have been played, the computer will continue to play the game until you have an incorrect note. When that happens you will be given your score and the proper sequence of the notes which you had incorrect.

JUDGMENT



JUDGMENT DAY has arrived for the fearless ZX-81 alien fighter on planet Earth. As a member of the Space Cadet Corps you must stop the aliens from making a permanent base.

The ground is shown at the bottom of the screen and the alien craft is shown as a ramp above the landscape. You have shots at your command and each one must count. You fire by entering a number from one to 10, corresponding to positions from left to right on the screen.

When you have entered your guess, your spaceship will travel across the screen and drop its bomb. The number which appears in front of the alien after you have fired is the correct position of the target.

The program was sent by Robert Courtney of Ashworth, Middlesex.

KINGDOM

```
[illegible]
```

FIVE-YEAR PLANS, massacres into the great revolution. Rulers have used the dictatorship of the people. You can try them all.

Kingdom gives you a fixed realm to regulate and five years in which to increase your personal wealth and protect your people against flood, famine and the depredations of the ruthless local bandits.

You are first given instructions for the game and asked to input your name, age and sex. Depending on the information you supply, you will be dubbed king, queen, prince or princess and then asked to decide how best to divide your available workforce in the season ahead. Consider the crops or your soldiers will starve. Bear the bandits in mind or your subjects are murdered. Delay on the dykes and they will drown.

It is reasonably difficult. Over 1,000 subjects were reduced to single figures after the first year.

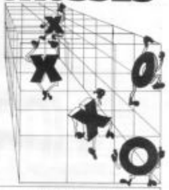
Any number can play and you have five years in which to justify your kingship and to amass as much money as possible by the judicious selling of surplus grain.

Good luck, your highness, and thanks to Andrew Johnson of Amersham, Bucks, who submitted this excellent listing (16K ZX-81).

```
[illegible]
```

```
[illegible]
```

3-D NOUGHTS + CROSSES



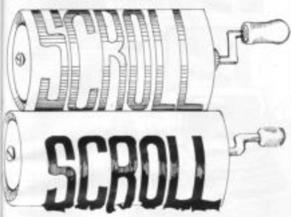
P B SCOTT of [illegible], Surrey, has sent the kind of program Mr Spock plays on long winter evenings. **3D Noughts and Crosses** displays a cube and 27 possible positions for the Xs and Os. Unlike the 2D version, the game must be continued until all the positions are filled, the object being not to obtain the first completed row but as many as possible.

The player who starts has an advantage as finally he occupies one space more than the opponent and so, to avoid [illegible], the first player is prevented from occupying the centre square on his first attempt.

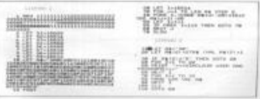
The program checks for that and other illegal moves, as well as setting up the board, indicating whose turn is next, and giving the correct score throughout. Moves are entered by keying in a letter, then a number, followed by NEWLINE. "F" indicates the front layer of the cube, "M" the centre and "B" the rear. Entering "R" will restart the game (16K ZX-81).

```
  5 DIM A(27)
 10 DIM C(18)
 15 DIM R(18)
 20 DIM X(27)
 25 DIM Y(27)
 30 LET X$="[illegible]
[illegible]
[illegible]"
 35 LET Y$="[illegible]
[illegible]
[illegible]"
 40 FOR Z=1 TO 27
 45 LET X(Z)=VAL X$(Z*2-1 TO Z*
Z)
 50 LET Y(Z)=VAL Y$(Z*2-1 TO Z*
Z)
 55 NEXT Z
 60 LET C$="[illegible]
[illegible]"
 65 LET R$="[illegible]
[illegible]"
 70 FOR Z=1 TO 18
 75 LET C(Z)=VAL C$(Z*2-1 TO Z*
Z)
 80 LET R(Z)=VAL R$(Z*2-1 TO Z*
Z)
 90 NEXT Z
100 FOR Z=1 TO 27
105 LET A(Z)=0
110 NEXT Z
115 LET S=1
120 LET N=1
170 CLS
175 GOSUB 1000
180 IF S=1 THEN PRINT AT 2,0;""
"X"" TO GO"
185 IF S=-1 THEN PRINT AT 2,0;"
""O"" TO GO"
190 PRINT AT 20,14;"
     "
200 INPUT Z$
205 IF N=28 THEN GOTO 100
210 IF Z$(1)="R" THEN GOTO 100
215 IF Z$(1)="F" THEN LET Z=0
220 IF Z$(1)="M" THEN LET Z=9
225 IF Z$(1)="B" THEN LET Z=18
230 LET Z=Z+VAL Z$(2)
240 IF A(Z)<>0 THEN GOTO 300
```

```
 245 IF W=1 AND Z=14 THEN GOTO 3
90
 250 LET A(Z)=S
 255 LET M=M+1
 260 IF S=1 THEN PRINT AT Y(Z),X
(Z);"(inverse X)"
 265 IF S=-1 THEN PRINT AT Y(Z),
X(Z);"(inverse O)"
 270 GOSUB 500
 275 LET S=-S
 280 GOTO 100
 290 PRINT AT 20,14;"ILLEGAL/TRY
 AGAIN"
 295 GOTO 200
 500 FAST
 505 LET SX=0
 510 LET SO=0
 515 FOR Z=1 TO 13
 520 LET W=A(14-Z)+A(14)+A(14+Z)
 525 IF ABS W=3 THEN GOSUB 800
 530 NEXT Z
 535 FOR Z=1 TO 18
 540 LET W=A(C(Z)-B(Z))+A(C(Z))+
A(C(Z)+B(Z))
 545 IF ABS W=3 THEN GOSUB 800
 550 LET V=28-C(Z)
 555 LET W=A(V-B(Z))+A(V)+A(V+B(
Z))
 560 IF ABS W=3 THEN GOSUB 800
 565 NEXT Z
 570 PRINT AT 20,0;"(inverse X)=
 ";SX;"(inverse O)= ";SO
 575 SLOW
 580 RETURN
 800 IF W=3 THEN LET SX=SX+1
 803 IF W=-3 THEN LET SO=SO+1
 810 RETURN
1000 PRINT AT 0,4;"3D NOUGHTS AN
D CROSSES"
1004 PRINT AT 2,10;"1:(five grap
hic 7s):2:(five graphic 7s):3"
1006 PRINT AT 3,7;"(graphic 6:in
verse SPACE:graphic 7):/:(eight
SPACEs:graphic 6:inverse SPACE:g
raphic 7:graphic 8)"
1008 PRINT AT 4,6;"1:/(three SPAC
Es):/:SPACE:2:(five SPACEs):3:(t
hree SPACEs:graphic 8)"
1010 PRINT AT 5,2;"(graphic 6:in
verse SPACE:graphic 7:four SPACE
s):/:/(four SPACEs:graphic 6:inve
rse SPACE:graphic 7:four SPACEs:
graphic 8)"
1012 PRINT AT 6,2;"1:(five graph
ic 7s):3:(seven SPACEs:graphic 8)
"
1014 PRINT AT 7,2;"(graphic 5:se
ven SPACEs):/:(three SPACEs:graph
ic 8:seven SPACEs:graphic 8)"
1016 PRINT AT 8,2;"(graphic 5:se
ven SPACEs):4:(three SPACEs:grap
hic 8):SPACE:5:(four SPACEs):6"
1018 PRINT AT 9,2;"(graphic 5:se
ven SPACEs):/:/(three SPACEs:grap
hic 8:seven SPACEs:graphic 8)"
1020 PRINT AT 10,2;"(graphic 5:t
hree SPACEs):4:(three SPACEs):/:
SPACE:5:SPACE:(graphic 8:three S
PACEs):6:(three SPACEs:graphic 8
)"
1022 PRINT AT 11,2;"(graphic 5:s
even SPACEs):/:(three SPACEs:gra
phic 8:seven SPACEs:graphic 8)"
1024 PRINT AT 12,2;"4:(five SPAC
Es):5:SPACE:/:(three SPACEs):6:(
seven SPACEs:graphic 8)"
1026 PRINT AT 13,2;"(graphic 5:s
even SPACEs):/:(three SPACEs:gra
phic 8:seven SPACEs:graphic 8)"
1028 PRINT AT 14,2;"(graphic 5:s
even SPACEs):7:(three /:graphic
8):/:8:(five /s):9"
1030 PRINT AT 15,2;"(graphic 5:f
our SPACEs:three /s:four SPACEs:
graphic 5:four SPACEs:graphic 6:
inverse SPACE:graphic 7)"
1032 PRINT AT 16,2;"(graphic 5:t
hree SPACEs):7:(five SPACEs):8:S
PACE:(graphic 6:three SPACEs):9"
1034 PRINT AT 17,2;"(graphic 5:t
hree /s:eight SPACEs:graphic 6:g
raphic 6:inverse SPACE:graphic 7
)"
1036 PRINT AT 18,2;"7:(five grap
hic 8s):8:(five graphic 8s):9"
1090 RETURN
```



SCROLL is a machine code program to move the display across the screen in any one of eight directions. Enter Listing 1, keying 120 characters in the REM statement in line 1. The variables N1 to N8 correspond to the compass points NW, N, NE, W, E, SW, S and SE. RUN the program and the machine code will be POKEd into the REM statement. Then delete lines 10 to 70 and replace them with the demonstration routine in Listing 2. If the direct command 'GOTO 10' is then entered, the versatility of this scroll program will be demonstrated. Scroll, written by Stephane Cassis, of Paris. (16K ZX-81)


LISTING 1

LISTING 2

SHOPPING LIST

SHOPPING LIST is a program for the 16K Spectrum with printer which enables the user quickly and efficiently to compile a list of items to be purchased.

The possible items are displayed one by one and you must hit the Y or N key as appropriate. At the end of the routine the chosen goods are listed through the printer, with the option of adding extra requirements.

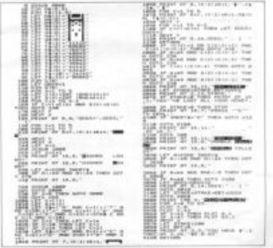
It is a genuinely useful memory aid and provides a rare practical use for the printer. The listing was supplied by Nigel [illegible] of [illegible]. (16K Spectrum).

HIGHER LOWER

HIGHER-LOWER is an excellent gambling routine based loosely on the TV game hosted by Bruce Forsyth. It involves trying to guess if the next card in a series will be higher or lower than the preceding one. In this version you need to have all five in correct order to win the round and the money.

Aces are a [illegible] since they can count as high or low. Two cards the same are decided on suit, and if you win the [illegible] forward. Also included is a Gamble/Collect routine which will double the odds if you gamble successfully.

The display shows the five cards face down and up, with appropriately garish flashing instructions. A fine program, well thought-out and presented, from Neil Stewart of Hastings, East Sussex. (16K ZX 81) Graphics
[illegible]



WORD

WORD PUZZLER is not so much a game as a game-generator.

The object is to make word puzzles like those which appear in puzzle magazines, where a series of words is hidden in a grid of random letters.

The words can be vertical, horizontal or diagonal, but rarely obvious.

The ingenious program requires a list of up to 15 words each of up to 15 letters, in order of length and pressing NEWLINE to start. The screen goes blank as the computer goes into fast mode as to arrange the

```
 10 REM **WORDSQUARE GENERATOR**
 20 REM (C) R.BLACKBURN 1982
 25 REM
 27 REM
 30 PRINT "[illegible]"
 40 PRINT ,,"THIS PROGRAM W
ILL GENERATE ""WORDSQUARE PUZZLES"" "
"PLEASE INPUT THE NUMBER OF WOR
DS YOU HAVE... YOU CAN USE UP TO 1
5"
 50 INPUT N
 55 IF N>15 THEN GOTO 50
 60 DIM X(15)
 70 DIM Y(15)
 80 DIM D(15)
 90 DIM G$(15,15)
100 CLS
110 PRINT "PLEASE INPUT YOUR ";
N;" WORDS NOW";" IN ORDER OF LENG
TH (LONGEST ";"FIRST,SMALLEST LAS
T)"
120 PRINT ,,"YOU CAN USE UP TO
15 LETTERS PER WORD"
125 PRINT
130 INPUT A$
135 DIM W$(N,LEN A$)
136 LET W$(1)=A$
138 PRINT A$
140 FOR M=2 TO N
145 INPUT W$(M)
150 PRINT W$(M)
160 NEXT M
170 PRINT AT 17,0;"IT WILL TAKE
ME A FEW MINUTES TO SORT THE
WORDS OUT ...""PRESS NEWLINE TO
START"
180 INPUT U$
190 CLS
200 FAST
210 REM ** MAIN LOOP **
215 LET E=1
220 FOR M=1 TO N
230 REM **RANDOM DIRECTIONS+STA
RTING POINTS**
240 LET D(M)=INT (RND*8)+1
245 IF D(M)=D(M-1) THEN GOTO 24
0
250 LET L=INT (RND*15)+1
260 LET C=INT (RND*15)+1
270 FOR A=1 TO LEN W$(M)
280 GOSUB 1000+D(M)*100
300 IF L<1 OR L>15 THEN GOTO 25
0
310 IF C<1 OR C>15 THEN GOTO 25
0
320 LET H$=G$(L,C)
330 IF H$<>" " AND H$<>W$(M,A)
THEN GOTO 250
340 LET X(A)=L
350 LET Y(A)=C
360 NEXT A
370 REM **OK WE HAVE A WORD FIT
SO PUT IT IN THE GRID**
380 FOR A=1 TO LEN W$(M)
390 LET G$(X(A),Y(A))=W$(M,A)
400 NEXT A
410 REM **NEXT WORD**
420 NEXT M
425 REM ** WORDSQUARE COMPLETE
**
430 SLOW
```

PUZZLER

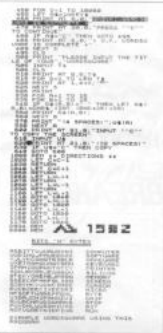
letters and hide the words in a square of 15 by 15 letters.

Eventually the word puzzle is shown on the screen and the game is to find the input words which are listed by the side of the square.

The grid can be printed so that a number of puzzles with different words can be made at the same time.

The dimensions of the square are set by the variable [illegible] which can be altered to provide other sizes.

Word Puzzler is from Andrew Blackburn, of North Hykeham, Lincoln.



```
  450 FOR D=1 TO 10000
  455 LET T$=INKEY$
  460 PRINT AT 0,0;"[illegible]"
[illegible]
  470 PRINT AT 20,0;"PRESS ""C"" 
TO CONTINUE"
  480 IF T$<>"C" THEN GOTO 450
  485 PRINT AT 0,0;" > W.P. WORDSQ
UARE IS COMPLETE <"
  490 NEXT D
  495 CLS
  500 PRINT "PLEASE INPUT THE TIT
LE OF YOUR ""WORDSQUARE"""
  505 INPUT T$
  506 CLS
  510 PRINT AT 0,0;T$
  515 FOR D=1 TO LEN T$
  520 PRINT AT 1,D-1;"-"
  525 NEXT D
  526 PRINT
  530 FOR A=1 TO 15
  535 FOR B=1 TO 15
  540 IF G$(A,B)=" " THEN LET G$(
A,B)=CHR$ (INT (RND*26)+38)
  550 PRINT G$(A,B);
  560 NEXT B
  570 PRINT "(4 SPACES)";W$(A)
  580 NEXT A
  600 PRINT AT 21,0;"INPUT ""C""
TO COPY THE SCREEN"
  610 INPUT U$
  620 PRINT AT 21,0;"(32 SPACES)"
  630 IF U$="C" THEN COPY
  640 GOTO 640
 1000 REM ** DIRECTIONS **
 1010 LET C=C-1
 1020 RETURN
 1040 LET C=C+1
 1050 RETURN
 1060 LET L=L-14
 1070 RETURN
 1080 LET L=L-15
 1090 RETURN
 1100 LET L=L+1
 1110 GOTO 1040
 1120 LET L=L+[illegible]
 1130 GOTO 1020
 1140 LET L=L-1
 1150 GOTO 1050
 1160 LET L=L[illegible]
 1170 GOTO 10[illegible]
 9998 REM
 9999 REM
```

[illegible]

[illegible]

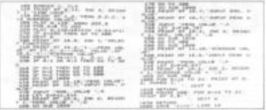
SAMPLE WORDSQUARE USING THIS PROGRAM

DAVID JOHNSON of Belper, Derbyshire, has sent a new version of the traditional arcade game of **Breakout**.

Two layers of bricks have to be demolished using a ball which bounces off walls and a bat controlled by the player. Ten points are scored for every brick hit and a bonus ball is given for each screen cleared. You start with three balls and control the bat by pressing Q for left and P for right. (16K ZX81)

81 BREAKOUT

```
[illegible]
```



MAKING WAVES for the 48K Spectrum will work out the average, RMS and peak values of an alternating sine wave. A menu is displayed and you must select one of the functions. If you want to find the peak value the program will ask you to enter the known RMS value; it is the other way round to find the RMS value and if you need to find the average value an input is required.

The graphics of the program are good and make this a fine educational program and mathematical aid. The program was sent by David Price of Caerphilly, Glamorgan.

making WAVES

CHORDS

FOR ALL who are trying to master a musical instrument, **Chords** is a good learning aid. By entering the name of a chord, the notes which comprise it are displayed on a piano keyboard drawn at the top of the screen.

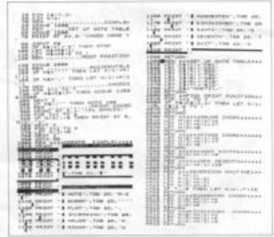
Despite some chords having complicated titles, the program can deal with them by using a code for the different elements, such as the note, whether is major or minor and whether flat/sharp or not. The code is shown on the screen beneath the keyboard.

To help in printing, the keyboard line 1030 contains a shifted 8 then a shifted 7 and a shifted space followed by alternate shifted 7s and spaces.

Line 1070 is made up of a shifted 8, six shifted 6s and a shifted 5, and in lines 1100 to 1160 there are six spaces for letters in the second set of doubles and [illegible] shifted 7s in line 1150.

In line 1110 there are two sets of double quotes, shifted Q, after TAB 26.

Chords was sent by Paul [illegible] of Wantage, Oxfordshire. It was one of the runners-up in the May competition in our companion publication, Sinclair User, and wins the 16K RAM pack.

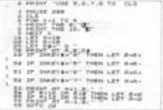


WIPE OUT

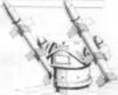
A DECEPTIVELY simple but frustrating game has been sent by Keith Paterson of Newmarket, Suffolk. When run, two walls are displayed with an O between them. The O can be used to obliterate the walls but as it does so it leaves a trail of Os behind it when moving vertically. No trail is left when moving horizontally.

The object is to finish with only one O on the screen. Despite a lengthy attempt by the Sinclair Programs reviewer, that proved impossible but Paterson maintains that it can be done with a little thought and concentration.

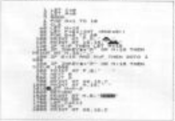
The O is moved by the cursor keys in the usual directions. It can run on the 1K ZX-81.



```
  2 PRINT "USE 5,6,7,8 TO  CLS"
  3 PAUSE 200
  4 CLS
  5 FOR X=1 TO 6
  7 PRINT TAB 6;"▮"
  8 PRINT TAB 15;"▮"
  9 NEXT X
 10 LET B=10
 20 LET A=10
 25 LET Z$=" O "
 30 PRINT AT A,B;Z$
 40 IF INKEY$="8" THEN LET B=B+1
 45 IF INKEY$="5" THEN LET B=B-1
 51 IF INKEY$="6" THEN LET A=A+1
 52 IF INKEY$="7" THEN LET A=A-1
 53 PRINT AT A+1,B;" "
 54 IF B>15 OR B<0 THEN LET B=0
 55 IF A>18 OR A<0 THEN LET A=0
 56 PRINT AT A-1,B;" "
 60 GOTO 30
```



SHIPS



```
   1 LET S=0
   2 RAND
   3 FOR N=1 TO 10
   4 CLS
[illegible]
10000 PRINT AT 20,10;S
```

FOR THE 1K ZX-81, **Ships** is a simple type of missile game in which a target moves at various distances from the gun across the screen and the objective is to hit it. Ten ships pass and the score is shown at the end of each game.

Only one shot can be made at a time, so the skill is in judging when to fire, so that the missile and ship coincide. When a hit is made in the middle of the ship, BANG is shown on the screen.

Press RUN and NEW LINE to start each game and F to fire the missile. The Sinclair Programs reviewer managed a top score of four.

The graphics in line 1400 are, all shifted, 6,8 and 4 and line 10020 [illegible] and W. Ships was sent by Ian Johnston, of Newmarket, Suffolk.

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 rooms by Glics or catching sight of a dreaded Balrog, which is fatal instantly.

Having slain the dragon, you must find the Arkenstone which assists you by protecting you from Glic-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 4K and was submitted by Mrs C M Coyne of Enfield.

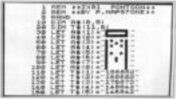
PONTOON

THIS VERSION of the card game **Pontoon** requires a minimum of 4K RAM on the ZX-81. The program is a very good simulation of the game which is played with the computer as the dealer.

S is pressed for stick and T for twist, with the answer as to whether you wish to play again after the end of a game being a Y or N. No betting is involved—only the satisfaction of having beaten the computer.

To help with the graphics for the card designs, on lines 30 to 100 there are five spaces between the quotes.

Pontoon was sent by Paul Mapstone of London [illegible].



```
   1 REM **ZX81  PONTOON**
   2 REM **BY P.MAPSTONE**
   5 RAND
  10 DIM A$(8,5)
  20 DIM T$(11,5)
  30 LET A$(1)="[illegible]"
  40 LET A$(2)="[illegible]"
  50 LET A$(3)="[illegible]"
  60 LET A$(4)="[illegible]"
  70 LET A$(5)="[illegible]"
  80 LET A$(6)="[illegible]"
  90 LET A$(7)="[illegible]"
 100 LET A$(8)="[illegible]"
 110 LET T$(1)="[illegible]"
 120 LET T$(2)="[illegible]"
 130 LET T$(3)="[illegible]"
 140 LET T$(4)="[illegible]"
 150 LET T$(5)="[illegible]"
```

```
[illegible] LET T$(1)="[illegible]"
[illegible] LET T$(2)="[illegible]"
[illegible] LET T$(3)="[illegible]"
[illegible] LET T$(4)="[illegible]"
[illegible] PRINT AT 21,20;"CREDITS: 10"
[illegible]
[illegible] PRINT AT 7,3;"DEALERS SCORE
[illegible]
[illegible] PRINT AT 18,3;"PLAYERS SCORE
[illegible] PRINT AT 17,3;"STICK OR TWI
[illegible]
[illegible] GOTO 300
```

```
[illegible]
[illegible] PRINT AT 10,18;"[illegible]"
[illegible] PRINT AT 10,18;"BUST"
[illegible] PRINT AT 10,18;"FIVE CARD T
[illegible] PRINT AT 7,18;"[illegible]"
[illegible] PRINT AT 7,18;"BUST"
[illegible] PRINT AT 7,18;"FIVE CARD TR
[illegible] PRINT AT [illegible];"YOU LOSE [illegible]
[illegible]
[illegible] PRINT AT 21,20;"CREDITS:";C
[illegible] GOTO 300
```

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 the ZX81 is a type of mini space invaders but with only one invader and one base and a much slower rate of firing.

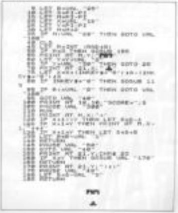
The object of the game is to hit the invader as many times as possible before it lands or you run out of missiles. Twenty-five missiles normally are given but that can be altered by changing the value of B in line 5.

You receive five points for hitting it but lose one to 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 PEEKS and POKES or other complicated functions.

If you want to get more memory, enter in direct mode the following BEFORE entering the program:
POKE [illegible] followed by NEWLINE [illegible] followed by NEWLINE.

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

Computer Combat was sent in by 14-year-old Anthony Wells, of Totnes, Devon.



```
[illegible]
```

SPEAR MAN'S RANK

SPEARMAN'S coefficient of rank correlation is used to prove hypotheses of relationship between two sets of values. This program calculates **Spearman's Rank** for up to [illegible] pairs of values; any more will run over the page on the final printout.

The program was sent by [illegible] of Richmond, Surrey, who writes that he had trouble with the calculations since the ZX 81 did not seem to store the numbers correctly. He overcame the problem by using the rounding technique in line [illegible] then dividing the result by [illegible] later in the listing. That gives a value to two decimal places [illegible].

Monster Maths

EDUCATIONAL GAMES are always popular and useful routines for the Sinclair machines. **Monster Maths** is designed to test simple mathematical skills.

The student is set 20 problems. Each incorrect answer extends a bridge towards a ravenous monster and 10 errors will enable it to cross over and eat you.

Lines can be changed to alter the range of numbers dealt with and the mathematical process required. Submitted by Russell Newby of Biggin Hill, Kent (16 ZX-81).

```
   5 PRINT AT 9,5;"(twelve SPAC
ES; graphic Q,T,Y,T,Y)"
  10 PRINT AT 18,5;"(inverse SPA
CE, ten SPACEs, five graphic Fs)"
  20 LET S=0
  25 LET T=0
  30 FOR F=1 TO 20
  35 PRINT AT 14,5;"(seventeen S
PACEs)"
  40 LET A=INT (RND*50)+10
  50 LET B=INT (RND*50)+10
  60 PRINT AT 14,5;A;"+";B;"=";
  70 INPUT N
  80 IF N=A+B THEN PRINT AT 14,1
2;N;" CORRECT"
  85 IF N=A+B THEN LET T=T+1
  90 IF N<>A+B THEN PRINT AT 14,
12;" WRONG"
 100 IF N<>A+B THEN LET S=S+1
 110 IF N<>A+B THEN PRINT AT 18,
S+2;"(graphic S)"
 120 IF S=10 THEN GOTO 200
 125 PAUSE 50
 130 NEXT F
 150 PRINT "SCORE ";T
 155 STOP
 200 FOR G=10 TO 5 STEP -.5
 210 PRINT AT 9,G;"(graphics Q,T
,Y,T,Y)"
 220 NEXT G
 230 PRINT "YOU ARE DEAD"
```

NUMBERBOARD

NUMBERBOARD is a 1K ZX-80 program whose object is to move the inverse plus sign from the top left-hand corner of the screen to the inverse position mark in the bottom right. You move with the usual cursor keys and your final score is the total of all the numbers on which you land in the course of your journey, the lower the better. To start the game, use GOTO 1 instead of RUN.

Numberboard was sent by Robert Hammond of Keswick, Cumbria.

```
 10 [illegible]
 20 [illegible]
 30 PRINT [illegible]
 40 [illegible]
 50 PRINT [illegible]
 60 LET [illegible]
 70 LET [illegible]
 80 LET [illegible]
 90 LET [illegible]
[illegible]
100 IF [illegible]
110 LET [illegible]
120 POKE [illegible]
130 INPUT [illegible]
140 POKE [illegible]
150 LET [illegible]
160 LET [illegible]
170 GOTO [illegible]
180 PRINT [illegible]
```

Jackpot

USERS with 1K can now join the losers using their machines to gamble. **Jackpot** is a fruit machine routine without the fruit. Hit any key except SHIFT or SPACE to change the line of numbers until three in a row appear. A running total is kept of your money and credits.

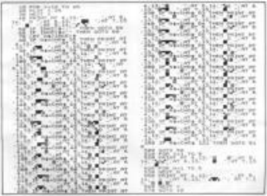
The program was sent by Darren Harlan of High Wycombe, Bucks (1K ZX-81).

```
 10 PRINT [illegible]
 20 PRINT [illegible]
 30 PRINT [illegible]
 40 LET [illegible]
 50 PRINT AT [illegible]
 60 PRINT AT [illegible]
 70 PRINT AT [illegible]
 80 PRINT AT [illegible]
 90 LET [illegible]
100 LET [illegible]
110 LET [illegible]
120 PAUSE [illegible]
130 PRINT AT [illegible]
135 PRINT AT [illegible]
140 PRINT AT [illegible]
150 IF [illegible] THEN GOTO [illegible]
160 GOTO [illegible]
170 LET [illegible]
```

SEMAPHORE

SEMAPHORE has sharp graphics and is educational too. You can teach yourself with the help of an unusual instructor supplied by Dr C. A. Jeffery of Hendon, Co Durham.

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



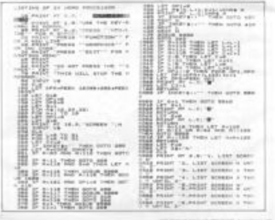
WOR PROC

A PROGRAM which allows the 16K ZX81 to be used as a word processor has been sent by S. J. Moore of Shoeburyness, Essex. It was a runner-up in the May competition in our companion publication, Sinclair User.

It allows the user to enter text directly on to the screen, the print position can be moved to any point using the cursor keys and up to 10 screens of text can be entered.

When run, a brief list of instructions is given and to continue press NEWLINE, when "Screen 1" will appear. Press NEWLINE again and you are ready to enter text.

Moore advises that when the program is run for the first time the user becomes used to entering text on the screen before proceeding to press



```
LISTING OF ZX WORD PROCESSOR
  10 PRINT AT 0,0;"
  20 PRINT AT 1,0;"USE THE KEY-B
  30 PRINT AT [illegible]"PRESS ""NEWLI
  [illegible] PRINT "PRESS ""FUNCTION"" F
  [illegible] PRINT "PRESS ""GRAPHICS"" F
  [illegible] PRINT "PRESS ""EDIT"" FOR
  [illegible] PRINT
  [illegible] PRINT "DO NOT PRESS THE ""S
  [illegible] PRINT "THIS WILL STOP THE P
  [illegible] INPUT U$
  [illegible] CLS
[illegible]
 [illegible] PRINT AT 10,0;"SCREEN ";N
 [illegible] INPUT U$
[illegible]
 [illegible] IF INKEY$="" THEN GOTO [illegible]
[illegible]
 [illegible] PRINT AT 0,0;"1. LIST SCREE
 [illegible] PRINT "2. LIST SCREEN N ON
 [illegible] PRINT "3. LIST SCREEN 1 TO
 [illegible] PRINT "4. LIST SCREEN X TO
 [illegible] PRINT "5.PRINT SCREEN N"
 [illegible] PRINT "6.PRINT SCREEN N ON
 [illegible] PRINT "7.PRINT SCREEN 1 TO
 [illegible] PRINT "8.PRINT SCREEN X TO
```

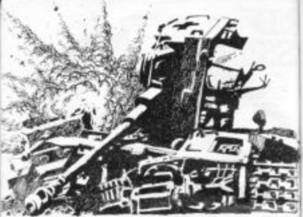
RD
CESSOR

[illegible]

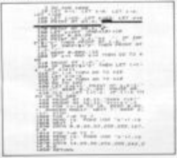
[illegible]

[illegible]

```
[illegible]
```



ROCKET ATTACK



ROCKET ATTACK is yet another spin-off from the Sinclair Programs R&D Industry. [illegible] of [illegible] has updated a program printed originally in our Mar-June issue.

He has transformed [illegible] Healey's Rocket Attack game, conceived originally for the ZX-81. The game involves a squadron of 10 planes heading towards your missile station. Pressing F will fire the missile. To destroy the planes you can either hit them directly or leave the missile in their path. Your hard-eyed reviewer only managed 13 out of 16 Graphics mode.

100—Three graphics by twenty-nine graphics in

170—Graphics 6

190—"ALL" as in graphic mode

440—Inverse video "Gameover".

```
  1 LET S=CODE "?"
  2 LET D=S
  3 LET C=S
  4 LET M=CODE "[graphic 1]"
  5 FOR B=M TO CODE "[graphic 4
]"
  6 FOR A=B+C TO CODE "[graphic
E]"-C
  7 PRINT AT B,A;"T"
  8 NEXT A
  9 LET C=C+M
 10 NEXT B
 11 LET X=CODE "[graphic T]"
 20 LET F=M
 25 LET Y=CODE "Y"
 30 LET X=X+(INKEY$="8" AND X<C
ODE "[graphic T]")-(INKEY$="5" A
ND X>CODE "")
 35 PRINT AT Y,X;" O "
 40 IF F=CODE "[graphic E]" THE
N GOTO CODE "[inverse -]"
 45 IF INKEY$="0" THEN GOSUB CO
 47 IF INKEY$="0" THEN GOSUB CO
DE "W"
 50 GOTO CODE "."
 60 PRINT AT Y,X+M;
 65 IF PEEK (PEEK 16398+VAL "25
6"*PEEK 16399)=CODE "T" THEN LET
 D=D+M
 70 PRINT AT Y,X+M;"O";AT Y,X+M
;"[inverse O]";AT Y,X+M;" "
 75 LET Y=Y-M
 80 IF Y=M THEN LET F=F+M
 90 IF D>S AND RND>VAL ".5" THE
N LET X=X-M
 95 IF D>S AND RND<VAL ".5" THE
N LET X=X+M
100 LET D=S
110 IF Y=M THEN RETURN
120 GOTO CODE "W"
150 PRINT D
```

SIXTEEN PINS appear at the top of the screen for **Bowling** and the ball at the bottom. Use keys 5 and 8 to line up the ball and press key 0 to bowl. The ball will be deflected by impact with the pins and thus make next rack more difficult. For every pin hit you will add one to your score. The score is printed after eight balls and the game ends [illegible]

BOWLING

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 these lines can easily be deleted and the same information is displayed automatically on the screen.

Adding Machine is from [illegible] Sales of [illegible] Ltd.

```
  10 REM [illegible]
  20 REM [illegible] LTD 1982
  30 REM
  40 REM SOMETIMES EVEN VERY [illegible]
[illegible]
  50 REM
  60 [illegible]
  70 CLS
  80 PRINT "ADDING MACHINE, BY [illegible]
[illegible]"
  90 PRINT
 100 PRINT
 110 PRINT "[illegible]
[illegible]
[illegible]
 114 PRINT
 116 PRINT "[illegible]
[illegible]
[illegible]
[illegible]
 120 PRINT
 130 PRINT "[illegible]
[illegible]
 140 PRINT AT 21,0;"PRESS A KEY [illegible]
 150 PAUSE 4E4
 160 REM
 168 REM ALL STATEMENTS [illegible]
[illegible]
 170 [illegible]
 175 CLS
 180 [illegible]
 190 LPRINT ,"[illegible]"
 200 [illegible]
 210 PRINT "[illegible]","[illegible]"
 220 LPRINT "[illegible]","[illegible]"
 240 SCROLL
 250 PRINT
 260 LPRINT
 270 [illegible]
 280 INPUT [illegible]
 290 INPUT [illegible]
 300 [illegible]
 305 SCROLL
 310 PRINT [illegible]
 320 LPRINT [illegible]
 330 GOTO [illegible]
 340 [illegible]
 350 [illegible]
```

```
[illegible]                  [illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]

[illegible]                  [illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]
```

```
100 REM UTILITY DRAW
110 REM P. SAFRANEK
120 GO SUB 340: CLS : LET x=0:
LET y=0
130 LET a$=INKEY$
140 IF a$<>"c" AND a$<>"d" AND
a$<>"o" AND a$<>"s" AND a$<>"r"
THEN GO TO 210
150 IF a$="c" THEN GO SUB 380
160 IF a$="r" THEN GO SUB 410
170 IF a$="s" THEN GO SUB 520
180 IF a$="d" THEN GO SUB 430
190 IF a$="o" THEN GO SUB 490
210 LET [illegible]
220 LET [illegible]
230 LET [illegible]
240 LET [illegible]
250 LET [illegible]
260 LET [illegible]
270 IF x<0 THEN LET x=0
280 IF x>255 THEN LET x=255
290 IF y>175 THEN LET y=175
300 IF y<0 THEN LET y=0
310 PLOT x,y: PLOT OVER 1;x,y
320 PLOT x,y: PLOT OVER 1;x,y
330 GO TO 130
340 INPUT "ink  (0-7)";i;"pap
er (0-7)";p;"border(0-7)";b
350 IF i<0 OR i>7 THEN GO TO 34
0
360 IF p<0 OR p>7 THEN GO TO 34
0
370 IF b<0 OR b>7 THEN GO TO 34
0
380 BORDER b: PAPER p: INK i
390 INPUT [illegible]: IF
o<>1 AND o<>0 THEN GO TO 390
400 RETURN
410 INPUT "x";x,"y";y
420 RETURN
430 INPUT "x coord";a
440 INPUT "y coord";b
450 INPUT "draw x";c
460 INPUT "draw y";d
470 PLOT a,b: DRAW c,d
480 RETURN
490 INPUT "x";xx;"y";yy;"r";r
500 CIRCLE xx,yy,r
510 RETURN
520 INPUT "name"; LINE f$
530 SAVE f$SCREEN$
540 RETURN
550 SAVE "ut.draw" LINE 100
```

UTILITY DRAW

PETER SAFRANEK of Ashford, Middlesex, has sent a very useful graphics program for the 16K or 48K Spectrum. Commands available are 'c' to input the colour, 'd' to draw (to inputted x and y and draw x and draw y), 'o' to draw a circle around inputted x and y co-ordinates and inputted radius, 's' to save the design on the screen as a SCREEN$ and 'r' to re-set the flashing pixel cursor to inputted x and y co-ordinates.

The pixel cursor is moved in any one of eight directions using the eight letters around 'H' on the keyboard—i.e. T, Y, U, G, J, B, N and M. Once you have entered the program you can SAVE it by entering 'RUN 550'.

Practice and patience can produce displays like the map of Europe shown; an outline on the screen is available as a help for this tedious exercise. The advantage of such a versatile display for background programs is obvious (16 or 48K Spectrum).

Sinclair ZX Spectru

16K or 48K RAM... full-size moving-key keyboard... colour and sound... high-resolution graphics...

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[illegible]

Key features of the Sinclair ZX Spectrum

- [illegible]
- [illegible]
- [illegible]
- [illegible]
- [illegible]
- [illegible]
- [illegible]
- [illegible]
- [illegible]

[illegible]

trum

The ZX Printer – available now

Designed exclusively for use with the Sinclair ZX range of computers, the printer offers ZX Spectrum owners the full ASCII character set – including lower-case characters and high-resolution graphics.

A special feature is COPY which prints out exactly what is on the whole TV screen without the need for further instructions. Printing speed is 50 characters per second, with 32 characters per line and 9 lines per vertical inch.

The ZX Printer connects to the rear of your ZX Spectrum. A roll of paper (65ft long and 4in wide) is supplied, along with full instructions. Further supplies of paper are available in packs of five rolls.

The ZX Microdrive – coming soon

The new Microdrives, designed especially for the ZX Spectrum, are set to change the face of personal computing.

Each Microdrive is capable of holding up to 100K bytes using a single interchangeable microfloppy.

The transfer rate is 16K bytes per second, with average access time of 3.5 seconds. And you'll be able to connect up to 8 ZX Microdrives to your ZX Spectrum.

All the BASIC commands required for the Microdrives are included on the Spectrum.

A remarkable breakthrough at a remarkable price. The Microdrives are available later this year, for around £50.

ZX Spectrum software on assettes – available now

The first 21 software cassettes are now available directly from Sinclair. Produced by ICL and Psion, subjects include games, education, and business/household management. [illegible] 'Flight Simulation', 'Chess', 'History', 'Inventions', 'VU-CALC', 'VU-3D' … 21 programs in all. There's something for everyone, and they all make full use of the Spectrum's colour, sound and graphics capabilities. You'll receive a detailed catalogue with your Spectrum.

RS232 / network interface board

This interface, available later this year, will enable you to connect your ZX Spectrum to a whole host of printers, terminals and other computers.

The potential is enormous. And the astonishingly low price of only £20 is possible only because the operating systems are already designed into the ROM.

sinclair

Sinclair Research Ltd, Stanhope Road,
Camberley, Surrey GU15 3PS.
Tel: Camberley (0276) 685311.

How to order your ZX Spectrum

BY PHONE – Access, Barclaycard or Trustcard holders can call 01-200 0200 for personal attention 24 hours a day, every day. BY FREEPOST – use the no-stamp needed coupon below. You can pay by cheque, postal order, Access, Barclaycard or Trustcard.

EITHER WAY – please allow up to 28 days for delivery. And there's a 14-day money-back option, of course. We want you to be satisfied beyond doubt – and we have no doubt that you will be.

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Qty	Item	Code	Item Price £	Total £
	Sinclair ZX Spectrum – 16K RAM version	100	125.00	
	Sinclair ZX Spectrum – 48K RAM version	101	175.00	
	Sinclair ZX Printer	27	59.95	
	Printer paper (pack of 5 rolls)	16	11.95	
	Postage and packing: orders under £100	28	2.95	
	orders over £100	29	4.95	
			Total £	

Please tick if you require a VAT receipt ☐

*I enclose a Cheque/postal order payable to Sinclair Research Ltd for £

*Please charge to my Access/Barclaycard/Trustcard account no.

*Please delete/complete as applicable

Signature

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[illegible]

CHESS PLAYER

[illegible]

SPEAKEASY

[illegible]

METEOR STORM

[illegible]

SPACE INTRUDERS

[illegible]

QS SCRABBLE QS INVADERS
QS ASTEROIDS QS DEFENDA

[illegible]

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