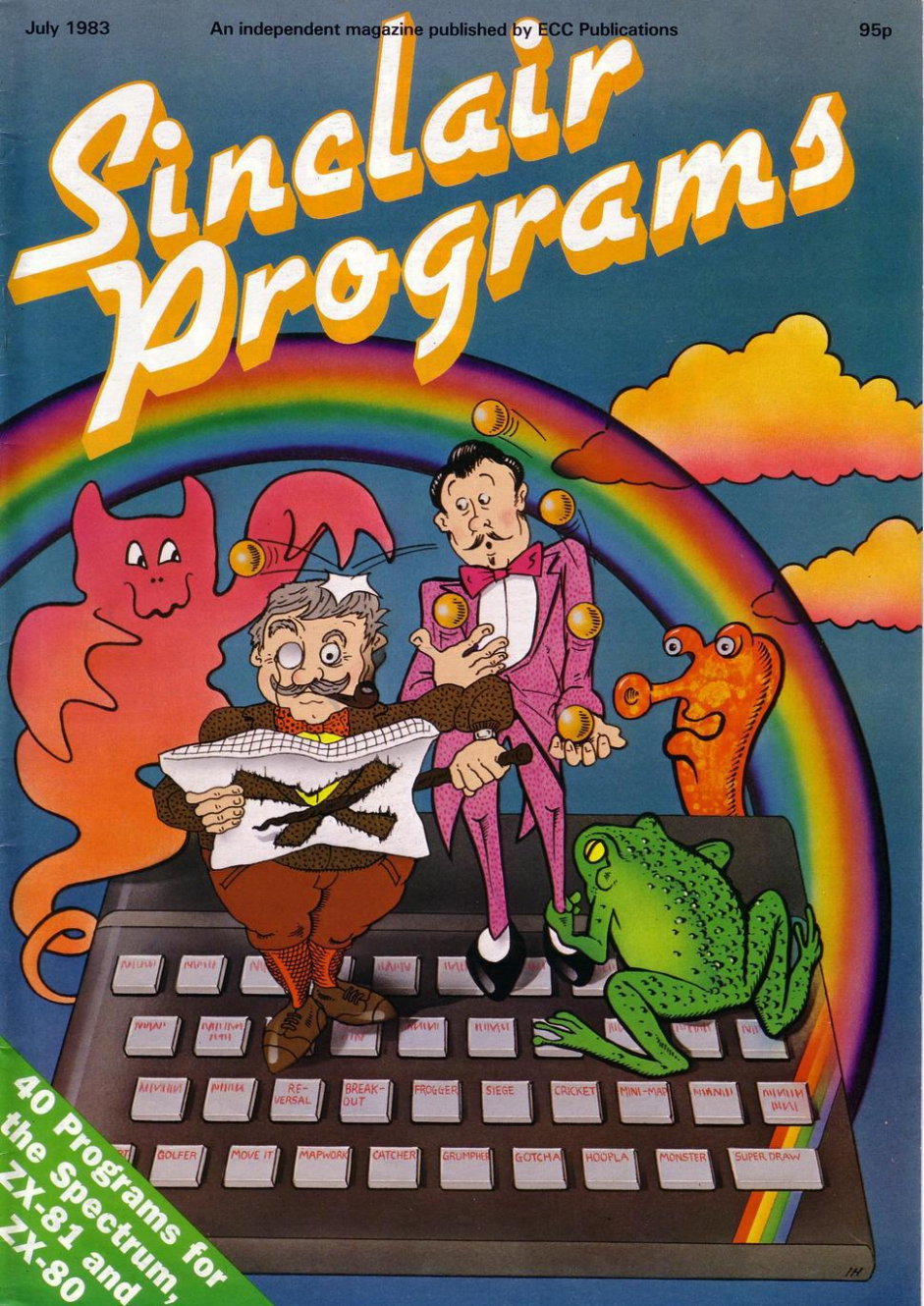
July 1983 An independent magazine published by ECC Publications 95p

Sinclair Programs



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

Second Edition Just Published

If you only buy ONE computing book

THIS IS THE CLASSIC!

An entertaining, but **thorough** reference source with the most readable, comprehensive glossary you'll find anywhere. The Good Computing Book for Beginners is an essential A-Z of all the facts you need to know about computing — and none you don't!

Whether you're brand new to computing, or an old hand keen to stay ahead, you'll score by keeping this classic, top-selling book within reach to use again and again.

The author, Dennis Jarrett, is a successful journalist who was also founder editor of Which Computer? magazine — so his first edition quickly became a standard work. Now this new, substantially enlarged and revised edition covers the latest trends, terms and technology with the relevant facts — and ONLY the relevant facts — in **plain English.**

Here's another fact you'll find fascinating: it will only cost you £2.95!

Use the coupon below to get your copy right away — or buy it soon from your bookshop. It's the **one** book you'll turn to again and again.

Please send me ____ copy(ies) of The Good Computing Book for Beginners by Dennis Jarrett at £2.95 each plus 50p post and packing. I enclose a cheque for ____ / Please debit my credit card account Visa/Access/Diners/Amex number ____

Signature ____

Name ____ (please print clearly)

Address ____

Send to: ECC PUBLICATIONS LIMITED
30-31 Islington Green
London N1 8BJ

Contents

Editor
Nigel Clark

Production editor
Harold Mayes MBE

Design
Elaine Bishop

Program Reviews
Rebecca Ferguson

Editorial director
John Sterlicchi

Advertisement manager
John Ross

Sales executive
Frank Humphrey-Gaskin

Editorial/production assistants
Margaret Hawkins
Dezi Epaminondou

Managing director
Terry Cartwright

Chairman
Richard Hease

Sinclair Programs is published monthly by ECC Publications Ltd.

Telephone
All departments
01-359 7481

If you would like to contribute to any of the Sinclair User group of publications please send programs, articles or ideas for hardware projects to:
Sinclair User and Programs,
ECC Publications,
30-31 Islington Green,
London N1 8BJ

Programs should be on cassette and articles should be typed. We cannot undertake to return them unless a stamped-addressed envelope is included.
We pay £10 for the copyright of each program published and £50 per 1,000 words for each article used.

© Copyright 1983
Sinclair Programs
ISSN No 0263-0265

Printed and typeset by
Cradley Print PLC,
Warley,
West Midlands

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

Cover Design/Illustrations
Ivan Hissey

29 PROGRAM OF THE MONTH
54 ERRORS AND MISHAPS

ZX-80
8 SIMULTANEOUS EQUATIONS

ZX-81
7 NUMBER CRUNCHER
12 LACE MAKER
14 BLACK HOLE DESTROYER
BOWLING
19 REVERSAL
21 LETTER FREQUENCY
ALPHABET TIME
23 CATACOMB
25 FORMULAE
26 REPETITION
28 EXPLOSIONS
29 GOTCHA
32 CATCHER
34 SIEGE
36 CHARACTER ENLARGER
38 FROGGER
MINIMAP
48 FRUIT MACHINE
GIANT WORMS
50 BREAKOUT

SPECTRUM
9 FLOWCHART
10 APPLE THIEF
13 ASTRAL FOXGLOVES
20 LISSAJOUS
22 GRUMPHERS
24 MOVE IT
27 MAPWORK
30 CRICKET
33 SUPERDRAW
35 HOOP-LA
37 LIGHT CYCLES
39 SPIRODRAW
40 DEFENDER
47 PERSONAL FINANCE
49 MONSTERS
51 ORCHARD
52 EXPLODING BORDER
53 GOLFER

To help with entering graphics characters we have adopted a system of writing the characters for the ZX-81. We indicate inverse characters by the letter i and graphics by g, so that an inverse letter W is shown as iW and the graphics character on key 6 is denoted by g6.

Spaces are shown by sp and inverse spaces are isp. If some occur together, for instance a row of six spaces, they are shown by 6*sp and where there is a combination of characters each one is divided by a colon, thus sp:isp:6*g6 means a space followed by an inverse space and then six characters on the 6 key.

Where whole words are written in inverse letters they appear in the listings as lower-case letters.

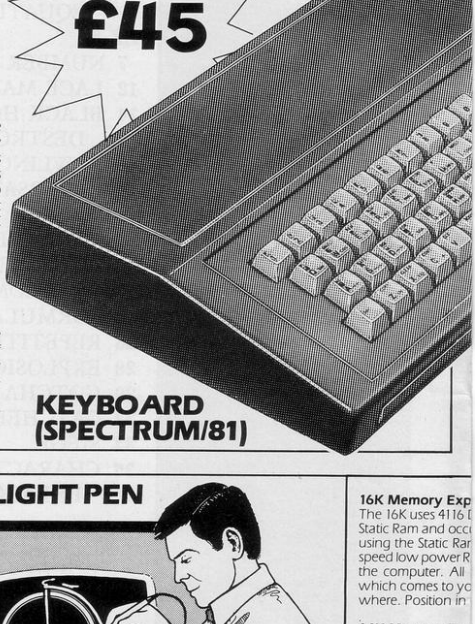
In the Spectrum listings, letters to be entered in graphics mode are underlined, while other graphics instructions are underlined and take the form shown above, with the addition that inverse graphics characters are represented by the letters "ig".

dk'tronics

ZX KEYBOARD FOR USE WITH/81 SPECTRUM

Our new cased keyboard has 52 keys, 12 of these are used for the numeric pad. The numeric pad offers some useful features, you can cursor with one hand and it will be a boon for anyone who enters a lot of numeric data. The pad is a repeat of the 1-9 keys plus it has a full stop and a shift key. The numeric pad keys are coloured in red, the normal keyboard keys are grey, with the case being black which makes the whole thing very attractive. The case measures 15 × 9 × 2½. The computer (either 80/81 or spectrum) fits neatly inside. You will have to remove the computer from its original case, it is then screwed to the base of the case. The case had all the bosses already fitted and the screw holes are marked. Also fitted inside the case is a mother board (81 model only) which allows 16K, 32K and 64K to be fitted in the case. All the connections are at the rear of the case i.e. Power, Mic, Ear, T.V. and the expansion port. The case is large enough for other add ons also to be fitted inside. One of these could be the power supply, then you could very quickly fit a mains switch, or a switch on the 9V line. This means you have a very smart self-contained unit. This case does not stop you from using any other add-ons that you may have e.g. Printer etc. We are convinced that this is the best keyboard available at present. It offers more keys and features than any other keyboard in its price range.

£45



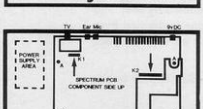
KEYBOARD (SPECTRUM/81)

NOTE

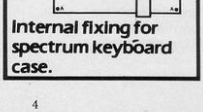
The case can be purchased separately with the keyboard aperture uncut, so if you have one of our early uncased keyboards, or in fact any other suppliers' keyboards, these could be fitted. The keyboard is connected to your computer by a ribbon cable and this has connectors fitted which simply push into the Sinclair connectors. It is a simple two minute job and requires no electronic skills. This keyboard does not need any soldering. Please specify on order whether you require the ZX 81 or Spectrum case.

SPECTRUM MODEL

This is supplied with spectrum legends, and a slightly different base for fitting the spectrum inside, again all the connectors are at the rear of the case and there is plenty of room for the power supply (and other add-ons). Should you want to change, we can supply both the Spectrum legends and details of updating your case which will enable modification from the ZX 81 to spectrum. PLEASE specify on your order whether you require the ZX 81 or spectrum case.



Internal fixing for ZX 81 keyboard case.



Internal fixing for spectrum keyboard case.

SPECTRUM LIGHT PEN

The pen enables you to produce high resolution drawings on your own television set, saving a vast amount of time over using basic programming statements, such as Plot, Draw etc. You can erase, modify and save drawings and it comes complete with software program. The superb light pen is available from D.K. tronics.

£19.95

16K Memory Exp
The 16K uses 4116 [
Static Ram and occ
using the Static Ra
speed low power R
the computer. All
which comes to yo
where. Position in

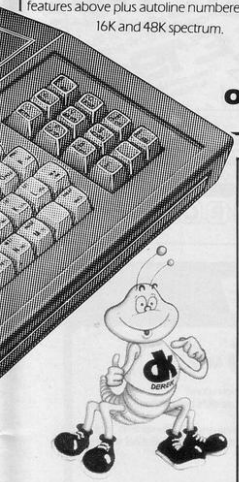
64K Memory Exp
All the above infor
advantage lies in th
56K of usable mem
the use of other ad
8192-65536. The Bl
Spectrum Memor
Upgrade your Spec
it is simply slipped ir
are supplied, and th
time. The fitting rec
same as Sinclair's u

ZX 80~81 Spectrum HARDWARE

SPECTRUM/81 TOOLKIT

This is the toolkit which won acclaim in the feature in the August 1982 issue (pages 29 and 30) of Sinclair User. "It is the most impressive program, fast in execution with clear and full instructions...it stands out from the rest of the field." The ZXED is a powerful editor for use on the expanded ZX81. It is intended for use by the serious BASIC programmer and offers several useful and time saving features most helpful during all stages of program development. The facilities provided are as follows: ALTER, BYTES, COPY, DELETE, FIND, HELP, INSERT, KEEP, MOVE, RENUMBER AND VERIFY. The Spectrum Toolkit contains most of the features above plus autoline numberer and append, and will run in the 16K and 48K spectrum.

Both at only £6.95



4K GRAPHICS ROM £24.95

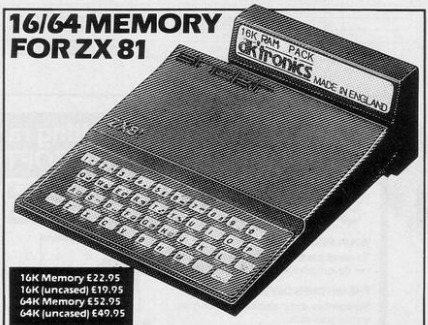
The DK Graphic module is our latest ZX 81 accessory. This module unlike most other accessories fits neatly inside your computer under the keyboard. The module comes ready built, fully tested and complete with a 4K graphic ROM. This will give you an unbelievable 448 extra pre-programmed graphics, your normal graphic set contains only 64. This means that you now have 512 graphics and with their inverse 1024. This now turns the 81 into a very powerful computer with a graphic set rarely found on larger more expensive machines. In the ROM are lower case letters, bombs, bullets, rockets, tanks, a complete set of invaders graphics and that only accounts for about 50 of them, there are still about 400 left (that may give you an idea as to the scope of the new ROM). However, the module does not finish there, it also has a spare holder on the board which will accept a further 4K of ROM/RAM. This holder can be fitted with a 1K/2K/RAM and can be used for user definable graphics so you can create your own custom character sets.

WHY WAIT?
ORDER TODAY FOR FAST DELIVERY

FLEXIBLE RIBBON CONNECTOR

If you have ever had whiteouts or system crashes this could be the answer. It stops the movement between the computer and the RAM expansion, it is supplied with a ribbon, 6 inches long, with a male connector at one end and a female at the other, at only **£10**

16/64 MEMORY FOR ZX 81



16K Memory £22.95
16K (uncased) £19.95
64K Memory £52.95
64K (uncased) £49.95

The above illustration shows the casing for the 16K or massive 64K.

nsion £22.95

ynamic Ram Chips. We use the dynamic as they are much denser than by less space. They are also much cheaper than the equivalent product . The Ram is manufactured with high quality materials, and uses high ms. It is supplied ready-built and only needs to be plugged into the rear of he components are fitted into holders. This massive add-on memory fully assembled and tested is the cheapest 16K memory available anywhere memory from 16384 to 32768. (Same as the Sinclair memory.)

16K (UNCASED) £19.95

nsion £52.95

ation on the 16K also applies to the 64K Memory Expansion, but the 64K giving nearly FOUR times the memory. This advanced model has ry. In addition, the block from 8K to 16K can be switched out to enable -ons. The graphics ROM is to be used in this area. Position in Memory: ck From 8192-16384 is switchable. **64K (UNCASED) £49.95**

Expansion MK1 £35.00, MKII £30.00.

um to 48K of user Ram. The Spectrum memory expansion is simple to fit, ide the case, and then only requires plugging in. Full fitting instructions e only tool you will need is a screwdriver and just two minutes of your ires no electronic skills. Position in memory from 32768 to 65536. (The grade to 48K).

Please state type of machine, which Rom memory size, quantity and place when ordering.

Please send me . . . . . @ £. . . . . .

Please send me . . . . . @ £. . . . . .

Please send me . . . . . @ £. . . . . .

Please add on £1.25 for P/P

In enclose cheque/P.O. payable to DK Tronics total £ . . . . . .

or debit my Access/Barclaycard [ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ]

Signature . . . . . MASTERCARD VISA

Name . . . . . .

Address . . . . . .

. . . . . .

Send to DK tronics, Unit 2, Shire Hill Ind Est, Saffron Walden, Essex CB11 3AQ. Tel: (0799) 26350 (24 hrs) 5 lines.

dk'tronics

New colour brochure now available, send SAE for quick return

AGF JOYSTICK INTERFACE II

ONLY 19.95 +£1.00P&P

for

sinclair ZX Spectrum 81

INTERFACE II COMPATIBLE SOFTWARE

ZX SPECTRUM

Abbex ... • Spookyman • Invasion • Harrier Attack • The Android Run • High Noon • ETX

Abersoft ... Mazeman, The Wizards Warriors

Apocalypse Software ... Galactic Jailbreak

Axis ... Labyrinth

Campbell Systems ... Guipman

CDS Micro Systems ... Leapfrog

C. Tech ... Specman

D. J. L. Software ... • Froggy • 3D Tanx £4.95 • Meteorods

Hewson Consultants .. Nightflite, Spectaders, Maziacs

ICL ... Star Trek (Mar. Dock)

Imagine ... Zzoom, Ghost's Revenge

Micromania ... • Escape £4.95 • 3D Tunnel £5.95

New Generation Software ... Time Bandits, Spectral Maze, Flight Simulation VU-3D

Newsoft Products ... Meteor Storm, Space Intruders, Gnasher, Spectapede

Poion ... Flight Simulation VU-3D

Quicksilva ... Meteor Storm, Space Intruders

R + R Software ... Gnasher, Spectapede

ZX SPECTRUM continued

Silversoft ... • Ground Attack • Cyber Rats £5.95 • Pony Express • Vic-Man

Vectis Software ...

LATEST ADDITION:
New Generation Software
☐ Knot In 3D £5.95

* State "AGF version"

ZX81

Abersoft ... Mazeman, Galaxians

Arrin ... Guip II, Buckman, Froggy, Pilot

Campbell Systems ... 3D Monster Maze

D.A.L. Software ... 3K Breakout, Time Bandits

Hewson Consultants .. Krazy Kong, Ghost Hunt, Maze Drag Race

New Generation Software ... Bomber

Newsoft Products ... QS Invaders, Scramble

Poion ... Asteroids

Quicksilva ... Gobblers, Asteroids

Silversoft ... • Super Scramble • Frog Hopper

KEY FEATURES

- Proven cursor key simulation for maximum software support
- Accepts Atari, Competition Pro, Wico, Starfighter, Le Stick, etc Joysticks
- Second Joystick facility
- Eight directions programmed in simple BASIC
- Rear extension connector for all other add-ons
- Free demo program, 'Video Graffiti' + full instructions

JOYSTICKS Atari CONTROLLERS

ONLY £7.54 inc VAT + P&P

FROM: MR/MRS/MISS

ADDRESS

SEND C.W.O. (NO STAMP NEEDED) TO: A.G.F. HARDWARE, DEPT. SPR

FREEPOST, BOGNOR REGIS, WEST SUSSEX, PO22 9BR

QTY	ITEM	ITEM PRICE	TOTAL
	INTERFACE MODULE II	20.95	
	JOYSTICK(S)	7.54	
	SOFTWARE AS TICKED ON LIST		
	SOFTWARE AS TICKED ON LIST		
ZX81 ☐	ZX SPECTRUM ☐ Please tick	FINAL TOTAL	

DEALER ENQUIRIES WELCOME *EXPORT PRICES ON APPLICATION*

MICROPOWER MICROPOWER MICROPOWER MICROPOWER MICROPOWER MICROPOWER

THE MICRO POWER SPECTRUM 'ADD-ON'

Bring 'JOY' to your Joysticks!!
Make your beeps BEEP!!
Create Multi-Channel Sound Effects!!

BLADAM!!! BOOK!

The new Spectrum Add-On gives you:

- ONE Atari/Commodore type Joystick Port
- TWO Potentiometer Joystick Ports
- Amplification of the standard sound output
- THREE-CHANNEL, PROCESSOR INDEPENDENT, PROGRAMMABLE SOUNDS — music, gun-shots, explosions etc
- Demonstration tape and full operating instructions

Note: The 'Add-On' simply plugs straight onto the back of your Spectrum. No soldering required.

Now offered at the incredibly LOW price of £19.95 (Please add 55p Post & Packing) Incl. VAT

JOYSTICKS (Potentiometer-Type)
BUILT £7.45 KIT (incl. case) £5.95

NOTE: We stock (and market) PROGRAM POWER SOFTWARE for the BBC, ACORN, SPECTRUM and DRAGON 32. Send S.A.E. for appropriate catalogue.

MICRO POWER

8/8a REGENT STREET, CHAPEL ALLERTON, LEEDS LS7 4PE. Tel. (0532) 683186 or 696343

BBC, DRAGON & ACORN DEALERS

VISA

MICROPOWER MICROPOWER MICROPOWER MICROPOWER MICROPOWER MICROPOWER

An Exciting range for 16K ZX81 from SOFTWARE FARM

SUPER SCRAMBLE

YOUR MISSION

To penetrate the witches defences, enter her cavern and destroy her wicked heart.

THE WITCHES DEFENCES

Stalagmites and stalactites - which grow across your path.

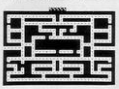
Volcanoes - to get past alive - if you can!

Vampire Bats - that cling to your ship and make controls sluggish

Cave-ins - should you hit the side of the cave with your Laser Cannon or Bomb, part of the roof will cave in on you

- Written entirely in machine code
- Hall of Fame
- 1 or 2 players
- Mystery score positions to bomb
- 5 skill levels

GOBBLERS Mk 2



Beat that high score!
Gobble those dots before those meanies gobble you!
Your only aids are four 'Power Pills' which make the meanies edible. But not for long!

- Machine coded for fast action
- Extra 'Gobbler' for 10,000 points
- On screen scoring
- High score with enter name facility
- Up to 4 players

Improved Mk 2 version!

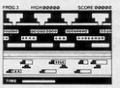
ASTEROIDS

Stay alive as long as possible in open space filled with flying rocks. Score by shooting them - which also causes them to break into lots of little bits and makes life even worse!

- Machine coded for fast action
- On screen scoring
- High score with enter name facility
- Up to 4 players
- Extra ship for 1,000 points (not as easy as it sounds!)
- Ship moves just like arcade version
- Rotate left/rotate right/thrust
- Fires in all 8 directions
- Increasing number of asteroids
- Three asteroid sizes
- alien spaceship (fires back!)

All games £5.95 each

NEW! FROG HOPPER



- 50 Skill levels!
- Played against the clock - froggie only has a short while to live!

Jump your frog over the lanes in the road - preferably without being turned into jam by the approaching traffic! Then cross the river by hitching a few rides on some passing logs and finally into the safety of your hole on the opposite bank. Once all 'Frog Holes' have been filled you start again with a different pattern and a bonus frog.

when more than one game purchased deduct £1.00 from each tape!

Send your order to:
Dept SP2, THE SOFTWARE FARM, Craigo Farm, Botany Bay, Tintern, Gwent

NUMBER CRUNCHER

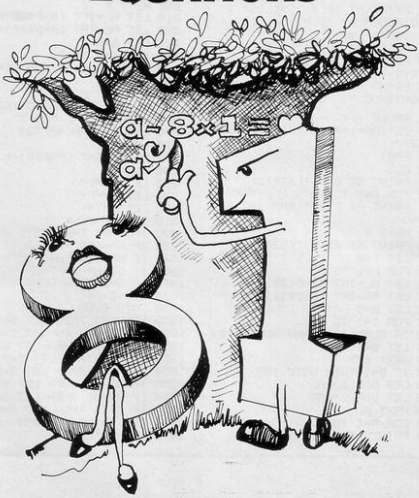
IN A FIELD surrounded by fences and hedges, the object is for you to hit the numbers one to nine, in numerical order, as quickly as possible. If you hit a fence or hedge you bounce back into the field.

Number Cruncher was written for the 16K ZX-81 by Allan Jarvis of Cottingham, North Humberside.

```
  10 DIM D(9,2)
  11 DIM M(10)
  12 LET M(1)=-34
  13 LET M(2)=-33
  14 LET M(3)=-32
  15 LET M(4)=1
  16 LET M(5)=34
  17 LET M(6)=33
  18 LET M(7)=32
  19 LET M(8)=-1
  20 LET M(9)=-34
  21 LET M(10)=-33
  25 PRINT AT 0,0;"DO YOU WANT I
NSTRUCTIONS ? (Y/N)"
  26 IF INKEY$="N" THEN GOTO 39
  27 IF INKEY$<>"Y" THEN GOTO 26
  28 CLS
  29 PRINT TAB 8;"number-crunche
r";AT 2,1;"YOU ARE IN A FIELD SU
RROUNDED    BY FENCES AND HEDGES.
 THE        OBJECT OF THE GAME IS
 TO EAT     THE NUMBERS 1 TO 9 IN
 THE        CORRECT ORDER AS QUIC
KLY AS"
  30 PRINT AT 7,1;"POSSIBLE. IF
YOU HIT A FENCE     OR HEDGE YOU
BOUNCE BACK INTO    THE FIELD AUT
OMATICALLY.         THE CONTROLS
ARE:"
S  31 PRINT AT 12,2;"R   T   Y   A N
OVICE MAY FIND IT(4*isP;9y;sP;is
P;sP;9t;)"
  32 PRINT AT 14,4;"(9y;isP;9t;4
*sP)EASIER NOT TO MOVE(5*sP;F;2*
isP;9a;2*isP;H)"
  33 PRINT AT 16,4;"(9t;isP;9y;4
*sP)DIAGONALLY IE.BY ONLY(3*sP;9
t;sP;isP;sP;9y)"
  34 PRINT AT 18,2;"Y   B   N   USI
NG KEYS:  T B F H"
  35 PRINT AT 20,3;"PRESS A KEY
TO CONTINUE."
  36 PAUSE 4E4
  39 LET SP=1+PEEK 16396+256*PEE
K 16397
  40 FAST
  45 CLS
  50 PRINT AT 0,0;"(32*isP)"
  60 FOR F=1 TO 20
  61 PRINT AT F,0;"(9h)";AT F,31
;"(9h)"
  62 NEXT F
  70 PRINT AT 21,0;"(32*isP)"
  80 LET T=0
 100 FOR F=1 TO 9
 105 LET AL=INT (RND*20)+1
 106 LET AC=INT (RND*30)+1
 108 LET B=0
 110 FOR I=1 TO F-1
 120 IF AL=D(I,1) AND AC=D(I,2)
THEN LET B=1
 130 NEXT I
 140 IF B=1 THEN GOTO 105
 150 LET D(F,1)=AL
 160 LET D(F,2)=AC
 170 NEXT F
 180 FOR F=1 TO 9
 190 PRINT AT D(F,1),D(F,2);F
 200 NEXT F
 210 LET AL=INT (RND*20)+1
 220 LET AC=INT (RND*30)+1
 225 LET B=0
 230 FOR I=1 TO 9
 240 IF AL=D(I,1) AND AC=D(I,2)
THEN LET B=1
 250 NEXT I
 260 IF B=1 THEN GOTO 210
 270 PRINT AT AL,AC;"*"
 275 LET P=SP+AC+AL*33
 277 LET D=1
 280 LET M=INT (RND*8)+1
 285 SLOW
 290 LET M=M(M)
 300 LET MP=P+M
 305 LET T=T+1
 310 LET NP=PEEK MP
 320 IF NP=0 THEN GOTO 2000
 330 IF NP=128 THEN GOTO 3000
 340 IF NP=136 THEN GOTO 3500
1000 IF D<>NP-28 THEN GOTO 1050
1010 IF D=9 THEN GOTO 5000
1020 LET D=D+1
1030 GOTO 2000
1050 IF M=33 THEN LET S=1
1051 IF M=-1 THEN LET S=3
1052 IF M=-33 THEN LET S=5
1053 IF M=1 THEN LET S=7
1054 IF M=32 THEN LET S=2
1055 IF M=-34 THEN LET S=4
1056 IF M=-32 THEN LET S=6
1057 IF M=34 THEN LET S=8
1060 LET O=INT (RND*3)
1070 LET M=M(S+O)
```

```
1000 GOTO 300
2000 REM space-move
2010 POKE P,0
2020 LET P=P+M
2030 POKE P,23
2040 IF INKEY$="" THEN GOTO 300
2050 IF INKEY$="T" THEN LET M=-3
3
2051 IF INKEY$="Y" THEN LET M=-3
2
2052 IF INKEY$="H" THEN LET M=1
2053 IF INKEY$="N" THEN LET M=34
2054 IF INKEY$="B" THEN LET M=33
2055 IF INKEY$="V" THEN LET M=32
2056 IF INKEY$="F" THEN LET M=-1
2057 IF INKEY$="R" THEN LET M=-3
4
2060 GOTO 300
3000 REM wall
3001 IF ABS (M)=33 OR MP=SP OR M
P=SP+31 OR MP=SP+693 OR MP=SP+72
4 THEN GOTO 3005
3002 IF M=-32 OR M=34 THEN LET M
=-M+2
3003 IF M=32 OR M=-34 THEN LET M
=-M-2
3004 GOTO 300
3005 LET M=-M
3010 GOTO 300
3500 REM wall
3501 IF ABS (M)=1 THEN LET M=-M
3502 IF M=-32 OR M=34 THEN GOTO
3520
3503 IF M=32 OR M=-34 THEN LET M
=M+2
3510 GOTO 300
3520 LET M=M-2
3530 GOTO 300
5000 CLS
5010 PRINT AT 0,11;"well done"
5020 PRINT AT 2,8;"TIME TAKEN ";
T
5030 PRINT AT 5,7;"another game
(Y/N)"
5040 IF INKEY$="Y" THEN GOTO 40
5050 IF INKEY$="N" THEN STOP
5060 GOTO 5040
```

SIMULTANEOUS EQUATIONS

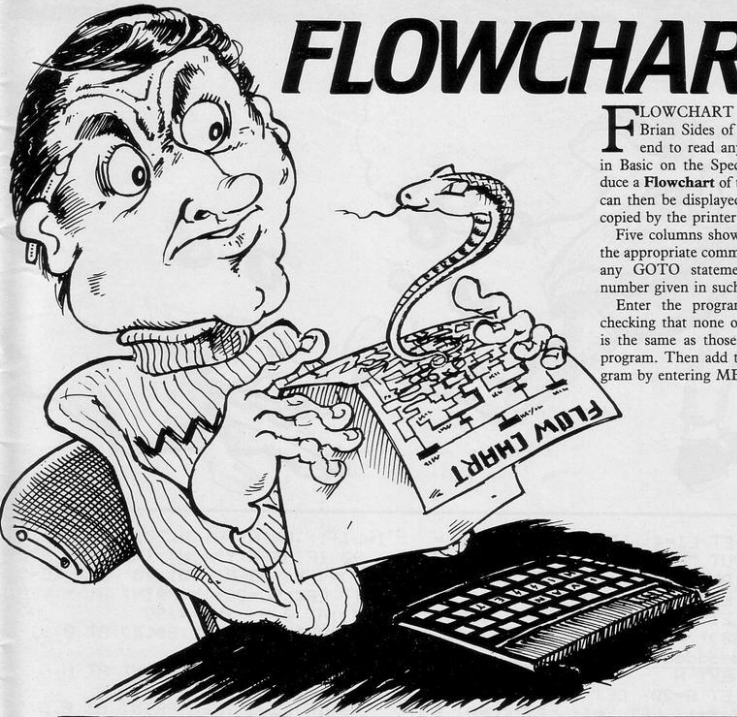


PROGRAMS for the ZX-80 are becoming few and far between, while good-quality programs for the 16K ZX-81 and Spectrum are increasing rapidly in number. Therefore we were pleased to receive **Simultaneous Equations,** which was written by Mike Davies of Llandeilo, Dyfed for the ZX-80 to help him while working for his mathematics O level.

Enter each of the co-efficients A, B, C, D, E and F, followed by NEWLINE, and the computer will solve the equation.

```
  1 CLS
  2 PRINT " SIMULTANEOUS EQUATI
ONS  SOLVER"
  3 PRINT ,"    AX+BY=C"
  4 PRINT ,"    DX+EY=F"
  5 PRINT "ENTER A,B,C"
  6 INPUT A
  7 INPUT B
  8 INPUT C
  9 PRINT "ENTER D,E,F"
 10 INPUT D
 11 INPUT E
 12 INPUT F
 13 LET DET=A*E-B*D
 14 LET N=C*E-B*F
 15 LET A$="X"
 16 GO SUB 25
 17 LET N=A*F-C*D
 18 LET A$="Y"
 19 GO SUB 25
 20 PRINT "AGAIN ? (Y OR N)"
 21 INPUT A$
 22 IF NOT A$="Y" AND NOT A$="N
" THEN GO TO 21
 23 IF A$="Y" THEN RUN
 24 STOP
 25 LET G=N/DET
 26 LET N=N-DET*G
 27 PRINT A$;"=";G;"-";
 28 FOR P=1 TO 3
 29 LET G=10*N/DET
 30 LET N=10*N-G*DET
 31 PRINT G;
 32 NEXT P
 33 PRINT
 34 RETURN
```

FLOWCHART



FLOWCHART was written by Brian Sides of Cefn-Glas, Bridgend to read any program written in Basic on the Spectrum and to produce a **Flowchart** of that program. That can then be displayed on the screen or copied by the printer.

Five columns show the line number, the appropriate command, the flow box, any GOTO statement, and the line number given in such a statement.

Enter the program to be charted, checking that none of its line numbers is the same as those in the Flowchart program. Then add the Flowchart program by entering MERGE " ".

```
9900 REM FLOW-CHART
9901 OVER 0: INVERSE 0: BRIGHT 1
: BORDER 1: PAPER 6: INK 0: CLS
9902 LET A=PEEK 23636: LET A=A*2
56: LET A=A+PEEK 23635
9903 LET C=0: LET Y=175: LET X=1
30
9904 LET L=PEEK A: LET L=L*256:
LET L=L+PEEK (A+1): LET A=A+4
9905 IF L>9899 THEN GO TO 9943
9906 PRINT L;TAB 5;CHR$ PEEK A:
LET C=C+2: PRINT
9907 PLOT X,Y: LET B=PEEK A
9908 IF B=226 OR B=234 OR B=242
OR B=254 THEN GO TO 9924
9909 IF B>227 AND B<231 OR B=232
 OR B=235 OR B=241 OR B=247 OR B
=249 OR B=253 THEN GO TO 9925
9910 IF B=243 OR B=250 THEN GO T
O 9926
9911 IF B=235 OR B=237 THEN GO T
O 9934
9912 DRAW 16,0: DRAW -4,-8: DRAW
 -28,0: DRAW 4,8: DRAW 12,0
9913 LET Y=Y-8
9914 IF B=226 OR B=236 OR B=237
OR B=254 THEN GO TO 9916
9915 PLOT X,Y: DRAW 0,-7: DRAW 4
,4: DRAW -4,-4: DRAW -4,4
9916 LET Y=Y-8
9917 LET B=PEEK A
9918 IF B=14 THEN LET A=A+4
9919 IF B=13 THEN GO TO 9922
9920 IF B=58 THEN GO TO 9940
9921 LET A=A+1: GO TO 9917
9922 IF C=20 THEN GO TO 9943
9923 LET A=A+1: GO TO 9904
9924 DRAW 12,0: DRAW 4,-8,-PI: D
RAW -24,0: DRAW -4,8,-PI: DRAW 1
2,0: GO TO 9913
9925 DRAW 16,0: DRAW 0,-8: DRAW
-32,0: DRAW 0,8: DRAW 16,0: GO T
O 9913
9926 DRAW 8,-4: DRAW 8,0: DRAW -
4,4: DRAW 4,-4: DRAW -4,-4: DRAW
 4,4: DRAW -8,0: DRAW -8,-4: DRA
W -8,4: DRAW 8,4
9927 IF B=243 THEN GO TO 9933
9928 LET A=A+1: LET F=PEEK A
9929 IF F=14 THEN LET A=A+4
9930 IF NOT F=203 THEN GO TO 992
8
9931 LET A=A+1: LET F=PEEK A: PR
INT AT C-2,19;CHR$ F: PRINT
9932 IF F=236 OR F=237 THEN GO T
O 9935
9933 GO TO 9913
9934 CIRCLE X,Y-4,4: PLOT X+4,Y-
4: DRAW 64,0: DRAW -4,4: DRAW 4,
-4: DRAW -4,-4: PLOT X,Y
9935 LET A=A+1: LET F=PEEK A
9936 IF NOT F=14 THEN GO TO 9935
9937 LET A=A+3: LET G=PEEK (A+1)
: LET G=G+256: LET G=G+PEEK (A)
9938 PRINT AT C-2,26;G: PRINT
9939 GO TO 9913
9940 IF C=20 THEN GO TO 9943
9941 LET A=A+1: PRINT "  ";TAB
5;CHR$ PEEK A: PRINT : LET C=C+
2
9942 GO TO 9907
9943 INVERSE 1: PRINT AT 21,0;"
PRESS ""V"" TO VIEW ""P"" TO PRI
NT ": INVERSE 0
9944 IF INKEY$="V" OR INKEY$="v"
 THEN GO TO 9947
9945 IF INKEY$="P" OR INKEY$="P"
 THEN GO TO 9951
9946 GO TO 9944
9947 CLS : LET D=0: LET E=22: LE
T C=0: LET X=130: LET Y=175
9948 IF PEEK A=58 THEN GO TO 994
1
9949 IF L>9899 THEN STOP
9950 LET A=A+1: GO TO 9904
9951 PRINT AT 21,0;"
                    ": COPY : GO
 TO 9947
```

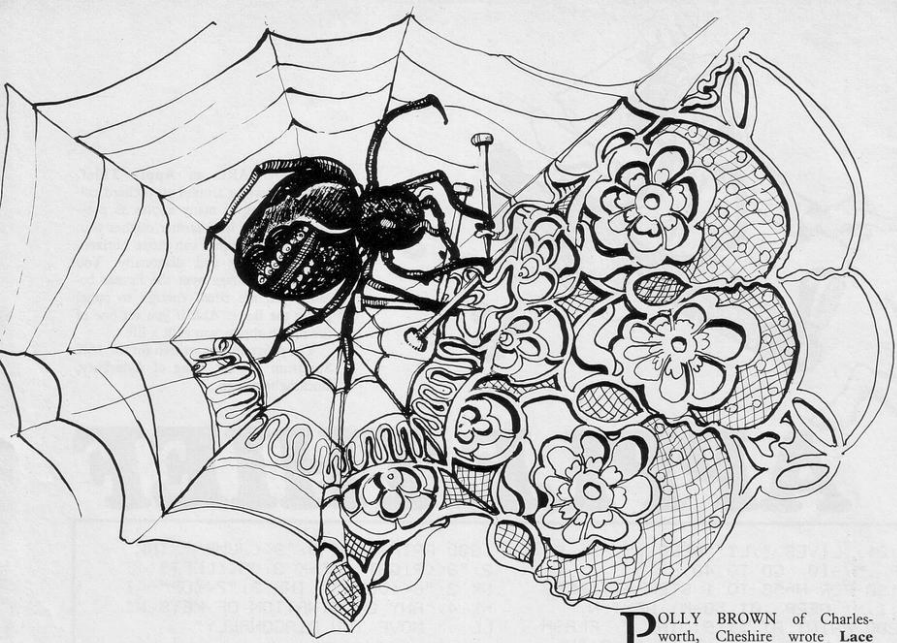
```
  3 LET LI=4: LET SC=0: LET LL=
1: INPUT "ENTER LEVEL 1 OR 2(2 =
INVISIBLE APPLES!!)";LE: IF LE<>
1 AND LE<>2 THEN GO TO 3
  10 LET Z=1: LET B$="a,b": DIM A
$(20,30): FOR N=1 TO 20: LET A$(
N)="ddddddddddddddddddddddddddddd
dd": NEXT N
  20 LET A=20: LET B=30: LET HP=
3: LET X=1: LET Y=1: LET CC=0: P
RINT AT 0,3; INK 4;"SCORE>";SC;A
T 0,13;"JUMPS>";HP;AT 0,21;"LIVE
S>";LI
  30 IF LE=1 THEN PRINT AT 1,0;
 FOR N=1 TO 20: PRINT AT N,1; IN
K 2;A$(N): NEXT N
  35 FOR N=1 TO 21: PRINT AT N,0
; INK LL;"■": BEEP .01,N: PRINT
AT 22-N,31; INK LL;"■": BEEP .01
,22-N: NEXT N: FOR N=0 TO 16: PR
INT AT 21,N; INK LL;"■": BEEP .0
1,N: PRINT AT 21,31-N; INK LL;"■
": BEEP .01,31-N: NEXT N
  40 IF LE=1 THEN PRINT AT X,Y;
INK 2;A$(X,Y)
  41 IF LE=2 THEN PRINT AT X,Y;"
 "
  45 LET X=X-(IN 61438=243 OR IN
 61438=247)+(IN 61438=239 OR IN
61438=235): LET Y=Y+(IN 61438=25
1 OR IN 61438=243 OR IN 61438=23
5)-(IN 63486=239)
  50 IF X=0 THEN LET X=20
  60 IF Y=0 THEN LET Y=30
  70 IF X=21 THEN LET X=1
  80 IF Y=31 THEN LET Y=1
  85 IF ATTR (X,Y)=60 THEN LET L
I=LI+1: PRINT AT 0,27; INK 4;LI
  90 IF A$(X,Y)="d" THEN LET A$(
X,Y)=" ": BEEP .001,20: LET CC=C
C+1: LET SC=SC+1: PRINT AT X,Y;B
$(Z);AT 0,9; INK 4;SC
  95 PRINT AT X,Y;B$(Z);AT 0,9;
INK 4;SC
  97 IF LE=1 THEN PRINT AT A,B;
INK 2;A$(A,B)
  98 IF LE=2 THEN PRINT AT A,B;"
 "
  100 LET A=A+(A<X)-(A>X): LET B=
B+(B<Y)-(B>Y): PRINT AT A,B; INK
 1;"c"
  110 LET Z=Z+1: IF Z=3 THEN LET
Z=1
  120 IF A=X AND B=Y THEN GO TO 1
80
  130 IF CC=600 THEN GO TO 170
  140 IF INKEY$="9" AND HP>0 THEN
 GO TO 160
  145 IF RND>=.99 THEN PRINT AT I
NT (RND*20)+1,INT (RND*30)+1; IN
K 4;"d"
  150 GO TO 40
  160 PRINT AT X,Y;A$(X,Y): BEEP
 .1,5: BEEP .1,10: LET X=INT (RND
*20)+1: LET Y=INT (RND*30)+1: PR
INT AT X,Y; INK 1; FLASH 1;"a":
FOR N=1 TO 220: NEXT N: LET HP=H
P-1: PRINT AT 0,19; INK 4;HP: GO
 TO 40
  170 FOR N=1 TO 50: BEEP .01,N:
BEEP .01,50-N: NEXT N: LET LL=LL
+1: GO TO 10
  180 IF LI>0 THEN LET LI=LI-1: L
ET X=1: LET Y=1: PRINT INK 4;AT
```

YOU ARE an **Apple Thief,** prowling around an orchard collecting as many apples as possible before the irate farmer catches you. You and the farmer can move horizontally, vertically and diagonally. You have an advantage over the farmer because you are small enough to crawl under the fence. Also if you eat one of the magic apples you gain a life.

The program was written for the 16K Spectrum by Tat Tang of Aylesbury, Buckinghamshire.

APPLE THIEF

```
0,21;"LIVES>";LI: BEEP .5,-5: BE
EP .5,-10: GO TO 40
 190 FOR N=50 TO 1 STEP -1: BEEP
 .1,N: BEEP .01,50-N: NEXT N
 200 PRINT AT 11,9; INK 2; FLASH
 1;"Ha Ha Too Slow";AT 12,9;"Ha
Ha Too Slow": PAUSE 0: PAUSE 0:
RUN
 700 CLS : FOR N=0 TO 7: READ A:
 POKE USR "A"+N,A: NEXT N: DATA
0,60,90,255,129,66,60,0
 710 FOR N=0 TO 7: READ A: POKE
USR "B"+N,A: NEXT N: DATA 0,60,9
0,255,255,66,60,0
 720 FOR N=0 TO 7: READ A: POKE
USR "C"+N,A: NEXT N: DATA 0,60,1
65,231,60,36,36,102
 730 FOR N=0 TO 7: READ A: POKE
USR "D"+N,A: NEXT N: DATA 16,8,4
2,127,127,127,62,28
 740 LET C$="YOU ARE IN CONTROL
OF AN APPLE   THIEF.YOU HAVE INVA
DED FARMER    BUMPKIN'S ORCHARD.Y
OU ARE NOW    CHOMPING YOUR WAY R
OUND THIS     ORCHARD WHILST THE
FARMER IS     CHASING YOU.HOW MAN
Y APPLES CAN YOU CHOMP?"
 750 LET I=1
 755 FOR N=1 TO LEN C$
 760 PRINT AT 0,11; INK I/2;"APP
LE THIEF"; INK I;AT 2,0;C$( TO N
): LET I=I+1
 770 IF I=7 THEN LET I=1
 780 NEXT N
 790 PRINT '"a<<CHOMPER"' INK 1;
"c<<ANGRY FARMER"' INK 2;"d<<APP
LE"
 800 PRINT INK 3;"9<<JUMP"' INK
2;"8<<RIGHT"' INK 3;"5<<LEFT"' I
NK 2;"6<<DOWN"' INK 3;"7<<UP"' I
NK 4;"ANY COMBINATION OF KEYS WI
LL    MOVE YOU DIAGONALLY"

 810 PRINT TAB 5; INK 1; FLASH 1
;"PRESS ANY KEY TO CONT"
 815 PAUSE 0: PAUSE 0
 820 CLS : LET C$="OCCASIONALLY
A MAGIC APPLE WILL APPEAR IF EAT
EN AN EXTRA LIFE   WILL BE GIVEN
.ALSO YOU CAN CRAWLUNDER THE FEN
CE!!"

 830 LET I=1
 840 FOR N=1 TO LEN C$: PRINT AT
 0,11; INK I/2;"APPLE THIEF";AT
2,0; INK I;C$( TO N): LET I=I+1
 850 IF I=7 THEN LET I=1
 860 NEXT N
 870 PRINT ' INK 1;"■<<FENCE"' I
NK 4;"d<<MAGIC APPLE"

 880 PRINT ' FLASH 1;"PRESS ANY
KEY TO PLAY"
 890 PRINT ' INK 3;"PS THE SOUND
 IS BETTER WHEN IT  IS AMPLIFIED
!"
 900 PAUSE 0: PAUSE 0: RUN
9999 CLEAR : RESTORE : CLS : BOR
DER 5: PRINT "SAVE": SAVE "APPLE
THIEF" LINE 700: BEEP 1,0: BORDE
R 2: PRINT "VERIFY": VERIFY "AP
PLETHIEF": BEEP 1,10: PRINT "OKA
Y": PAUSE 200: BORDER 7: GO TO 7
00
```



LACE MAKER

POLLY BROWN of Charlesworth, Cheshire wrote **Lace Maker** to generate patterns for use as design charts for punch-lace or Fair Isle work on domestic knitting machines. She adds that it would also be suitable for those designing filet crochet.

The program first requests the number of stitches in each pattern repeat — 6, 8 or 12 for the more popular makes of knitting machine — followed by the number of rows required. Lace Maker can cope with any stitch repeat between 4 and 16, and any number of rows between 4 and 20. (16K ZX-81).

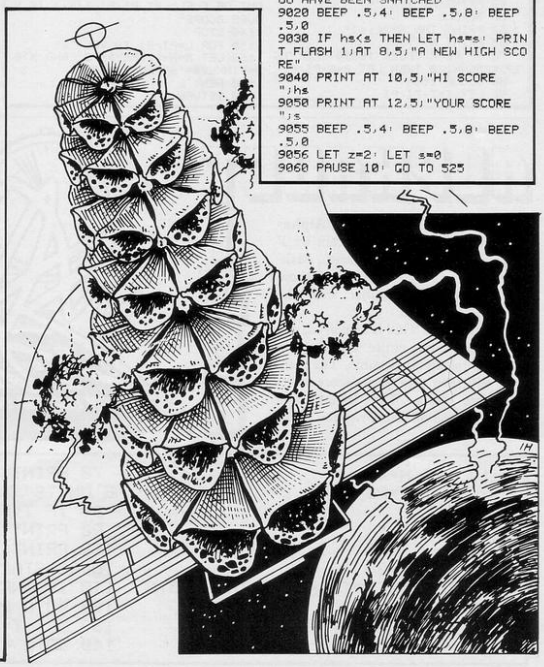
```
  1 RAND
  2 GOSUB 9000
  10 LET C$="HOW MANY ARE REQUIR
ED  IN ONE REPEAT OF THE PATTERN
?  TYPE A NUMBER BETWEEN AND  (
INCLUSIVE) THEN PRESS NEWLINE."
  20 LET R$="  rows  "
  30 LET S$="stitches"
  40 DIM D$(20,16)
  50 DIM A$(16)
  70 LET E=0
  90 PRINT AT 0,0;C$(1 TO 9);S$;
C$(9 TO 77);4;C$(77 TO 81);16;C$
(81 TO 113)
 100 INPUT N
 110 PRINT N
 115 IF N>16 OR N<4 THEN GOTO 40
0
 120 PRINT AT 8,0;C$(1 TO 9);R$;
C$(9 TO 77);4;C$(77 TO 81);20;C$
(81 TO 113)
 140 PRINT D
 150 IF D>20 OR D<4 THEN GOTO 42
0
 200 LET H=D/2
 210 LET Z=INT (32/N)*N-N
 220 LET Y=INT (22/(D+1))*(D+1)
 230 LET G=N/2
 240 IF G>INT G THEN LET G=G+1
 250 CLS
 255 LET L=0
 260 IF L>=Y THEN GOTO 1000
 270 FOR E=1 TO INT H
 280 GOSUB 1500
 290 LET D$(E)=A$
 295 NEXT E
 300 IF H>INT H THEN GOSUB 1500
 310 FOR F=E-1 TO 1 STEP -1
 320 FOR C=0 TO Z STEP N
 330 PRINT AT L,C;D$(F,1 TO N)
 340 NEXT C
 350 LET L=L+1
 360 NEXT F
 370 LET L=L+1
 380 GOTO 260
 400 PRINT "BETWEEN 4 AND 16 PLE
ASE"
 410 GOTO 100
 420 PRINT "BETWEEN 4 AND 20 PLE
ASE"
 430 GOTO 130
1000 PRINT AT 21,0;"C TO CONTINU
E, N FOR NEW SIZE"
1010 IF INKEY$="" THEN GOTO 1010
1020 IF INKEY$="C" THEN GOTO 250
1030 CLS
1040 GOTO 10
1500 FOR B=1 TO G
1510 LET A=INT (RND*2)
1520 IF A=1 THEN LET A$(B)=" "
1530 IF A=0 THEN LET A$(B)="*"
1540 NEXT B
1550 FOR B=B TO N
1560 LET A$(B)=A$(N+1-B)
1570 NEXT B
1580 FOR C=0 TO Z STEP N
1590 PRINT AT L,C;A$(1 TO N)
1600 NEXT C
1610 LET L=L+1
1620 RETURN
9000 CLS
9015 PRINT
9030 PRINT AT 20,4;"PRESS ANY KE
Y TO START"
9040 IF INKEY$="" THEN GOTO 9040
9045 CLS
9050 RETURN
9990 SAVE "LACEMAKER"
9991 RUN
```

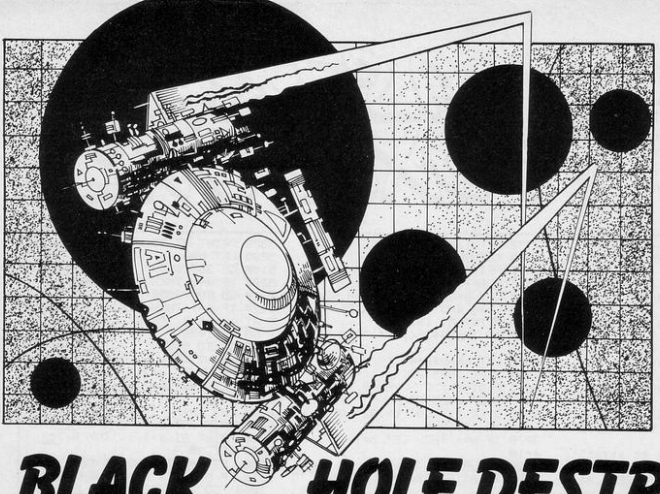
THE DEADLY **Astral Foxgloves** hang poised above the earth. Their aim is to eat all humans and then to invade the earth. Save yourself by moving left and right with keys '1' and '2' and firing the lethal fungicide with key '0'.

The program was written for the Spectrum by I Gray of Bath, Avon.

ASTRAL FOXGLOVES

```
  5 RESTORE 50
 10 FOR x=USR "a" TO USR "c"+7
 20 READ a
 30 POKE x,a: BEEP .1,0: NEXT x
 50 DATA 16,56,56,56,56,124,255
,84
 60 DATA 0,16,16,16,56,56,124,1
24
 70 DATA 0,28,8,28,42,73,20,34
100 LET s=0: LET hs=0
110 LET z=2
510 BORDER 0: PAPER 0: INK 7: C
LS
520 PRINT AT 7,5;"1  LEFT";AT 9
,5;"2  RIGHT";AT 11,5;"0  FIRE"
525 PRINT
AT 16,5;"Hit any key to start":
PAUSE 0
530 FOR x=-50 TO 50: BEEP .01,x
: NEXT x
550 CLS
670 LET a=1

680 LET h=0: LET u=h
690 LET c=15: LET b=c
700 LET n=c
1000 FOR y=1 TO 50
1010 PLOT INK RND*7;RND*255,RND*
125+50
1020 NEXT y
1050 PRINT AT 20,0; INK 0;"
                                "
1100 FOR y=1 TO n
1110 PRINT AT z,y*2; INK 6;"a";A
T z,y*2+1; INK 0;" ": BEEP .1,2*
y
1120 NEXT y
1150 PRINT AT 0,1;"SCORE  ";s,"H
I SCORE ";hs
1200 PLOT 0,22: DRAW 255,0: DRAW
 0,-16: DRAW -255,0: DRAW 0,16
1300 PRINT AT 18,b;"b"
1310 PRINT AT 20,c;"c"

1400 BEEP .1,8: BEEP .1,6: BEEP
.1,8: BEEP .1,6
1450 LET u=0: IF n=0 THEN GO TO
9000
1500 GO SUB 2000: LET h=0
1550 IF u=1 THEN GO TO 5000
1600 IF y=19 THEN GO TO 4000
1700 GO SUB 2100
1800 GO SUB 3000
1900 PRINT AT 0,8;s
1910 IF h=1 THEN PRINT AT y,x;"
": GO TO 1450
1920 GO SUB 2500
1930 GO TO 1550
2000 LET n=n-1
2010 LET x=INT (RND*16)*2
2020 IF ATTR (z,x)=6 THEN LET y=
z: RETURN
2025 GO SUB 3000: GO SUB 2500
2026 IF u=1 THEN LET n=n+1: RETU
RN
2030 GO TO 2010

2100 PRINT AT y,x; INK 0;" "
2110 LET x=x+(RND>.5 AND x<30)-(
RND>.5 AND x>1)
2120 LET y=y+1
2130 PRINT AT y,x; INK 6;"a"
2140 RETURN
2500 PRINT AT 20,c; INK 0;" "
2510 IF c>29 THEN LET a=-1
2520 IF c<2 THEN LET a=1
2530 LET c=c+a
2540 IF ATTR (20,c)=6 THEN LET u
=1
2550 PRINT AT 20,c;"c"
2560 RETURN
3000 PRINT AT 18,b;" "
3005 BEEP .005,b
3010 LET b=b+(b<31 AND IN 63486=
253)-(b>0 AND IN 63486=254)
3020 PRINT AT 18,b;"b"
3030 IF IN 61438<>254 THEN RETUR
N
3040 LET bP=b*8+4
3045 BEEP .005,20
3050 PLOT bP,32: DRAW 0,125-z*8
3055 BEEP .005,20
3060 OVER 1: PLOT bP,32: DRAW 0,
125-z*8: OVER 0
3070 IF b=x THEN LET h=1: LET s=
s+10
3080 RETURN
4000 IF ATTR (20,x)=7 THEN GO TO
 5000
4010 PRINT AT 20,x; INK 6;"a"
4020 PRINT AT 19,x;" "
4030 GO TO 1450
5000 PRINT AT 19,c; INK 6;"a": P
RINT AT y,x;" ": GO SUB 8000: PR
INT AT y,x; INK 6;"a": LET x=c:
LET y=19
5010 PRINT AT 19,x; INK 6;"a"
5020 PRINT AT 20,x; INK 6;"c"
5030 LET h=0
5100 GO SUB 6000
5200 IF y=z THEN GO TO 9000
5210 GO SUB 3000
5220 IF h=1 THEN LET n=n+1: PRIN
T AT y,x;" ": PRINT AT y+1,x;" "
: GO TO 1450
5230 GO TO 5100
6000 PRINT AT y,x; INK 6;" "
6010 PRINT AT y+1,x; INK 6;" "
6020 LET x=x+(RND>.5 AND x<31)-(
RND>.5 AND x>0)
6030 LET y=y-1
6040 PRINT AT y,x; INK 6;"a"
6050 PRINT AT y+1,x; INK 6;"c"
6060 RETURN
8000 LET x=INT (RND*16)*2
8010 IF ATTR (z,x)=6 THEN GO SUB
 8000: GO TO 8000
8020 LET y=z: RETURN

9000 IF n=0 THEN PRINT AT 6,5;"T
HIS INVASION IS OVER": LET s=s+1
00: PRINT AT 8,5;"THE NEXT WAVE
HAS ARRIVED": LET z=z+1: GO TO 5
30
9010 IF y=z THEN PRINT AT 6,5;"Y
OU HAVE BEEN SNATCHED"
9020 BEEP .5,4: BEEP .5,8: BEEP
.5,0
9030 IF hs<s THEN LET hs=s: PRIN
T FLASH 1;AT 8,5;"A NEW HIGH SCO
RE"
9040 PRINT AT 10,5;"HI SCORE
";hs
9050 PRINT AT 12,5;"YOUR SCORE
";s
9055 BEEP .5,4: BEEP .5,8: BEEP
.5,0
9056 LET z=2: LET s=0
9060 PAUSE 10: GO TO 525
```





BLACK HOLE DESTROYER

```
  10 LET T=0
  15 LET X=5
  20 LET S=0
  25 LET Y=15
  30 LET A=INT (RND*11)
  40 PRINT AT Y,X;"+"
  50 SCROLL
  60 PRINT TAB A;"(is)"
  65 PRINT AT Y,X;
  70 IF PEEK (PEEK 16398+PEEK 16
399*256)=128 THEN LET S=S+PI/PI
  80 GOSUB 150
  90 LET T=T+PI/PI
 100 IF T=59 THEN GOTO 120
 110 GOTO 30
 120 PRINT AT Y,X-PI/PI;"(9y is'
9t)"
 130 PRINT AT 0,0;"YOU HAVE RUN
OUT OF FUEL";AT PI/PI,1;S;" IS Y
OURE SCORE"
 140 STOP
 150 FOR L=PI/PI TO VAL "2"
 160 LET X=X-(INKEY$="5" AND X>0
)+(INKEY$="8" AND X<13)
 170 NEXT L
 180 RETURN
```

PROGRAMS BASED on various symbols scrolling up the screen are submitted frequently for review. D Basson and J Robery of Wickford, Essex have taken the idea and used it in a slightly unusual way in **Black Hole Destroyer.**

Black holes move up the screen and you must run into as many of them as possible before your fuel runs out. Move using keys 5 and 8. (16K ZX-81).

ALPHABET TIMER

THIS SHORT program, **Alphabet Timer,** was written by P Fisher of Newton Heath, Manchester for the 16K ZX-81 to help those who are not yet familiar with the QWERTY keyboard.

Once the word 'GO' is displayed, you must type-in the entire alphabet, in order, as quickly as possible. The computer will then give you a score in its own time units. The fastest time achieved in the *Sinclair Programs* office was 179 units.

```
  10 LET H=4E4
  20 LET T=PI-PI
  23 CLS
  25 PRINT "                    go
          "
  30 FOR N=38 TO 63
  40 IF INKEY$<>CHR$ N THEN GOTO
130
  50 PRINT CHR$ N;
  60 NEXT N
  70 PRINT AT 6,0;"TIME=";T;" TI
ME UNITS"
  80 IF T<H THEN LET H=T
  90 PRINT ,,"FASTEST TIME=";H
 100 PRINT ,,,,"   PRESS ANY KEY
TO RE-START"
 110 IF INKEY$="" THEN GOTO 110
 120 GOTO 20
 130 LET T=T+1
 140 GOTO 40
```

48K SPECTRUM GAMES

Simply the best Value Software...

VELNOR'S LAIR only £6.50 inc p&p

Can you find and destroy the evil wizard VELNOR and so prevent his reign of terror on Earth?

- ★ You can be a wizard, warrior or priest
- ★ Use spells such as polymorph, teleport, fireball, shield, heal and dispel undead
- ★ Collect treasures and items to help you on your quest
- ★ Encounter vampires, mummies, goblins, orcs, trolls and other creatures too ghastly to speak of
- ★ Score, save facility and full documentation

"Like a good book, you don't want to put it down . . . If you are a D&D person then this game is a must for your collection."

HOME COMPUTING WEEKLY, 10th May 1983

TWO CLASSIC GAMES ON ONE TAPE FOR ONLY £5.50 inc p&p

MUNCH MAN

- ★ 4 ghosts and power pills
- ★ Real munching action in all 4 directions
- ★ Fruits for extra points
- ★ Increasing difficulty from easy to impossible
- ★ High score
- ★ Superb graphics
- ★ Hold game facility

STAR TREK

- ★ All of the usual features plus:
- ★ Automatic short range scan
- ★ Galaxy chart
- ★ Anti-matter bombs
- ★ Klingon attacks on Starbases
- ★ Graphic Warp
- ★ Excellent use of graphics and sound
- ★ 9 levels of play

neptune games from another world

NEPTUNE COMPUTING (DEPT SU4)
98 Howe Street, Gateshead,
Tyne and Wear, NE8 3PP

Tapes also available from: Last chance Leeds
Dragon Byte Morley
The Computer Shop Newcastle
Buffer Micro Shop

SP7

FANTASTIC VOYAGE
16K ZX81

A real-time adventure with fast machine-code graphics.

"A very good game indeed"
Personal Computer News
Week ending 22 April

ADVENTURE 200
ZX81 16K/SPECTRUM 16/48K

All machine-code text adventure.

"For ZX81 owners this is a must"
Personal Computer News
Week ending 29 April

All Games £5.95 each or 2 for 9.95

Send SAE for full details

FOILKADE LTD

'SP3' 66 LITTLEDEAN, YATE, BRISTOL BS17 4UQ

New from ...

MIKRO-GEN

SPECTRUM Software

COSMIC RAIDERS (16K) £5,95

You — the only remaining pilot of the "Earth Defence Fleet" — have the daunting task of defending the Earth from attack by alien beings that have already set up a base of their own on earth.

*** Radar Scanner display in hi-res ***
*** Full colour and sound effects ***
*** From the author of Spectrum 'Scramble' ***
*** 100% machine code ***

SPACE ZOMBIES (16K) £5,95

Shooting through space you are ambushed by a fleet of Space Zombies flying at you in formation, swooping and diving at you. Destroy them, if you can! But in destroying them, you attract more to the area, and the game gets progressively harder.

*** Full screen hi-res graphics ***
*** 1 or 2 players * Joystick option ***
***Full sound and colour ***
***Three playing speeds ***

MINES OF SATURN and RETURN TO EARTH £5,95

(16K) Text Adventure

Mines of Saturn While piloting a routine orbit of Saturn, you are caught up in a radiation storm which forces you into the giant planet's rings. Your energy drained, you make a forced landing on the planet's surface. Luckily you crashed near an abandoned mining base and you set off in search of some di-lithium crystals to refuel your stranded space ship. Can you do it?

Return to Earth Having escaped from your previous dilemmas, you reach Earth Station 1, but fail to make radio contact. You effect a safe if harrowing manual ducking. On entry you find it deserted, and the control room destroyed. You must explore the station and find some way to alert Earth of your predicament, but beware, many of the rooms are identical, there is extensive damage, and signs of alien intruders.

Graphic Adventure (48K)

MAD MARTHA £6,95

Poor little Henry is the hen-pecked hero of this domestic tale. One night he can take no more. He steals his wages from his wife's purse, sneaks out of the house being careful not to wake the baby or trip over the cat, and heads for the bright lights to have some fun. Trouble is he runs out of money. His only way to raise some cash is to gamble his few remaining pounds on the spinning wheel of the roulette table. Just as Henry is getting into his evening his wife — Mad Martha — has noticed his absence. Realising Henry has absconded with the housekeeping she sets out after him with an axe. Guess what part you play in this happy tale? That's right, you're Henry. Watch out for that axe!

Access

Access or Visa Card holders please telephone (0344) 27317 (9am-6pm)

BARCLAYCARD VISA

Please add 40p per order for post & packing

Name _____ Address _____

☐	Cosmic Raiders	☐	Space Zombies
☐	Mines of Saturn/Return to Earth	☐	Mad Martha

MIKROGEN, Dept SP, 24 Agar Crescent, Bracknell, Berkshire, RG12 2BK

ORWIN SOFTWARE: ZX81 CASSETTES

THE BEST SOFTWARE (BY VARIOUS AUTHORS) AT LOW PRICES

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

Your Computer, May '82

"Michael Orwin has built a reputation for value-for-money software and his Cassette 4 offers quantity as well as quality."

Sinclair User, October '82

"If each game was on a separate tape and selling for £5 each I would still recommend them. But all on one for £5. . . . I This sort of value for money just has not been seen before on any personal computer."

"Without sounding pushy I would like to conclude this review by saying — if you have a ZX81 and like games, then you should buy Michael Orwin's cassette 4."

2 extracts from *ZX Computing*, Oct/Nov '82

"Eight games, including an excellent version of the Scramble arcade game, three-dimensional noughts and crosses, dropping bombs on sprouting plants and a western style shoot-out. Easy to operate, graphically impressive and good value for money."

The Times, Saturday 11th December 1982
(about Cassette 4)

CASSETTE 1

(eleven 1k programs)
Machine code:
React, Invaders, Phantom aliens, Maze of death, Planet lander, Bouncing letters, Bug splat.
Basic:
I Ching, Mastermind, Robots, Basic Hangman. PLUS Large screen versions of Invaders and Maze of Death, ready for when you get 16k.
Cassette One costs £3.80

CASSETTE 2

Ten games in Basic for 16k ZX81
Cassette Two contains Reversi, Awari, Laser Bases, Word Mastermind, Rectangles, Crash, Roulette, Pontoon, Penny Shoot and Gun Command.
Cassette Two costs £5.

CASSETTE 3

8 progams for 16k ZX81
STARSHIP TROJAN

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

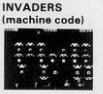
STARTREK This version of the well known space adventure game features variable Klingon mobility, and graphic photon torpedo tracking.
PRINCESS OF KRAAL An adventure game.
BATTLE Strategy game for 1 to 4 players.
KALABRIASZ World's silliest card game, full of pointless complicated rules.
CUBE Rubik Cube simulator, with lots of functions including 'Backstep'.
SECRET MESSAGES This message coding program is very txlp qexi jf.
MARTIAN CRICKET A simple but addictive game (totally unlike Earth cricket) in machine code. The speed is variable, and its top speed is very fast.
Cassette Three costs £5.

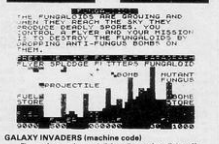
CASSETTE 4 **8 games for 16k ZX81**

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

GUNFIGHT (machine code)

INVADERS (machine code)





GALAXY INVADERS (machine code)
Fleets of swooping and diving alien craft to fight off.
SNAKEBITE (machine code)
Eat the snake before it eats you. Variable speed. (very fast at top speed).
LIFE (machine code)
A ZX81 version of the well known game.
3D TIC-TAC-TOE (Basic)
Played on a 4 × 4 × 4 board, this is a game for the brain. It is very hard to beat the computer at it.

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

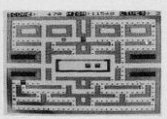
Please make cheques payable to ORWIN SOFTWARE. Recorded on high quality cassettes, sent by first class post from: ORWIN SOFTWARE, Dept. OSP, 26 Brownlow Road, Willesden, London NW10 9QL.
ZX81 & SPECTRUM SOFTWARE WANTED

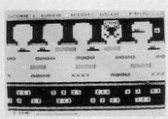
DJL SOFTWARE

DEPT SP, 9 TWEED CLOSE, SWINDON, WILTS SN2 3PU

Tel: (0793) 724317 Trade enquiries welcome

***Export Orders:* Please add £1.00 per tape airmail**





ZUCKMAN
ZX81 (16K)

*ALL MACHINE CODE (10K)
*FOUR INDEPENDENT GHOSTS
* HIGH-SCORE 'HALL OF FAME'
*AUTHENTIC ARCADE ACTION
*TITLE/DISPLAY MODE

ONLY £5.95 INC. P&P

FROGGY
ZX81 (16K)

*MOVING CARS, LOGS, TURTLES
*ALLIGATORS, DIVING TURTLES
*FOUR 'SCREENS' OF ACTION
*ALL ARCADE FEATURES
*ENTIRELY MACHINE CODE

ONLY £5.95 INC. P&P

NEW **ZX Spectrum** NEW
FROGGY
16K or 48K

SPECTRUM VERSION OF ARCADE GAME WITH FULL ARCADE FEATURES:

★ Fabulous Hi-Res Colour Graphics
★ Authentic Sound Effects + 3 Tunes
★ 3-D Logs, Swimming & Diving Turtles
★ 3 Lanes of Multi-coloured vehicles
★ On-screen Score, Hi-Score, Time-bar
★ Snake, Alligators and Baby Frog
★ 'Top 5' High-Score initials table
★ Demonstration Game routine

Your home-sick frog must leap across a busy main road, then onto logs and turtles in the river to reach safety of the river-bank frog-homes. THIS MACHINE-CODE GAME MUST BE SEEN TO BE BELEIVED!!

ONLY £5.95 INC. P & P

For SPECTRUM 48K or ZX81 16K

You are an Allied POW in the infamous **Castle Colditz,** Nazi fortress jail for Allied prisoners-of-war! Can you escape with your life through the vast labyrinth of rooms to the main gate? Tackle brutal **Gestapo** and **SS** guards, savage guard-dogs, traps and pitfalls! Survive if you can the **Corridor of Rats,** the **Tunnel of Poisonous Spiders,** the **Vault of Human Bones** and many more! And on your way, grab all the fabulous **Nazi loot** you can carry!

- ***Classic adventure games** — no random alterations!
- ***Fast, powerful machine-code** response to your commands!
- *"Save-game" facility and (you'll need it!)

Hours (weeks?) (months?) of enjoyment!

For ZX81 with 16K RAM £4.95
For 48K SPECTRUM £5.95

Price includes ready-to-load cassette with library case and inlay, full instructions, postage and packing. Order today! Money refunded if not delighted!

Send cash, P.O. or cheque to:
FELIX SOFTWARE (DEPT. SP3)
19 Leighton Avenue, Pinner, HA5 3BW

3D HORROR ADVENTURE GAME!

For the **16K ZX81** or with colour and sound for the **48K SPECTRUM,** a superb 3D graphics adventure game! **Enter** Dracula's tomb at 30 minutes to sunset . . . **wander** through the tomb's pre-mapped 300 vaults in search of the fabled Vampire's Treasure . . . **pick up** valuable silver stakes and use them to defend yourself against the lurking horrors . . . ghouls, zombies, pits of primaeval slime . . . **See** them all on the computer's plan of the tomb . . . when it will let you! **Take** a chance on a Mystery Vault . . . if you dare! And all the time the minutes are ticking by to sunset . . . when **Dracula** rises from his coffin and comes after **you!** Each of the infinite levels of the tomb has its own 300 vaults . . . go as deep as you like, the Prince of Darkness will seek you out in his blood-lust! **WARNING: people of an exceptionally nervous disposition should play this game only during the hours of daylight!** Special facility lets you save a game in progress onto tape so you can continue it whenever you choose.

For ZX81 with 16K RAM £3.95
For 48K SPECTRUM £4.95

Price includes ready-to-load cassette with library case and inlay, full instructions, postage and packing. **Order today!** Money refunded if not delighted!

Send cash, P.O. or cheque to:

FELIX SOFTWARE (DEPT. SP3)
19 Leighton Avenue, Pinner, HA5 3BW.

THE WIZARD'S WARRIORS: A fast moving game that matches developments in your skill as a player by becoming increasingly more devious. By offering to you the full range of options you can choose how to control your warrior through the maze. A full implementation of this program enables such features as a continuous series of sound effects, arcade quality graphics, double-point scoring, and--for the very artful --bonus lives. — **Spectrum £4.95**

FORTH: A full implementation. Ideal for writing fast moving arcade type games. Allows the full colour and sound facilities of the Spectrum to be used. Future Microdrive enhancements will be made available. — **Spectrum 14.95**

ADVENTURE ONE: Features a save game routine as the game can take months to complete. — **ZX81 £5.95**
'a remarkably good version....well worth the money.' ...*Sinclair User*...

MAZEMAN: A fast action m/c game that reproduces the spirit of the original. — **Spectrum £4.95**
'..is very accurate and fast.' ...*Which Micro?*... — **ZX81 £4.45**

CHESS 1.4: Ten levels of play with this m/c program. Good graphic screen display. — **ZX81 £5.95**
'In a class of it's own.' ... *Your Computer*...

INVADERS: Very fast m/c action. Includes mystery ship and increasingly difficult screens. — **ZX81 £4.45**

7 MAES AFALLEN, BOW ST., DYFED, SY24 5BA
24hr Ansaphone 0970 828851

SPECTRUM BOOKS

AVAILABLE THROUGH COMPUTER BOOKSHOPS AND W H SMITH

40 BEST MACHINE CODE ROUTINES FOR THE ZX SPECTRUM £5·95

By Andrew Hewson and John Hardman. This book teaches the beginner all he needs to know in a simple, easy-to-learn form and its an invaluable reference work for the expert too! SECTION A: Three chapters explaining what you need to know about Z80 machine code on the Spectrum. • How to load and save machine code. • How to use the system variables. • How memory is organised. • How program lines are stored. • How to use the stack, the display, the attribute files. • How to call ROM Routines – where they are and what they do. • The structure of Z80 code – plus a valuable glossary. SECTION B: 40 routines including, • Scroll – up, down, side to side by pixel or by character. • Search and replace, token swap, string search. • Rotate character, invert character – horizontally and vertically. • Line renumber – including GOSUBs, GOTOs, RUN etc.

20 BEST PROGRAMS FOR THE ZX SPECTRUM £5·95

By Andrew Hewson. Program titles include: MACHINE CODE EDITOR – Write, modify, extend and load machine code using this all-basic program. No need to use an Assembler when you have this program. INDEX FILE – Learn about fixed length records, save numeric and string information, add to, sort, modify, delete and print your records. Ideal as a computer based filing system. DUCKSHOOT – Learn how to manipulate the attributes file *and* have fun at the same time. GRAPHIX – Construct up to 210 graphics characters with the full on-screen editing facilities, enhance and modify them and recall them later to build a detailed display to save on cassette. SPIROMANIA – A program to stretch your artistic talents, imagination and ingenuity. Draws a limitless variety of curves and spirals. Plus: FOOTBALL, DIGITISER, DIARY and many more.

Hewson Consultants

Please send me: (tick box)
☐ 40 Best Machine Code Routines £5·95 ☐ 20 Best Programmes £5·95

Please debit my Access/Visa Account No _____

Signature _____

Name _____

Address _____

Please make cheques/postal orders payable to Hewson Consultants. Allow up to 14 days for delivery.

Post to: Hewson Consultants, 60A St Mary's Street, Wallingford, Oxon OX10 0EL Tel (0491) 36307 SP7

HIRE ZX81/SPECTRUM PROGRAM TAPES

Make the most of your computer by hiring from the original and still the only software library offering all these features:

- Over 900 tapes stocked, offering more than 120 different programs from 39 suppliers (all with their permission)—many of the best currently advertised, plus some specially commissioned—and the range increases each week!
- Arcade, adventure and simulation games, many business and home utilities, graphics, education...and so much more besides
- Descriptive catalogue helps you make your choice
- **Free** quarterly, illustrated magazine includes tips from a professional programmer, DIY plans, reviews, letters, discount offers—and our **Top 40 Tapes** chart averaged from thousands of members' scores
- Full-time staff offer you a friendly, efficient welcome & service
- A fortnight's hire for just £1 +40p p/p—hire what/when you like
- All tapes guaranteed loadable
- Help given with loading problems (azimuth test tape available) and with marketing members' programs
- You may switch from ZX81 to Spectrum at any time
- Send SAE for details—or join on money-back no-risk approval today

The SINCLAIR OWNERS'
SOFTWARE LIBRARY
Warren Road, Liss, Hants GU33 7DD.

Please send me on money-back approval my magazine, descriptive library catalogue and order form, on the understanding that if I'm not delighted with your service within 28 days you will refund my money in full.

NAME.....

ADDRESS.....

.....

Please enclose cheque/P.O. for £8.50 (year's ZX81 membership)/ £9.50 (Spectrum). Overseas £2 extra in each case. SP

SPECTRUM COMPILER

For both 16K and 48K

Almost any BASIC program can be speeded up, by a factor of up to several hundred times. It will produce machine code which can be located at any address.

Handles nearly all BASIC commands. Some of the features unique to this compiler are:

1. Noise generator (explosions, gunshots)
2. Mini sprite graphics
3. Selected Screen Scrolling
4. Special BEEP commands
5. Special INPUT statement and normal INPUT statement
6. Fill the screen with current attributes, and many more, too numerous to mention

All this for only £7.99 both versions

TAPE COPIER

copies any Spectrum tape if you have sufficient memory for program to be copied £4.00 incl.

We have a number of original machine code games under development, which will use the full HI RES graphics and sound facilities of the compiler. These will be coming shortly.

Send PO/Cheque payable to:
WYE VALLEY SOFTWARE,
PARTON HOUSE, KINNERSLEY,
HEREFORDSHIRE

Print-out Rolls for your ZX printer

£10.95 per 6 rolls

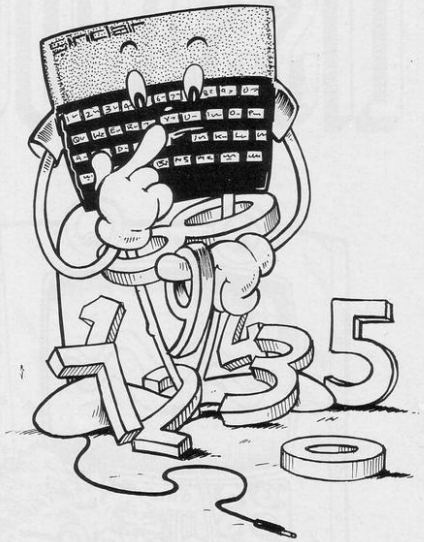
inclusive of VAT, postage and packing (U.K. prices only).
Quantities of 50 plus for schools and computer clubs, prices on application.
Cash with order to: **Dept. SP**

Guildhall Computer Stationery Limited

The Drill House, Street Road, Glastonbury, Somerset BA6 9EF
Telephone: (0458) 34122

GCSL

```
    1 PRINT AT 0,7;"reversal"
   2 PRINT AT 2,3;"THE OBJECT OF
 THE GAME IS TO     PUT THE NINE
NUMBERS INTO        THE CORRECT O
RDER. YOU DO        THIS BY ENTER
ING THE NUMBER      OF NUMBERS YO
U WISH TO           REVERSE.A FIG
URE IN THE TOP      RIGHT-HAND CO
RNER SHOWS THE      NUMBER OF GOE
S YOU""VE HAD.              "
   3 PRINT AT 10,3;"THE MAXIMUM
NUMBER OF GOES        IS 15";AT 18
,7;"Press any key to start"
   4 IF INKEY$="" THEN GOTO 4
   5 CLS
   7 PRINT AT 11,11;"PLEASE WAIT
."
  10 DIM A(9)
  70 FOR F=1 TO 9
  80 LET B=INT (RND*9)+1
  90 FOR G=1 TO F-1
 100 IF A(G)=B THEN GOTO 80
 110 NEXT G
 120 LET A(F)=B
 130 NEXT F
 133 CLS
 135 LET S=0
 136 PRINT AT 0,0;
 140 FOR T=1 TO 9
 150 PRINT A(T);" ";
 160 NEXT T
 165 GOSUB 240
 167 PRINT AT 0,23;"GOES : "
 170 INPUT U
 172 IF U<1 THEN PRINT AT 1,0;"Y
OU MUST SWOP SOME                "
 174 IF U>9 THEN PRINT AT 1,0;"T
HERE IS ONLY 9 NUMBERS           "
 176 IF U<1 OR U>9 THEN GOTO 170
 180 PRINT AT 1,0;"
                  "
 185 LET S=S+1
```



```
 186 PRINT AT 0,30;S
 188 IF S>15 THEN GOSUB 6000
 189 IF S>15 THEN STOP
 190 FOR Z=1 TO INT (U/2)
 200 LET T=A(Z)
 210 LET A(Z)=A(U-Z+1)
 220 LET A(U-Z+1)=T
 230 NEXT Z
 235 GOTO 136
 250 DIM B(9)
 260 FOR O=1 TO 9
 270 LET B(O)=O
 280 NEXT O
 289 LET M=0
 290 FOR P=1 TO 9
 300 IF A(P)=B(P) THEN LET M=M+1
 310 IF M=9 THEN GOSUB 9000
 320 NEXT P
 330 RETURN
6000 PRINT AT 11,5;"YOU HAVE REA
CHED YOUR LIMIT"
6010 RETURN
9000 PRINT AT 11,5;"CONGRATULATI
ONS. YOU DID IT      IN ";S;" GOE
S"
9997 GOTO 10000
9998 SAVE "REVERSAL"
9999 RUN
```

REVERSAL

THE COMPUTER scrambles numbers from one to nine and you have 15 attempts in which to arrange them in numerical order by reversing blocks of numbers. Full instructions are included in the program.

Reversal was written for the 16K ZX-81 by Timothy England of Worksop, Nottinghamshire.

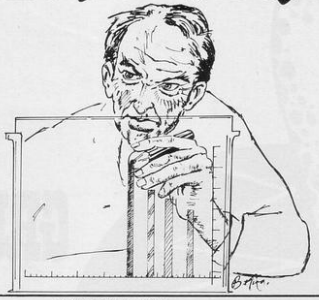
LISSAJOUS

A LEVEL physics students should find useful **Lissajous** which was written by Stephen Keevil of Dulwich, London for the 16K Spectrum.

The program is designed to draw graphs representing the mathematical relationship existing between pairs of sinusoidal waveforms. It is self-explanatory and contains a simplified explanation of the principles involved. Keevil adds that good examples of Lissajous figures will be obtained with a frequency of 1:1 and various values of phase angle.

```
  1 PAPER 1: BORDER 4: INK 6
  2 REM "lissajous"
  3 PRINT "Lissajous figures."
  4 PRINT "Developed and writte
n by          Stephen F. Keevil
."
  5 PRINT
  6 PRINT "Do you require an ex
planation of this program (y/n)?
"
  7 PAUSE 0
  8 IF INKEY$="y" THEN GO TO 10
00
  9 IF INKEY$="n" THEN GO TO 10
 10 CLS : BORDER 1
 12 INPUT "Enter the phase angl
e in degrees and Press ENTER. ";
P
 13 LET Ph=P/180*PI
 14 INPUT "Enter ratio of frequ
encies of X-signal to Y-signal.
  Just enter the first number, P
ress ENTER, enter the second num
ber and     Press ENTER again. B
oth values  should be whole numb
ers. ";x;y
 15 INPUT "Enter ratio of ampli
tudes of    X-signal to Y-signal
 in the same way. Neither value m
ay be       greater than two. ";
a;b
 17 CLS
 18 FOR n=1 TO 255
 20 PLOT 127+a*40*SIN (x*n/128*
PI),88+b*40*SIN (y*n/128*PI+Ph)
 30 NEXT n
 40 GO TO 12
1000 CLS
1100 PRINT "   When the displace
ments with   time due to two sin
usoidal   progressive waves ar
e plotted   against each other,
certain     mathematical figures
, known as  LISSAJOUS FIGURES, a
re created  if the frequencies o
f the waves bear a simple relati
onship to   each other.   The si
tuation is  complicated if the w
aves are out of step.   We say t
here is a   PHASE DIFFERENCE bet
ween them.    If the waves have d
ifferent    AMPLITUDES (heights
), then the figure will be stret
ched in one  direction or the ot
her."
1150 PRINT
1200 PRINT "Press any key to con
tinue"
1250 PAUSE 0
1275 CLS

1300 PRINT "Using this program y
ou can vary the Phase angle  and
 the        frequency and amplit
ude ratios, and have the compute
r draw the  appropriate Lissajou
s figure."
1350 PRINT
1400 PRINT "Press any key to beg
in"
1450 PAUSE 0
1500 GO TO 10
```

LETTER FREQUENCY

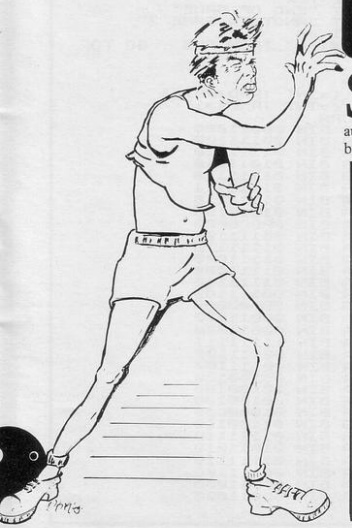


FINDING the frequency of letters in a language can be useful for many reasons, from code-breaking to the study of linguistics. Andy Munro has written **Letter Frequency** for the 16K ZX-81 which will draw a bar chart to show the frequency of letters in any word or sentence which is entered.

The scale of the chart will be altered automatically from 1:1 to 1:2, 1:5 or 1:10 to prevent the most frequently-occurring letter from going off the screen.

```
  1 REM "WORDS"
  2 LET Z=0
  3 GOSUB 135
  4 LET G=0
  5 FAST
  6 LET S=1
 10 FOR X=0 TO 20 STEP 2
 20 PRINT AT X,0;"(9t)"
 25 PRINT AT X,31;"(9t)"
 30 NEXT X
 40 FOR X=1 TO 21 STEP 2
 50 PRINT AT X,0;"(9y)"
 55 PRINT AT X,31;"(9y)"
 60 NEXT X
 70 FOR X=0 TO 30 STEP 2
 80 PRINT AT 0,X;"(9y)"
 90 PRINT AT 21,X;"(9y)"
 95 NEXT X
100 FOR X=1 TO 31 STEP 2
110 PRINT AT 0,X;"(9t)"
120 PRINT AT 21,X;"(9t)"
125 NEXT X
130 GOTO 200
135 LET F$="9"
136 LET D$="0"
140 PRINT AT 2,4;"ENTER WORDS"
150 INPUT S$
175 FOR X=1 TO (LEN S$)
180 IF CODE S$(X)<63 OR CODE S$
(X)>38 OR CODE S$(X)=0 THEN RETU
RN
185 PRINT AT 3,(LEN S$+5);"?"
186 GOTO 140
200 FOR X=19 TO 5 STEP -1
210 PRINT AT X,3;"(isP)"
215 PRINT AT X,2;D$
216 IF CODE D$>=165 THEN LET D$
=CHR$ ((CODE D$)-10)
217 LET D$=CHR$ ((CODE D$)+1)
220 NEXT X
221 FOR X=5 TO 9
222 PRINT AT X,1;"1"
223 NEXT X
230 FOR X=4 TO 29
240 PRINT AT 19,X;"(isP)"
241 LET F$=CHR$ ((CODE F$)+1)
242 PRINT AT 20,X;CHR$ (CODE F$
)
250 NEXT X
260 FOR Y=30 TO 63
262 LET Z=0
265 FOR X=1 TO (LEN S$)
270 LET C=(Y-38)+4
280 IF C<0 THEN NEXT X
290 IF CODE S$(X)=Y THEN LET Z=
Z+1
295 NEXT X
296 IF Z>G THEN LET G=Z
297 IF G>14 AND G<=28 THEN LET
S=2
298 IF G>28 AND G<=140 THEN LET
S=5
299 IF G>140 AND G<=280 THEN LE
T S=10
300 FOR F=(19-(INT (Z/S))) TO 1
8
310 PRINT AT F,C;"(9a)"
320 NEXT F
330 NEXT Y
335 PRINT AT 2,17;"SCALE IS 1:"
;S
340 SLOW
```

BOWLING



SEVERAL SKITTLES are displayed on the left-hand side of the machine and a ball is bowled automatically from the right. Move the ball up and down with the normal cursor keys to knock down as many skittles as possible.

Bowling was written for the 1K ZX-81 by Brian Skitt of Willenhall, West Midlands.

```
  2 REM "BOWLING"BY BRIAN SKITT
  3 CLS
  5 PRINT AT 0,0;"(11*9a)bowlin
g(14*9a)"
  6 PRINT AT 14,0;"(32*9a)"
  7 FOR I=0 TO 18
  8 PRINT AT I,0;"(9a)"
  9 NEXT I
 10 PRINT AT 18,0;"(32*9a)"
 11 PRINT AT 1,1;"(31*i*)";AT 1
3,1;"(31*i*)"
 12 FOR I=1 TO 13
 13 PRINT AT I,1;"(i*)"
 14 NEXT I
 15 PRINT AT 15,1;"(31*i*)";AT
17,1;"(31*i*)"
 16 PRINT AT 16,1;" ";AT 16,31;
" "
 17 LET T=0
 18 LET A=7
 19 PRINT AT 4,5;"(isP)"
 20 PRINT AT 5,5;"(sP:isP)"
 30 PRINT AT 6,5;"(isP:sP:isP)"
 40 PRINT AT 7,5;"(sP:isP:sP:is
P)"
 50 PRINT AT 8,5;"(isP:sP:isP)"
 60 PRINT AT 9,5;"(sP:isP)"
 70 PRINT AT 10,5;"(isP)"
 80 FOR I=0 TO 4
 90 FOR O=25 TO 4 STEP -1
 95 LET A=A+(INKEY$="6")-(INKEY
$="7")
100 PRINT AT A,O;"O"
101 PRINT AT A,O;" "
110 NEXT O
115 LET T=T+1
116 PRINT AT 16,7;"BALLS=";T
130 NEXT I
135 CLS
140 PRINT AT 0,0;"(32*9a)";AT 5
,0;"(32*9a)"
150 FOR I=0 TO 5
160 PRINT AT I,0;"(9a)";AT I,31
;"(9a)"
170 NEXT I
180 PRINT AT 3,3;"     ANOTHER
GO? Y/N"
190 PAUSE 5E4
200 IF INKEY$="N" THEN GOTO 300
210 IF INKEY$="Y" THEN RUN
300 CLS
310 PRINT "THANK YOU FOR PLAYIN
G"
```

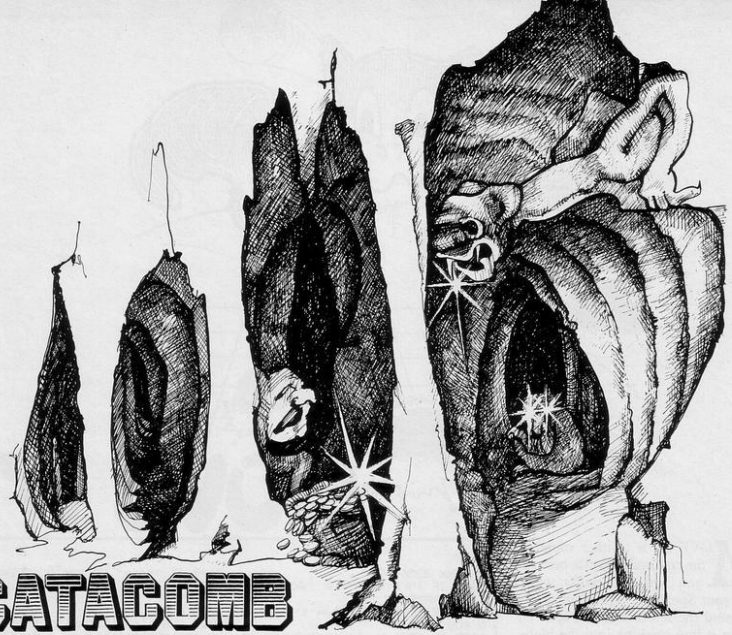
GRUMPHERS

THE OBJECT of **Grumphers** is to capture the grumphers by moving your figure on top of them with the usual cursor keys. As you move you leave a trail which you must not cross. Unless you move carefully you will soon find your way blocked at all turns.

If you find yourself trapped, use the 'J' key to jump to a random position on the screen. The game ends when you cross, or land on your own trail.

The program was written by John Litherland of Manchester for the 16K Spectrum.

```
    2 FOR x=0 TO 7: READ b: POKE
USR "a"+x,b: NEXT x
    3 FOR x=0 TO 7: READ b: POKE
USR "b"+x,b: NEXT x
    4 FOR x=0 TO 7: READ b: POKE
USR "c"+x,b: NEXT x
    5 FOR x=0 TO 7: READ b: POKE
USR "d"+x,b: NEXT x
    6 PAPER 0: BORDER 2: INK 7: C
LS
   10 LET hs=0
   80 LET s=0
   90 PRINT PAPER 2;AT 0,0;"
                            "
  100 LET l=11: LET c=16
  105 GO SUB 800
  110 LET x=l: LET y=c
  115 INK 7
  120 PRINT PAPER 2;AT 0,0;"SCORE
:";s
  125 PRINT PAPER 2;AT 0,17;"HIGH
SCORE:";hs
  190 LET v=l: LET w=c
  200 LET c=c+(INKEY$="8" AND c<3
1)-(INKEY$="5" AND c>0)
  210 LET l=l+(INKEY$="6" AND l<2
1)-(INKEY$="7" AND l>1)
  255 IF INKEY$="j" THEN GO SUB 2
000
  380 IF SCREEN$ (l,c)="*" THEN G
O TO 1000
  385 INK 3
  390 PRINT AT x,y;"*"
  392 IF l=rl AND c=rc THEN LET s
=s+tt: BEEP .5,20: GO TO 105
  395 INK 6
  400 PRINT AT l,c;"A"
  410 IF l<>v OR c<>w THEN BEEP .
05,-20
  500 GO TO 110
  800 LET rl=INT (RND*20)+1
  810 LET rc=INT (RND*31)
  820 LET z=INT (RND*11)
  830 IF z>=0 AND z<2 THEN INK 4:
PRINT AT rl,rc;"A": LET tt=15
  840 IF z>=2 AND z<6 THEN INK 6:
PRINT AT rl,rc;"*": LET tt=10
  850 IF z>=6 AND z<=11 THEN INK
7: PRINT AT rl,rc;"¥": LET tt=5
  860 RETURN
 1000 IF s>hs THEN LET hs=s
 1005 FOR x=30 TO 0 STEP -1: BEEP
 .05,x: NEXT x
 1010 PRINT "END OF GAME"
 1030 PRINT "ANOTHER GAME ?"
 1040 INPUT a$
 1050 IF a$="y" THEN CLS : GO TO
80
 1055 REM
 1060 STOP
 2000 LET l=INT (RND*20)+1
 2010 LET c=INT (RND*31)
 2020 RETURN
 3000 DATA BIN 00011000
 3001 DATA BIN 00111100
 3002 DATA BIN 01111110
 3003 DATA BIN 01011010
 3004 DATA BIN 01111110
 3005 DATA BIN 01111111
 3006 DATA BIN 01111110
 3007 DATA BIN 01010100
 3011 DATA BIN 00000000
 3012 DATA BIN 00111100
 3013 DATA BIN 01111110
 3014 DATA BIN 01111000
 3015 DATA BIN 01111000
 3016 DATA BIN 01111110
 3017 DATA BIN 00111100
 3018 DATA BIN 00000000
 3021 DATA BIN 00011000
 3022 DATA BIN 00011000
 3023 DATA BIN 11111111
 3024 DATA BIN 00111100
 3025 DATA BIN 00111100
 3026 DATA BIN 00100100
 3027 DATA BIN 00100100
 3028 DATA BIN 00100100
 3031 DATA BIN 01000010
 3032 DATA BIN 01100110
 3033 DATA BIN 01111110
 3034 DATA BIN 01011010
 3035 DATA BIN 01111110
 3036 DATA BIN 00111100
 3037 DATA BIN 00011000
 3038 DATA BIN 00011000
```



CATACOMB

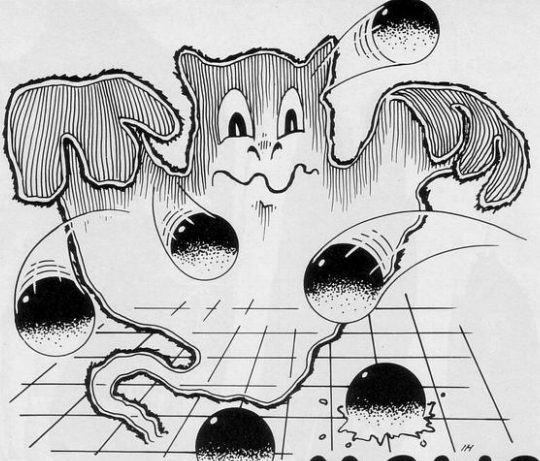
YOU ARE TRAPPED in the fathomless complexities of an underground cavern whose intestinal windings contain enormous golden nuggets and a mythology of fabulous beasts. Your aim is to collect as many points as possible by collecting gold and killing phantoms (inverse P), dragons (inverse D) and ogres (inverse O). Your remaining strength is displayed and can be boosted by the consumption of food pellets (inverse F).

Different caverns can be reached by passing through the exits (inverse X).

A running score and high score are displayed and your man is moved with keys 5 to 8. The Japanese author of the program, Ysichiro Idori of Purley, Surrey, reports his best score as 2,360 but says encouragingly: "I wish you will get higher mark."

In our listing, lower-case letters in brackets are graphics instructions (16K ZX-81).

```
    2 LET B$=""
    5 LET H=0
    7 GOSUB 600
   10 DIM A$(5)
   15 LET A$(1)="(inverse £)"
   16 LET A$(2)="(inverse F)"
   17 LET A$(3)="(inverse O)"
   18 LET A$(4)="(inverse P)"
   19 LET A$(5)="(inverse D)"
   20 LET T=1
   30 LET S=0
   40 LET A=10
   45 CLS
   50 LET B=15
   55 LET ST=-T*10+510+INT (S/100
0)*500
   60 FAST
   65 FOR Y=1 TO 8
   70 LET C=INT (RND*14)+1
   75 LET D=INT (RND*25)
   80 FOR X=C TO (C+INT (RND*4)+3
)
   90 PRINT AT X,D;"(six inverse
 spaces)"
  100 IF NOT INT (RND*(4-(T)3)*2)
 ) THEN PRINT AT X,D+INT (RND*5);
 A$(INT (RND*(2+(S)3000)+(T=2)+(S
)1000))+1))
  110 NEXT X
  120 NEXT Y
  130 PRINT AT 1,RND*30;"(inverse
 X)"
  140 PRINT AT 10,5;"(twenty inve
rse spaces)"
  150 SLOW
  160 PRINT AT A,B;
  170 LET L=PEEK (PEEK 16398+256*
PEEK 16399)
  190 IF L(>169 AND L(>180 AND L(
)181 THEN GOTO 250
  200 LET ST=ST-INT (RND*200)-100
0+(L=180)*1000+(L=181)*700
  205 PRINT AT 0,10;ST
  210 IF CODE INKEY$)=33 AND CODE
 INKEY$(=36 THEN GOTO 320
  220 IF INT (RND*(5+(T/2)))=0 TH
EN GOTO 240
  225 IF ST(0 THEN GOTO 400
  230 GOTO 200
  240 LET S=S+(T*(500-(L=180)*400
-(L=181)*200))
  250 IF L=171 THEN LET ST=ST+INT
 (RND*100)+50
  260 IF L=140 AND INT (RND*2) TH
EN LET ST=ST-20
  270 IF L=140 THEN LET S=S+INT (
RND*5)*10
  280 IF L(>189 THEN GOTO 290
  282 LET T=T+1
  284 GOTO 40
  290 IF L=CODE "" THEN LET ST=ST
-10
  295 PRINT AT 0,0;S;TAB 10;ST;"
";TAB 15;H;B$;AT A,B;"O"
  300 LET ST=ST-1
  310 IF ST(0 THEN GOTO 400
  315 IF CODE INKEY$)36 OR CODE I
NKEY$(33 THEN GOTO 160
  317 PRINT AT A,B;"(inverse spac
e)"
  320 LET B=(INKEY$="8")-(INKEY$=
"5")+B
  330 LET A=A+(INKEY$="6")-(INKEY
$="7")
  350 GOTO 160
  400 CLS
  410 PRINT AT 10,2;"YOU ARE DEAD
 SCORE";S
  430 IF S(H THEN GOTO 480
  440 PRINT "YOU MANAGED THE HIGH
 SCORE"
  450 PRINT "PLEASE INPUT YOUR NA
ME"
  455 PRINT "JUST 5 LETTERS"
  460 LET H=S
  470 INPUT B$
  480 PRINT B$;" HIGH";H
  490 PRINT " TO CONTINUE PRESS""
S"""
  500 PAUSE 3E3
  510 IF INKEY$(>"S" THEN GOTO 50
0
  520 GOTO 10
  600 PRINT AT 6,8;"CAVE FIGHTER"
  610 PRINT AT 9,5;"(inverse F)=F
OOD (inverse £)=GOLD (AND TRAP)
    (inverse O)=ORE (inverse P)=
PHANTOM (inverse D)=DRAGON"
  620 PRINT AT 12,5;" TO MOVE USE
 KEY 5 TO 8"
  630 PRINT AT 14,5;"PRESS ""S""
TO START"
  635 PAUSE 4E4
  640 IF INKEY$(>"S" THEN GOTO 63
5
  650 RETURN
```



MOVE IT!

MOVE IT is another round in the continuing battle between you and the ghosts which haunt your Spectrum. The ghost chases you round the screen and you score by tricking it into crashing into the blobs. If the ghost catches you it will eat you and if you run into a blob you will be SPLATTED.

The program was written by R Wileman of Emsworth, Hampshire.

```
  1 PAPER 7: CLS : GO SUB 6000: GO SUB 5000
  2 CLS : GO TO 50
  5 LET s=0: LET k=15: LET l=15: LET j=1: LET h=20
  10 FOR a=0 TO 31: PRINT AT 0,a;"*": PRINT AT 21,a;"*": NEXT a
  20 FOR a=0 TO 21: PRINT AT a,0;"*": PRINT AT a,31;"*": NEXT a
  30 PRINT AT 1,1;"*"
  40 GO TO 90
  50 FOR n=0 TO 9-1
  55 LET w=INT (RND*19)+1: LET e=INT (RND*29)+1
  60 PRINT INK 1; PAPER 6;AT w,e;"AA"
  65 PRINT INK 1; PAPER 6;AT w+1,e;"AA"
  70 NEXT n
  80 GO TO 5
  90 PRINT AT k,l;"C"
  100 PRINT AT INT j,INT h;" ": LET j=j+.8*(j<k)-.5*(j>k): LET h=h+.8*(h<l)-.5*(l<h): IF ATTR (INT j,INT h)=49 THEN LET s=s+1
  101 IF SCREEN$ (INT j,INT h)="* " THEN GO SUB 1200
  105 PRINT INK 2; PAPER 7;AT INT j,INT h;"B"
  110 IF ATTR (k,l)=58 THEN GO TO 2000
  145 PRINT AT k,l;" "
  150 LET l=l-(PEEK 23560=119 OR PEEK 23560=87)+(PEEK 23560=101 OR PEEK 23560=69)
  160 LET k=k+(PEEK 23560=107 OR PEEK 23560=75)-(PEEK 23560=111 OR PEEK 23560=79)
  165 IF INKEY$="h" OR INKEY$="H" THEN PAUSE 0
  170 IF SCREEN$ (k,l)="*" THEN GO SUB 1000
  180 IF ATTR (k,l)=49 THEN GO TO 1500
  185 PRINT AT 0,0;s
  190 IF s=q*4/2 THEN GO TO 3000
  200 GO TO 90
  1000 IF k=0 THEN LET k=1
  1010 IF k=21 THEN LET k=20
  1020 IF l=0 THEN LET l=1
  1030 IF l=31 THEN LET l=30
  1050 RETURN
  1200 IF INT j=0 OR INT j<0 THEN LET j=1
  1210 IF INT j=21 THEN LET j=0
  1220 IF INT h=0 OR INT h<0 THEN LET h=1
  1230 IF INT h=31 THEN LET h=30
  1240 RETURN
  1500 CLS
  1505 READ a
  1510 BEEP .5,a
  1520 DATA 6,9,3,2,5,7,6,5,4,9,1,0
  1540 IF a=0 THEN RESTORE a: GO TO 1560
  1550 GO TO 1505
  1560 PRINT : PRINT : PRINT "YOU CRASHED"'" WITH A SCORE OF ";s
  1570 INPUT " Another Game ?";q$
  1580 IF q$="y" OR q$="Y" THEN GO TO 1
  1999 STOP
  2000 CLS : PRINT "        IT GOT YOU": PRINT : PRINT "      YOUR SCORE IS ";s
  2020 INPUT "Another Game ? ";q$
  2030 IF q$="y" OR q$="Y" THEN GO TO 1
  2500 STOP
  3000 FOR n=0 TO 30
  3010 FOR z=0 TO 5: BEEP .01,z: NEXT z
  3020 PRINT FLASH 1;AT 18,12;"YOU WON"
  3100 LET a=INT (RND*7)+1
  3110 PAPER a
  3120 NEXT n
  3130 INPUT " Another Game ? ";q$
  3140 IF q$="y" OR q$="Y" THEN GO TO 1
  3150 STOP
  4010 PAUSE 100
  5000 CLS : PRINT "%%%%%%%%%%%%%%%%MOVE IT%%%%%%%%%%%%%%%%"
  5010 PRINT : PRINT "In this Game you have to make  the Ghost eat the blobs."'"But if the Ghost catches you it will eat you and if you run intothe blobs you will be SPLATTED."
  5020 PRINT : PRINT "You look like this ";"C"
  5030 PRINT : PRINT "The Ghost looks like this  "; INK 2;"B"
  5040 PRINT : PRINT "The blobs look like this  AA"'"  AA"
  5050 PRINT : PRINT "To move use keys:-"
  5055 PRINT : PRINT "w to move left"
  5060 PRINT "e to move right"
  5065 PRINT "o to move up"
  5067 PRINT "k to move down"
  5068 PRINT "h to hold (any key to cont)"
  5070 INPUT "How many blobs ?";q
  6000 POKE USR "a",BIN 11111111
  6010 POKE USR "a"+1,BIN 10000001
  6020 POKE USR "a"+2,BIN 11111111
  6030 POKE USR "a"+3,BIN 10000001
  6040 POKE USR "a"+4,BIN 11111111
  6050 POKE USR "a"+5,BIN 10000001
  6060 POKE USR "a"+6,BIN 11111111
  6080 POKE USR "b",  BIN
  6090 POKE USR "b"+1,BIN 01111100
  7000 POKE USR "b"+2,BIN 11010110
  7010 POKE USR "b"+3,BIN 11111110
  7020 POKE USR "b"+4,BIN 11111110
  7030 POKE USR "b"+5,BIN 01111100
  7040 POKE USR "b"+6,BIN 01010100
  7060 POKE USR "c",  BIN
  7070 POKE USR "c"+1,BIN 0001000
  7080 POKE USR "c"+2,BIN 0011100
  7090 POKE USR "c"+3,BIN 1010101
  8000 POKE USR "c"+4,BIN 1000001
  8010 POKE USR "c"+5,BIN 0001000
  8020 POKE USR "c"+6,BIN 0001000
  8030 POKE USR "c"+7,BIN 0111110
  8050 RETURN
```

FORMULÆ

```
  1 PRINT AT 0,11;"FORMULAE"
  3 PRINT AT 5,0;"PRESS NEWLINE
TO START PROGRAM"
  4 PAUSE 4E4
  6 CLS
 10 LET A$="FORMULA"
 12 FOR X=0 TO 14 STEP 7
 14 FOR Y=1 TO 7
 16 FOR Z=7+ABS (4-Y) TO 13-ABS
(4-Y)
 18 PRINT AT Z,X+Y+4;A$(Y)
 20 NEXT Z
 22 NEXT Y
 24 NEXT X
 26 PRINT AT 10,12;"formula"
 40 PAUSE 150
 43 CLS
 45 PRINT AT 10,0;"THIS PROGRAM
 WILL TEST YOU ON";AT 12,0;"FORM
ULAE OF COMPOUNDS WHOSE";AT 14,0
;"NAMES ARE IN TWO PARTS"
 46 PRINT AT 18,0;"PRESS NEWLIN
E TO CONTINUE"
 50 PAUSE 4E4
 55 CLS
 60 LET A$="1- LEAD          2-
ZINC          3- SODIUM      4-
CARBON        5- SILICON     6-
SILVER        7- CALCIUM     8-
LITHIUM       9- BARIUM      10-
COPPER        11-IRON(2)     12-
IRON(3)       13-AMMONIUM    14-
POTASSIUM     15-ALUMINIUM   16-
CHROMIUM      17-MAGNESIUM   "
 65 PRINT A$
 70 PRINT AT 15,0;"SELECT THE F
IRST HALF OF YOUR";AT 16,0;"COMP
OUNDS NAME FROM THIS LIST.";AT 1
7,0;"TYPE IN ITS NUMBER.PRESS NE
WLINE"
 75 INPUT N
 80 CLS
 81 LET H=4
 81 LET H=4
 82 IF N<3 THEN LET H=7
 83 IF N>12 THEN LET H=2
 85 LET B$=" PB ZN NA  C SI AG
CA LI BA CU FE FENH4  K AL CR MG
"
 90 LET C$="221441212223113 32"
 100 LET J$="1- CHLORIDE     2-
BROMIDE       3- HYDROXIDE   4-
NITRATE       5- SULPHATE    6-
SULPHITE      7- CARBONATE   8-
PHOSPHATE     9- IODIDE      10-
SULPHIDE      11-FLUORIDE    12-
PHOSPHIDE     13-OXIDE       14-
```

DAVID HUGHES of Tunbridge Wells, Kent found, when he was teaching chemistry, that pupils were having problems with **Formulae.** So he used his 16K ZX-81 to write a program which could be used to test anyone's knowledge of chemical notation.

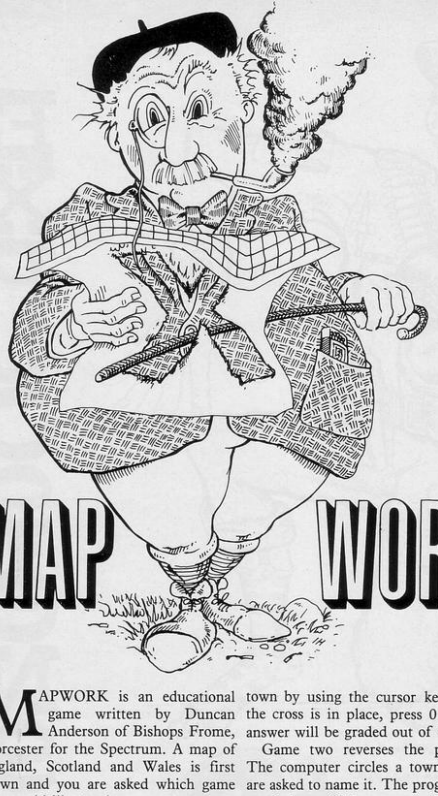
The program contains full instructions and works on a 16K ZX-81. When you are asked for the response 'Yes' or 'No', enter either 'Y' or 'N' rather than the full word.

```
NITRIDE      "
 105 LET Z=1
 106 IF N=4 OR N=14 THEN LET Z=0
 107 IF N=13 THEN LET Z=2
 110 PRINT J$
 120 PRINT AT 15,0;"SELECT THE S
ECOND HALF OF YOUR";AT 16,0;"COM
POUNDS NAME FROM THIS LIST.";AT
17,0;"TYPE IN ITS NUMBER.PRESS N
EWLINE"
 130 INPUT P
 140 LET K$="CL BR OH NO3SO4SO3C
O3PO4I  S  F  P  O  N  "
 150 LET R$="11112223121323"
 170 LET E=0
 180 IF P<4 THEN LET E=1
 185 IF P>8 THEN LET E=2
 190 LET S$=""
 195 LET T$=""
 200 IF P>2 AND P<9 AND VAL C$(N
)>1 AND C$(N)<>R$(P) THEN LET S$
="("
 210 IF S$="(" THEN LET T$=")"
 215 LET F$=C$(N)
 216 LET G$=R$(P)
 217 IF C$(N)=R$(P) OR VAL C$(N)
=1 THEN LET F$=""
 218 IF C$(N)=R$(P) OR VAL R$(P)
=1 THEN LET G$=""
 225 IF N=13 AND P>11 THEN GOTO
299
 228 IF N>3 AND N<6 AND P>2 AND
P<9 THEN GOTO 299
 230 IF VAL C$(N)=4 AND VAL R$(P
)=2 THEN LET F$="2"
 232 IF VAL C$(N)=4 AND VAL R$(P
)=2 THEN LET G$=""
 234 CLS
 240 PRINT AT 2,0;"WHAT IS THE F
ORMULA OF ";AT 4,0;A$(16*N-12 TO
 16*N-H);J$(16*P-12 TO 16*P-3);"
?"
 241 INPUT L$
 242 PRINT AT 7,0;"I THINK THE F
ORMULA IS ";L$
 245 IF N=13 AND VAL R$(P)>1 THE
N GOTO 270
 250 IF L$=B$(3*N-2 TO 3*N)+G$+S
$+K$(3*P-2 TO 3*P-E)+T$+F$ THEN
GOTO 330
 260 GOTO 280
 270 IF L$="(NH4)"+R$(P)+K$(3*P-
2 TO 3*P-E) THEN GOTO 330
 280 PRINT AT 12,0;"SORRY. WRONG
 ANSWER. DO YOU WANT";AT 13,0;"A
NOTHER TRY? YES/NO IF ""NO""!";A
T 14,0;"WILL TELL YOU THE CORREC
T ANSWER"
 290 INPUT M$
 292 IF M$="Y" THEN GOTO 234
 293 IF M$="N" THEN GOTO 340
 294 STOP
 299 CLS
 300 PRINT AT 8,0;"THERE IS NO S
UCH COMPOUND"
 310 GOTO 350
 330 PRINT AT 12,0;"CORRECT. WEL
L DONE"
 335 GOTO 350
 340 PRINT AT 18,0;"THE CORECT A
NSWER IS ";
 342 IF N=13 AND VAL R$(P)>1 THE
N PRINT "(NH4)";R$(P);K$(3*P-2 T
O 3*P)
 344 IF (N=13 AND VAL R$(P)=1) O
R N<>13 THEN PRINT B$(3*N-2 TO 3
*N);G$;S$;K$(3*P-2 TO 3*P-E);T$;
F$
 350 PRINT AT 20,0;"DO YOU WISH
TO CONTINUE? YES/NO?"
 360 INPUT W$
 365 CLS
 370 IF W$="Y" THEN GOTO 60
 380 IF W$="N" THEN PRINT AT 11,
10;"GOODBYE"
1000 STOP
1100 SAVE "FORMULAe"
1200 GOTO 1
```

IAN SHELLEY of Beaminster, Dorset has written a simple memory-testing program for use on the 1K ZX-81. In **Repetition** a number will be displayed on the screen and will then disappear. Type that number. Another number will be displayed and vanish. Type the first number and then the second. That will continue for 12 numbers. Can you remember them all?

REPETITION

```
  10 DIM A(12)
  14 LET E=3
  20 LET Z=1
  30 FOR N=Z TO VAL "12"
  33 CLS
  39 LET A(N)=INT (RND*VAL "10")
  42 PRINT A(N)
  60 FOR Y=Z TO VAL "75"
  66 NEXT Y
  70 SCROLL
  80 FOR X=Z TO N
  90 PRINT AT E,E;"ENTER NUMBER"
 100 INPUT B
 108 PRINT AT VAL "6",E+X;B
 109 PRINT AT VAL "8",E+X;A(X)
 120 IF A(X)<>B THEN GOTO VAL "1
60"
 130 NEXT X
 135 IF N=VAL "12" THEN GOTO VAL
 "155"
 140 PRINT AT E,E;"CORRECT.NOW "
;N+Z;" NOS"
 144 FOR C=Z TO VAL "75"
 148 NEXT C
 150 NEXT N
 155 PRINT AT E,E;"WELL DONE.MAX
 SCORE OF 12"
 156 STOP
 160 PRINT AT E,E;"YOU FAIL ON "
;N;" NOS"
 170 STOP
```



MAP WORK

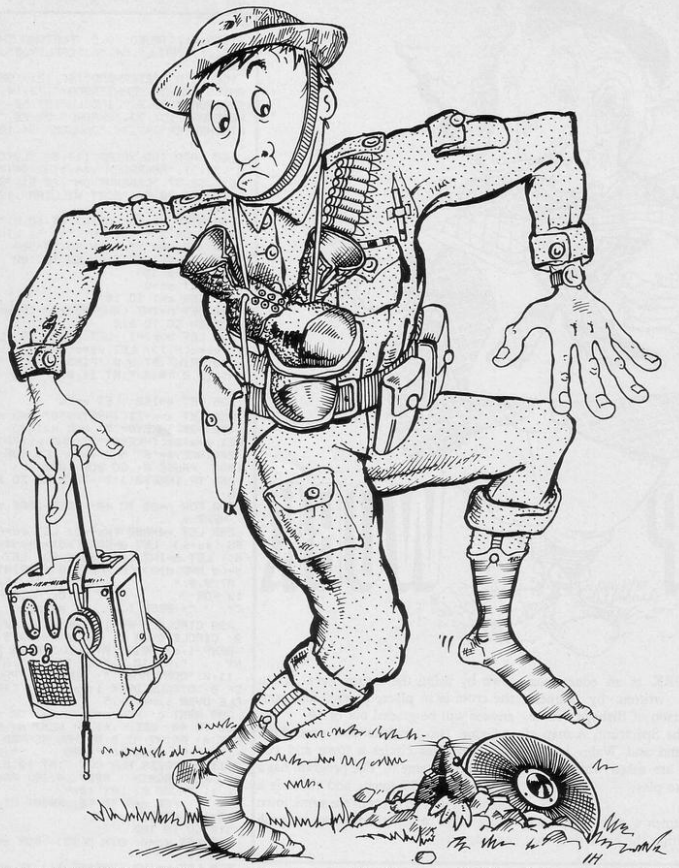
MAPWORK is an educational game written by Duncan Anderson of Bishops Frome, Worcester for the Spectrum. A map of England, Scotland and Wales is first drawn and you are asked which game you would like to play.

Game one names a town and then asks you to position the cross over that town by using the cursor keys. When the cross is in place, press 0 and your answer will be graded out of 10.

Game two reverses the procedure. The computer circles a town and you are asked to name it. The program has a vocabulary of 35 towns and there is a safeguard in it to prevent the same town being used more than once in each round.

```
  2 BORDER 0: PAPER 0: INK 9: C
LS
  3 PRINT AT 10,0; INK 6; FLASH
 1;"PLEASE WAIT"
  4 LET o=1.2
  5 LET e=0: LET w=10: LET r=0
  10 LET l$="2121119212222226e291
2412412523414436r124034212r42113
11418r341523e1242r44441434339212
12291212314e4444"
  11 LET l$=l$+"982424442444269
2111426e3w34w64w2242741643442344
24441421432e2142212213624e233413
42148144e44423431133243298e2"
  12 LET l$=l$+"1342e41414414w2
w22u2ew212u4w1u2ew2u2e14244w241
w5w1w32eew4w2w3ew4w2ew1241423w21
423ew1w4ew4w1w1ew4w3w5ew22e"
  13 LET l$=l$+"1233112241211412w
5w7ew11w4115w3e41w24e31e25w1w3w1
w3w63w81e222ee41"

  14 LET l$=l$+"1412141434eew32w1
w3w3ew3w12w4w1w21w2w1w2ew12w3w12
w32ew5w662ew31w3w1w3w5w4w4w2142e
w24r123r1424142612434412321434344
642411429431ew2w41w4e41424441414
445442w3w4w7w21w2"
  20 LET q=10
  25 PLOT 150,2
  30 LET n=1
  35 IF n>=LEN l$ THEN GO TO 100
  40 LET x=VAL l$(n): IF x=10 TH
EN LET x=-(VAL l$(n+1)): LET n=n
+1
  50 LET n=n+1: LET y=VAL l$(n):
 IF y=10 THEN LET y=-(VAL l$(n+1
)): LET n=n+1
  60 LET n=n+1: DRAW o*x,o*y: GO
 TO 35
  100 RESTORE : DIM c$(40,12): DI
M c(40,2): FOR n=1 TO 35: READ c
$(n),q,w: LET c(n,1)=150+o*q: NEXT n
  LET c(n,2)=2+o*w: NEXT n

  130 DATA "LONDON",59,22,"SOUTHA
MPTON",45,13,"EXETER",23,10,"BRI
STOL",34,23,"CARDIFF",26,23,"BIR
MINGHAM",41,39,"LIVERPOOL",30,56
,"MANCHESTER",39,56,"SHEFFIELD",
47,55
  140 DATA "LEEDS",46,62,"YORK",5
1,65,"NEWCASTLE",46,82,"EDINBURG
H",34,98,"GLASGOW",22,94,"NORWIC
H",73,41,"TRURO",9,5,"PORTSMOUTH
",51,11,"HULL",54,56,"CARLISLE",
31,80
  150 DATA "PETERHEAD",47,121,"SW
ANSEA",20,25,"CANTERBURY",72,14,
"TORQUAY",23,6,"LINCOLN",57,52,"
HEREFORD",31,33,"OXFORD",50,26,"
WINCHESTER",47,16,"DUNDEE",34,10
7
  160 DATA "HOLYHEAD",17,53,"LUTO
N",59,31,"ABERDEEN",44,113,"GRIM
SBY",62,57,"CAERNARVON",20,51,"S
OUTHEND",70,24,"FORT WILLIAM",17
,116
  180 BEEP .1,10: PRINT AT 10,0,"
GAME 1 OR 2 ?": INPUT ">> "; LIN
E y$: IF y$="2" THEN GO TO 500
  190 IF y$<>"1" THEN GO TO 180
  200 DIM d(35)
  201 LET sc=0
  205 FOR c=1 TO 10
  210 LET r=INT (RND*35)+1: IF d(
r) THEN GO TO 210
  220 LET d(r)=1: LET p$=c$(r): L
ET xx=c(r,1): LET yy=c(r,2)
  230 PRINT AT 9,0;"FIND
;AT 10,0;p$;"  ";AT 11,0;"
                "
  235 LET x=140: LET y=70
  250 LET x=x+2*(INKEY$="8" AND x
<252)-2*(INKEY$="5" AND x>140): 
LET y=y+2*(INKEY$="7" AND y<172)
-2*(INKEY$="6" AND y>3): GO SUB
1000: PAUSE 0: GO SUB 1000
  260 IF INKEY$<>"0" THEN GO TO 2
50
  270 FOR n=20 TO 40: BEEP .006,n
: NEXT n
  280 LET xd=ABS (xx-x): LET yd=A
BS (yy-y): LET d=SQR (xd*xd+yd*y
d): LET d=INT ((20-d)/1.9): LET
 d=(d AND d>0)+(0 AND d<0): PRINT
 AT 9,0;"                ";AT 10,0;d;"/
10 FOR          ";AT 11,0;"ACCURA
CY          ": BEEP 1,d: LET sc=sc+d
  290 CIRCLE OVER 1; INK 6;xx,yy,
2: CIRCLE OVER 1; INK 6;xx,yy,5:
 BEEP 1,d: PRINT AT 9,0;"PRESS A
NY      ";AT 10,0;"KEY TO       ";AT
 11,0;"CONTINUE  ": PAUSE 1: PAU
SE 0: CIRCLE OVER 1;xx,yy,2: CIR
CLE OVER 1;xx,yy,5
  300 NEXT c: FOR n=0 TO 3: FOR m
=30 TO 40: BEEP .01,m: NEXT m: N
EXT n: PRINT AT 9,0;"YOU SCORED
          ";AT 10,0;sc;"/100          ";A
T 11,0;"PRESS ANY KEY ";AT 12,0;
"TO PLAY AGAIN": BEEP .4,10: PAU
SE 1: PAUSE 0: LET l$="
          ": FOR n=9 TO 12: PRINT AT
n,0;l$: NEXT n
  310 GO TO 180
  500 LET sc=0: DIM d(35): FOR c=
1 TO 10
  510 LET r=INT (RND*35)+1: IF d(
r) THEN GO TO 510
  520 LET d(r)=1: LET xx=c(r,1): 
LET yy=c(r,2): CIRCLE INK 6; OVE
R 1;xx,yy,2: CIRCLE INK 6; OVER
1;xx,yy,5
  530 DIM t$(12): PRINT AT 9,0;"W
HAT IS      ";AT 10,0;"THIS TOWN
          ";AT 11,0;"CALLED ?       ": P
OKE 23658,8: INPUT ">> "; LINE t
$: POKE 23658,0: IF CODE t$=32 T
HEN GO TO 530
  540 IF t$=c$(r) THEN PRINT AT 9
,0;"THAT IS     ";AT 10,0;"CORRECT
      ";AT 11,0;"WELL DONE    ": B
EEP 1,15: LET sc=sc+10: GO TO 56
0

  550 PRINT AT 9,0;"NO, IT IS
 ";AT 10,0;"CALLED       ";AT 11
,0;c$(r): BEEP ,5,0: BEEP ,5,-10
  560 CIRCLE OVER 1;xx,yy,2: CIRC
LE OVER 1;xx,yy,5
  570 GO TO 300

1000 OVER 1: PLOT x,y-2: DRAW 0,
4: PLOT x-2,y: DRAW 4,0: OVER 0:
 RETURN
```

EXPLOSIONS



YOU (O) MUST MAKE your way across the minefield to reach your home (H). Avoid the mines marked—inverse space—or you will explode. It is safe to walk on the defused mines (+). Move up with 'E', down with 'D', left with 'G' and right with 'F'.

At the start of **Explosions** you are asked to input your speed, which must be between one and 20, and the number of mines in one row, which must be between 7 and 15. The game was written for the 16K ZX-81 by Peter Vitray of Budapest, Hungary.

```
    5 LET F=0
   10 PRINT "SPEED="
   20 INPUT V
   25 PRINT AT 0,6;V
   30 PRINT "NUMBER OF MINES IN O
NE ROW="
   35 INPUT M
   40 PRINT AT 1,27;M
   45 CLS
   50 IF V<1 OR V>20 OR M<7 OR M>
15 THEN GOTO 5
   55 FOR X=0 TO 31
   60 PRINT AT 0,X;"(9▲)";AT 20,X
;"(9▲)"
   70 IF X>0 AND X<20 THEN PRINT
AT X,0;"(9▲)";AT X,31;"(9▲)"
   80 NEXT X
   90 FOR A=18 TO 2 STEP -1
   95 IF A<10 THEN PRINT AT RND*1
7+1,RND*29+1;"+"
   96 IF A=18 THEN FOR B=1 TO 5
  100 IF A<18 THEN FOR B=1 TO M
  105 IF A=18 THEN PRINT AT A+1,R
ND*28+10;"(isP)"
  110 PRINT AT A,RND*29+1;"(isP)"
  120 NEXT B
  130 NEXT A
  135 PRINT AT 1,RND*29+1;"H"
  140 LET X=1
  145 LET W=0
  150 LET Y=19
  155 LET V=22-V
  160 LET Z=1
  180 PRINT AT Y,X;" "
  200 IF INKEY$="E" THEN LET Z=3
  210 IF INKEY$="D" THEN LET Z=4
  220 IF INKEY$="J" THEN LET Z=1
  230 IF INKEY$="G" THEN LET Z=2
  235 LET X=X+(-1 AND Z=2)+(1 AND
Z=1)
  245 LET Y=Y+(-1 AND Z=3)+(1 AND
Z=4)
  255 PRINT AT Y,X;
  256 LET F=PEEK (PEEK 16398+256*
PEEK 16399)
  315 PRINT AT Y,X;"O"
  320 IF F=21 THEN LET W=W-1
  330 IF F=128 THEN LET W=W+1
  340 IF W=1 OR F=8 THEN GOTO 500
  350 IF F=45 THEN GOTO 550
  370 FOR H=1 TO V
  380 NEXT H
  400 GOTO 180
  500 FOR S=1 TO 10
  510 PRINT AT Y,X;" ";AT Y,X;"*"
  520 NEXT S
  530 IF F<>45 THEN PRINT AT 10,1
;"THE MINE HAS BLOWN UP WITH YOU
"
  550 IF F=45 THEN PRINT AT 10,5;
"YOU REACHED YOUR HOME"
```

GOTCHA!

```
  10 LET X=CODE "(95)"
  20 LET Y=CODE "2"
  30 DIM C(I+J,J)
  40 LET S=0
  50 LET X=X+(INKEY$="6" OR X=0)
-(INKEY$="7" OR X=CODE "(9≤)")
  60 LET Y=Y+(INKEY$="8" OR Y=0)
-(INKEY$="5" OR Y=CODE "3")
  70 LET R=INT (RND*J)+I
  80 LET C(R,I)=C(R,I)+(X)C(R,I)
)-(X<C(R,I))
  90 LET C(R,J)=C(R,J)+(Y)C(R,J)
)-(Y<C(R,J))
 100 LET S=S+I
 110 PRINT AT X,Y;"*";AT C(R,I),
C(R,J);"(i*)";AT 0,0;S
 120 IF X<>C(R,I) OR Y<>C(R,J) T
HEN GOTO CODE "M"
 130 PRINT AT X,Y;"GOTCHA"
```

GOTCHA is an exciting game for the 1K ZX-81 which can be played again and again without becoming boring. It requires some skill and forethought.

It was written by Paul Sutton, a law student of Cardiff, South Glamorgan. He owns a ZX-81 with 16K RAM pack, which he uses normally to help him in fantasy games, such as dungeons and dragons.

You—an asterisk—must avoid the two intelligent ghosts—inverse asterisks—for as long as possible. As each of you leaves a trail, it can become impossible to spot the ghosts for long periods.

Remember that you can cross your own trail or that of the ghosts, that you can move only in the upper half of the screen, and that you can move faster than the ghosts. Your movement is controlled by the usual cursor keys. Start by entering GOTO 1.

CRICK

```
  1 REM Cricket
  3 BORDER 4: PAPER 4
  5 PRINT AT 0,10;"Cricket"
  7 PRINT AT 7,0;"Operating Ins
tructions"
  8 PRINT AT 9,2;"7 for next de
livery"
  9 PRINT AT 11,2;"5 to strike
ball on Off-Side"
 10 PRINT AT 13,2;"8 to strike
ball on On-Side"
 11 PRINT AT 15,0;"  If you don
't bat straight you may get bowl
ed or caught behind! Try not to
get a Duck!"
 12 INPUT "Level of difficulty?
 1-3?";d
 13 IF d<>1 AND d<>2 AND d<>3 T
HEN GO TO 12

 15 IF d=1 THEN LET p=5
 16 IF d=2 THEN LET p=3
 17 IF d=3 THEN LET p=1
 19 DIM t(2)
 20 DIM h$(2,12)
 21 LET tt=1
 22 FOR o=1 TO 2
 25 INPUT "Team?";h$(o)
 27 NEXT o
 30 LET o=1
 31 IF tt=2 THEN LET o=2
 32 PRINT AT 21,0;"Innings of "
;h$(o)
 40 PAUSE 25
 50 CLS
 60 GO SUB 9000
 65 GO SUB 8505
 72 LET rr=0: LET ss=0: LET w=0
: LET r=0
 75 GO TO 4500

 96 INK 7: LET k=0: PRINT AT 20
,14;"F": PRINT AT 21,14;"G"
 100 LET x=19: LET y=15
 110 FOR n=1 TO 20: INK 2: PRINT
 AT x,y;"E"
 115 PAUSE p
 120 PRINT AT x,y;" ": LET x=x-1
 130 IF n=10 THEN LET q=INT (RND
*5-3): LET y=y+q
 140 IF n<>12 AND INKEY$="0" THE
N LET n=13
 145 IF x<=3 THEN LET x=3
 150 IF n=12 AND y<=15 AND INKEY
$="5" THEN GO TO 5001
 155 IF n=12 AND y>=16 AND INKEY
$="8" THEN GO TO 5001
 160 IF y<=14 AND n=12 AND INKEY
$="8" THEN GO TO 3000
 170 IF y>=16 AND n=12 AND INKEY
$="5" THEN GO TO 3000
1200 NEXT n

1210 IF y=b THEN GO TO 1300
1220 IF y=b+1 THEN GO TO 1300
1250 GO TO 4500
1300 PRINT AT 10,0;"BOWLED"
1303 GO SUB 8555
1305 PRINT AT 10,0;"       "
1308 GO TO 6095
2000 LET k=1+INT (2*RND)
2010 IF k=1 THEN GO TO 2200
2020 IF k=2 THEN GO TO 2050
2050 GO SUB 8555
2060 PRINT AT 10,0;"DROPPED"
2070 BEEP .1,-10: BEEP .1,-10
2075 PAUSE 5
2080 PRINT AT 10,0;"       "
2090 GO TO 6095
2200 PRINT AT 10,0;"CAUGHT"
2210 GO SUB 8555
2220 PRINT AT 10,0;"       "
2250 GO TO 6095

3000 PRINT AT 3,15;"E";AT 13,0;"
CAUGHT BEHIND"
3010 GO SUB 8555
3020 PRINT AT 3,15;" ";AT 13,0;"
                "
3035 GO TO 6095
4410 GO TO 4500
4500 PRINT AT 10,b;"  "
4505 INPUT INKEY$
4510 IF INKEY$="7" THEN GO TO 85
4520 IF INKEY$<>"7" THEN GO TO 4
```

KET

```
500
5000 GO TO 4500
5002 INK 7: PRINT AT 7,m;"L";AT
8,m;"M"
5003 BEEP .03,0
5005 LET c=x: LET d=y
5006 LET s=INT (15*RND)
5010 LET h=INT (1+4*RND)
5015 FOR n=1 TO s
5020 IF h=1 THEN GO TO 5100

5030 IF h=2 THEN GO TO 5110
5040 IF h=3 THEN GO TO 5120
5050 IF h=4 THEN GO TO 5130
5100 LET d=d-1: LET c=c-1: GO TO
 6000
5110 LET d=d-1: LET c=c+1: GO TO
 6000
5120 LET d=d+1: LET c=c-1: GO TO
 6000
5130 LET d=d+1: LET c=c+1
6000 IF c=2 AND d=9 THEN GO TO 2
000
6005 IF c=10 AND d=10 THEN GO TO
 2000
6010 IF c=8 AND d=20 THEN GO TO
2000
6015 IF c=15 AND d=22 THEN GO TO
 2000
6040 INK 2: PRINT AT c,d;"E"
6045 PAUSE 10
6047 IF c<=0 THEN LET m=s: IF c>
=20 THEN LET m=s
6048 IF d<=0 THEN LET m=s: IF d>
=32 THEN LET m=s
6050 PRINT AT c,d;" "
6055 GO SUB 8525
6060 NEXT n
6061 IF s>=0 AND s<=3 THEN LET r
=1
6062 IF s>=4 AND s<=7 THEN LET r
=2
6063 IF s>=8 AND s<=10 THEN LET
r=3
6064 IF s>=11 AND s<=13 THEN LET
 r=4
6078 IF s>=14 THEN LET r=6
6082 INK 1: PRINT AT 10,b;r
6084 PAUSE 10
6086 LET t(o)=t(o)+r
6088 LET rr=t(o)
6095 INK 1: PRINT AT 0,1;h$(o)
6096 PRINT AT 1,2;t(o)
6097 PRINT AT 2,1;"For"
6098 PRINT AT 3,2;w
6099 INK 7
7000 IF w=10 THEN GO TO 8200
7010 GO SUB 8505
8000 GO TO 4500
8200 CLS
8210 PRINT AT 5,5;"All Out"
8220 PRINT AT 7,5;h$(o);" Scored
 ";t(o)
8222 IF o=2 THEN GO TO 8630
8250 INPUT "ENTER for next innin
gs";i$
8260 LET tt=2
8300 CLS
8500 GO TO 28
8505 INK 7: PRINT AT 1,15;"F";AT
 2,15;"N";AT 0,13;"F";AT 1,13;"N
"
8510 PRINT AT 4,27;"F";AT 5,27;"
G";AT 17,7;"F";AT 18,7;"G"
8515 PRINT AT 5,5;"F";AT 6,5;"G"
;AT 20,14;"H";AT 21,14;"G"
8520 LET m=17: LET a=5: LET b=15
8525 INK 7: PRINT AT a,b;"AB";AT
 6,b;"DC";AT 21,b;"AB"
8530 PRINT AT 7,m;"J";AT 8,m;"K"
8535 PRINT AT 2,9;"F";AT 3,9;"N"
;AT 10,10;"F";AT 11,10;"G"
8540 PRINT AT 1,11;"F";AT 2,11;"
N"
8545 PRINT AT 0,20;"F";AT 1,20;"
G";AT 15,22;"F";AT 16,22;"G"
8550 RETURN
8555 INK 7: PRINT AT 2,9;"H";AT
0,13;"H";AT 1,b;"H";AT 3,5;"H"
8560 PRINT AT 1,11;"H";AT 20,14;
"H";AT 21,14;"N"
8565 PRINT AT 15,22;"H";AT 0,20;
"H";AT 10,10;"H"
8567 BEEP .1,12: BEEP .1,10: BEE
P .1,12: BEEP .1,10
8569 IF k=2 THEN RETURN
8575 LET w=w+1
8578  IF ss=rr THEN GO TO 9750
8579 LET ss=t(o)
8580 FOR v=1 TO 17
8585 INK 7: PRINT AT 8,m;"K";AT
7,m;"J"
8590 PAUSE 6
8595 PRINT AT 8,m;"N"
8600 PAUSE 6
8605 PRINT AT 7,m;" ";AT 8,m;" "
8610 LET m=m-1
8615 NEXT v
8620 RETURN
8625 STOP
8630 PAUSE 20
8635 CLS
8640 IF t(1)>t(2) THEN GO TO 865
0
8642 IF t(1)=t(2) THEN GO TO 867
2
8645 IF t(1)<t(2) THEN GO TO 866
5
8650 LET u=t(1)-t(2)
8655 PRINT AT 10,0;h$(1);" wins
by ";u;" runs"
8660 STOP
8665 LET u=t(2)-t(1)
8670 PRINT AT 10,0;h$(2);" wins
by ";u;" runs"
8671 STOP
8672 PRINT AT 10,0;"MATCH DRAWN"
8675 STOP
9000 DATA 0,0,0,0,BIN 00111111,BI
 N 00011001,BIN 00011001,BIN 00011
001,BIN 00011001
9005 DATA 0,0,0,0,BIN 11111000,BIN
 10011000,BIN 10011000,BIN 10011
000,BIN 10011000
9010 DATA BIN 10011000,BIN 10011
000,BIN 10011000,BIN 10011000,BI
N 10011000,BIN 10011000,BIN 1001
1000,BIN 10011000
9015 DATA BIN 00011001,BIN 00011
001,BIN 00011001,BIN 00011001,BI
N 00011001,BIN 00011001,BIN 0001
1001,BIN 00011001
9020 DATA 0,BIN 00011000,BIN 001
11100,BIN 01111110,BIN 01111110,
BIN 00111100,BIN 00011000,0
9025 DATA BIN 00011000,BIN 00100
100,BIN 00100100,BIN 00011000,BI
N 01111110,BIN 01111110,BIN 1011
1101,BIN 10111101
9030 DATA BIN 10111101,BIN 01111
110,BIN 00111100,BIN 00111100,BI
N 00111100,BIN 00111100,BIN 0011
1100,BIN 00111100
9035 DATA BIN 00000011,BIN 00000
011,BIN 00000110,BIN 00110110,BI
N 01001110,BIN 00110110,BIN 1111
1110,BIN 10111110
9040 DATA BIN 01111100,BIN 00111
100,BIN 00111100,BIN 00111100,BI
N 00111100,BIN 00111100,BIN 0011
1100,BIN 00111100
9045 DATA BIN 00000110,BIN 00001
001,BIN 00000110,BIN 00001110,BI
N 00011111,BIN 00011111,BIN 0011
0111,BIN 01101111
9050 DATA BIN 01001110,BIN 01001
110,BIN 11111111,BIN 11101110,BI
N 11101110,BIN 11101110,BIN 1110
1110,BIN 01011110
9055 DATA BIN 01100110,BIN 01101
001,BIN 01100110,BIN 01100111,BI
N 01100111,BIN 01100111,BIN 0010
0111,BIN 00111111
9060 DATA BIN 00000111,BIN 00000
111,BIN 00000111,BIN 00000111,BI
N 00000111,BIN 00000111,BIN 0000
0111,BIN 00001111
9065 DATA BIN 00111100,BIN 00111
100,BIN 01111110,BIN 01100110,BI
N 01100110,BIN 01100110,BIN 0110
0110,BIN 11101110
9070 DATA 0,0,0,0,BIN 00110000,BIN
 01111000,BIN 00011000,BIN 00011
001,BIN 00011111
9075 DATA BIN 00011111,BIN 00011
110,BIN 00011111,BIN 00011110,BI
N 00001110,BIN 00000100,BIN 0000
0100,BIN 00001100
9080 DATA BIN 00011111,BIN 00011
110,BIN 00011110,BIN 00011110,BI
N 00001110,BIN 00001010,BIN 0000
1010,BIN 00001010
9100 RESTORE 9000
9110 FOR f=0 TO 7: READ a: POKE
USR "a"+f,a: NEXT f
9120 FOR f=0 TO 7: READ a: POKE
USR "b"+f,a: NEXT f
9130 FOR f=0 TO 7: READ a: POKE
USR "c"+f,a: NEXT f
9140 FOR f=0 TO 7: READ a: POKE
USR "d"+f,a: NEXT f
9150 FOR f=0 TO 7: READ a: POKE
USR "e"+f,a: NEXT f
9160 FOR f=0 TO 7: READ a: POKE
USR "f"+f,a: NEXT f
9170 FOR f=0 TO 7: READ a: POKE
USR "g"+f,a: NEXT f
9180 FOR f=0 TO 7: READ a: POKE
USR "h"+f,a: NEXT f
9190 FOR f=0 TO 7: READ a: POKE
USR "i"+f,a: NEXT f
9200 FOR f=0 TO 7: READ a: POKE
USR "j"+f,a: NEXT f

9210 FOR f=0 TO 7: READ a: POKE
USR "k"+f,a: NEXT f
9220 FOR f=0 TO 7: READ a: POKE
USR "l"+f,a: NEXT f
9230 FOR f=0 TO 7: READ a: POKE
USR "m"+f,a: NEXT f
9240 FOR f=0 TO 7: READ a: POKE
USR "n"+f,a: NEXT f
9250 FOR f=0 TO 7: READ a: POKE
USR "o"+f,a: NEXT f
9260 FOR f=0 TO 7: READ a: POKE
USR "p"+f,a: NEXT f
9270 FOR f=0 TO 7: READ a: POKE
USR "q"+f,a: NEXT f
9400 RETURN
9750 FOR v=1 TO 17
9755 INK 7: PRINT AT 8,m;"P";AT
7,m;"Q"
9760 PAUSE 6
9765 PRINT AT 8,m;"Q"
9770 BEEP .1,-10

9775 PRINT AT 7,m;" ";AT 8,m;" "
9780 LET m=m-1
9785 NEXT v
9800 GO TO 8620
9999 CLS : LET z=(PEEK 23730+(25
6*PEEK 23731))-(PEEK 23653+(256*
PEEK 23654)): PRINT "Spare Memor
y=";z
```

THE SCENE is a perfect green pitch somewhere in the heart of the *Sinclair User* office. Lancashire step out confidently, only to see their first three players out for a duck, much to the amusement of Yorkshire, who are watching the game from a desk on the other side of the office.

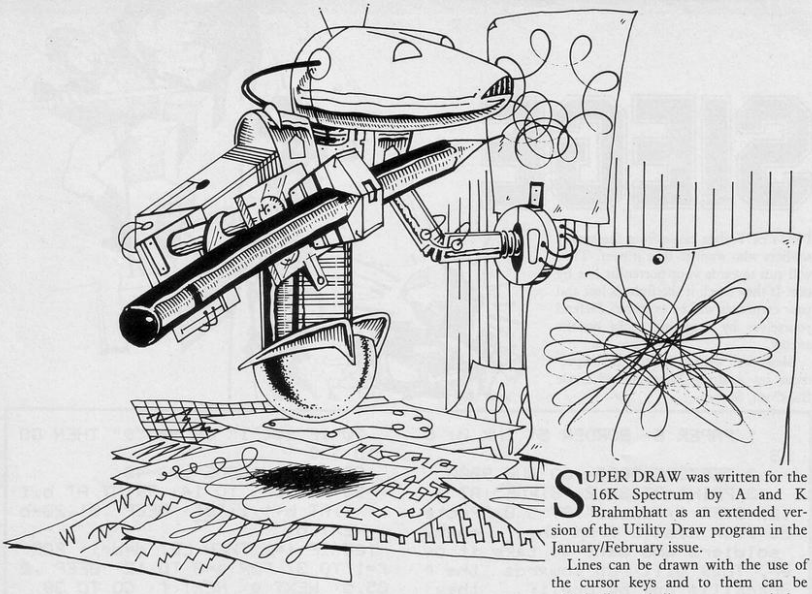
Scenes such as that could become everyday events in your home if you program your 16K Spectrum with **Cricket** by Hugh Williams of Droitwich, Worcestershire. It is the best cricket program we have seen. The screen display shows the team on the field, the path of the ball, and even a fielder catching the ball. You decide when and where to hit the ball and see how many runs you can score. Any player who fails to score will leave the field literally as a duck.

```
  5 GOSUB 400
 10 LET B=0
 15 LET Q$="Z.X.81."
 20 CLS
 25 FOR G=1 TO 32
 30 PRINT "(9a)";
 35 NEXT G
 40 FOR O=1 TO 64
 45 PRINT "(io)";
 50 NEXT O
 55 FOR F=1 TO 608
 60 PRINT "(isP)";
 65 NEXT F
 70 LET W=0
 75 LET H=11
 80 LET L=0
 85 LET E=500
 90 DIM A(10)
 95 LET L=W-(A(1)+A(2)+A(3)+A(4
)+A(5))
 100 GOSUB 300
 105 LET P=INT (10*RND)+1
 110 PRINT AT 0,2;"scoreE";L;AT
0,14;"ener9yE";E
 115 LET W=W+1
 120 LET J=3*P
 125 FOR I=3 TO 21-A(P)
 130 PRINT AT I,J;"(9o)"
 135 PRINT AT I-1,J;"(isP)"
 140 LET M$=INKEY$
 145 IF M$="Z" THEN LET H=H-2
 150 IF M$="C" THEN LET H=H+2
 155 IF M$="Z" OR M$="C" THEN LE
T E=E-15
 160 IF M$="B" THEN LET H=H-1
 165 IF M$="M" THEN LET H=H+1
 170 IF M$="B" OR M$="M" THEN LE
T E=E-5
 175 IF E<=0 THEN GOTO 250
 180 PRINT AT 14,H;"(2*isP)94(sP
)93(3*isP)"
 185 PRINT AT 15,H;"(3*isP)96(2*
isP)"
 190 IF I=15 AND ABS (H+3-J)<=1
THEN GOTO 95
 195 NEXT I
 200 LET A(P)=A(P)+1
 205 IF A(P)=7 THEN PRINT A(1)+A
(2)+A(3)+A(4)+A(5);"bricks 9ot t
hrou9h"
 210 IF A(P)=7 THEN GOSUB 500
 215 GOTO 105
 250 PRINT AT 6,0;"no ener9y lef
t;AT 7,0;"your scoreE";L;AT 8,
0;"you let ";W-L;"bricks throu9h
"
 255 PAUSE 50
 260 IF L>=B THEN GOSUB 540
 265 PRINT AT 9,0;"hi9h score";B
;"by";Q$
 270 GOSUB 500
 300 IF L=9 THEN LET E=E+500
 305 IF L<>9 THEN RETURN
 310 FOR D=1 TO 10
 315 PRINT AT 7,8;"BONUS";AT 7,8
;"bonus"
 320 NEXT D
 325 PRINT AT 7,8;"(5*isP)"
 350 RETURN
 400 PRINT AT 0,13;"CATCH";AT 2,
4;"YOU,THE CATCHER,HAVE TO"
 405 PRINT AT 4,4;"CATCH THE BAL
LS""o""BEFORE";AT 6,4;"THEY HIT
THE GROUND."
 410 PRINT AT 8,4;" TO MOVE...US
E KEYS;";AT 10,3;"b...LEFT USES
5 ENERGY PTS."
 415 PRINT AT 12,3;"m..RIGHT USE
S 5 ENERGY PTS.";AT 14,3;"z..2*L
EFT USES 15 ENERGY PTS."
 420 PRINT AT 16,3;"c.2*RIGHT US
ES 15 ENERGY PTS.";AT 19,6;"bonu
s after 9 catches
 425 PRINT AT 21,4;"PRESS NEWLIN
E TO COMMENCE."
 430 INPUT F$
 435 IF F$="" THEN GOTO 10
 440 RETURN
 500 FOR D=1 TO 15
 505 PRINT AT 3,7;"ANOTHER GO?(y
\n)";AT 3,7;"another 9o!(Y/N)"
 510 NEXT D
 515 LET K$=INKEY$
 520 IF K$<>"Y" AND K$<>"N" THEN
 GOTO 515
 525 IF K$="Y" THEN GOTO 20
 530 IF K$="N" THEN STOP
 540 CLS
 545 LET B=L
 550 FOR F=1 TO 640
 555 PRINT "(isP)";
 560 NEXT F
 565 PRINT AT 4,11;"WELL DONE.";
AT 6,6;"YOU HAVE ATTAINED";AT 8,
6;"TODAYS HIGH SCORE."
 570 PRINT AT 10,6;"PLEASE ENTER
 YOUR";AT 12,6;"NAME AND NEWLINE
.";AT 14,4;"NO NAMES >10 DIGITS
LONG"
 575 INPUT Q$
 580 IF LEN Q$>=10 THEN GOTO 575
 585 CLS
 590 GOTO 500
 700 SAVE "CATCh"
 710 GOTO 0
```

CATCHER

YOU, THE CATCHER, have to catch as many balls—inverse Os—as possible before you run out of energy. Moving quickly makes catching the balls easy but it also means that you soon exhaust your energy supplies. Bonus energy is added once you have caught nine balls.

Catcher was written for the 16K ZX-81 by John Howie of Currie, Edinburgh.



SUPER DRAW

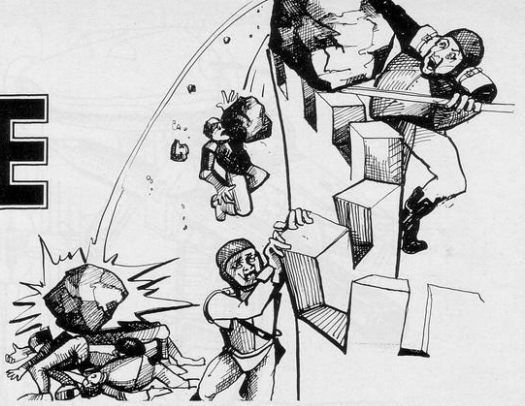
SUPER DRAW was written for the 16K Spectrum by A and K Brahmbhatt as an extended version of the Utility Draw program in the January/February issue.

Lines can be drawn with the use of the cursor keys and to them can be added diagonal lines, curves, circles, triangles and squares.

The writers believe it has a multitude of applications, including drawing maps and designing plans. Full instructions are included within the program.

```
  2 LET o=1
  3 OVER o
  5 INPUT "PAPER?";p: PAPER p: INPUT "BORDER?";b: BORDER b: INK 9
  7 PRINT AT 10,0; BRIGHT 1;"DO YOU WANT INSTRUCTIONS?      "
  8 IF INKEY$="y" THEN GO TO 11
  9 IF INKEY$="n" THEN GO TO 90
 10 GO TO 8
 11 PRINT BRIGHT 1;''"SUPER DRAW is a Program to aid the usage of hi-resolution      Graphics on the ZX Spectrum"''"Press any key to continue": PAUSE 0
 12 PAUSE 0: CLS : PRINT BRIGHT 1;"Here are the facilities     available in SUPER DRAW .""'"5,6,7 AND 8 for normal direction"''"E,R,D AND F for the Points      inbetween these"''"1 to return to screen centre"''"Q to change the Plot Position"''"W is to draw curves "';
 13 PRINT BRIGHT 1;''"C to draw a circle"''"P to make a copy of the present coordinates for later use"''"O to Print on screen": PAUSE 0: CLS : PRINT BRIGHT 1;"I to change ink colour"''"G to save the Picture on tape  under given name"''"L to draw a line"''"V to clear screen"''"Your Present coordinates appear at the bottom of the screen"
 15 PRINT BRIGHT 1;''"S is to draw a square when you  input half the length of a side."''"0 is to input OVER ""T is to draw a triangle"''"Z is to stop."'' FLASH 1;"      PRESS ANY KEY TO START      "
 20 PAUSE 0
 90 CLS
100 LET x=127
110 LET y=87
120 PLOT x,y
125 LET a$=INKEY$
130 IF a$="5" THEN LET x=x-1: BEEP 0.005,0: GO TO 170
131 IF a$="6" THEN LET y=y-1: BEEP 0.005,13: GO TO 170
132 IF a$="7" THEN LET y=y+1: BEEP 0.005,26: GO TO 170
133 IF a$="8" THEN LET x=x+1: BEEP 0.005,39: GO TO 170
134 IF a$="e" THEN LET x=x-1: LET y=y+1: BEEP 0.005,-10: GO TO 170
135 IF a$="d" THEN LET x=x-1: LET y=y-1: BEEP 0.005,2: GO TO 170
136 IF a$="r" THEN LET x=x+1: LET y=y+1: BEEP 0.005,15: GO TO 170
137 IF a$="f" THEN LET x=x+1: LET y=y-1: BEEP 0.005,25: GO TO 170
138 IF a$="1" THEN GO SUB 1000: INPUT "PLOT X? ";x: INPUT "PLOT Y? ";y: INPUT "DRAW X? ";x1: INPUT "DRAW Y? ";y1: PLOT x,y: DRAW x1-x,y1-y: GO SUB 1001
139 IF a$="i" THEN INPUT " INK ";i
140 IF a$="w" THEN GO SUB 1000: INPUT "X-AXIS? ";x2: INPUT "Y-AXIS? ";y2: INPUT "SIZE OF CURVE ";z: LET z=z/180*PI: PLOT x,y: DRAW x2,y2,z: GO SUB 1001
141 IF a$="o" THEN INPUT "LINE ? ";l,"COLUMN ? ";c: INPUT "WORDS ?";w$: PRINT AT l,c;w$
142 IF a$="c" THEN INPUT "RADIUS";z: CIRCLE x,y,z
144 IF a$="s" THEN INPUT "size of half square? ";a: GO SUB 2000
146 IF a$="q" THEN INPUT "x-axis";m: INPUT "y-axis";m: LET x=m: LET y=m: GO TO 170
148 IF a$="p" THEN PRINT AT 0,0; OVER 0;x;"  ";AT 0,16;y;"  "
150 IF a$="l" THEN LET x=127: LET y=87: GO TO 170
152 IF a$="v" THEN CLS
155 IF a$="0" THEN INPUT " OVER ? ";o: OVER o
157 IF a$="t" THEN GO SUB 2500
160 IF a$="g" THEN PRINT AT 21,0; OVER 0;"    ","    ": INPUT "NAME ? ";a$: SAVE a$SCREEN$
165 IF a$="z" THEN STOP
170 IF x>=0 AND y>=0 AND x<=255 AND y<=175 THEN PLOT x,y
180 PRINT AT 21,0; OVER 0;x;" ";AT 21,16;y;"  ": GO TO 125
200 STOP
1000 INPUT "space between lines? ";u: GO SUB 1001: RETURN
1001 FOR n=0 TO 255 STEP u: PLOT n,0: DRAW OVER 1;0,175: NEXT n: FOR n=0 TO 175 STEP u: PLOT 0,n: DRAW OVER 1;255,0: NEXT n: RETURN
2000 PLOT x+a,y-a: DRAW 0,2*a: DRAW -2*a,0: PLOT x+a,y-a: DRAW -2*a,0: DRAW 0,2*a: RETURN
2500 OVER o: INPUT "SIZE OF SIDE ";z: PLOT x,y-z: DRAW z/2,0: DRAW -z/2,z: PLOT x,y-z: DRAW -z/2,0: DRAW z/2,z: OVER 1: RETURN
9999 SAVE "SUPER DRAW" LINE 1: PAUSE 0: VERIFY "SUPER DRAW": PAUSE 0: RUN
```

SIEGE



PROTECT your castle from the enemy soldiers who want to take it over. They will run towards your portcullis one by one. If they reach it the fight is lost and your comrades will be executed. Defend yourselves by dropping rocks on the enemy.

Siege was written for the 16K Spectrum by Andrew Burnham of Little Bookham, Surrey.

```
  1 PAPER 6: BORDER 5: INK 0: C
LS
  2 RESTORE 9000: GO SUB 9000
  3 PRINT AT 3,12;"SIEGE";AT 3,
12; OVER 1;"_____";AT 5,0;"Prote
ct your castle from the    enemy
 soldiers who want to take it ov
er. They will run towards  the P
ortcullis one by one,if    they
 get there the fight is lostand y
ou and your comrades will  be ex
ecuted. StoP the soldiers  by hi
tting them with rocks,     contr
olled with keys [1] to' [9]"
  4 INPUT "Press ~ENTER~ to sta
rt    ";x$
  5 CLS : INK 4: PRINT AT 2,5;"
(94:20*93:97)": FOR f=3 TO 19: P
RINT AT f,5;"(95:20*sP:195)": NE
XT f: PRINT AT 19,5;"(91:20*93:9
2)"

  10 PRINT AT 4,9; INK 1;"123456
789";AT 5,7; INK 0;"(2*98:93:98:
93:98:93:98:93:98:93:98)"
  15 FOR f=6 TO 11: PRINT INK 0;
AT f,7;"(98:95)": NEXT f: PRINT
INK 0;AT 12,7;"(98:91)"
  20 LET d=0
  30 LET a=18
  35 INK 0: PRINT AT 17,7;"(2*98
)#(98)#(98)#(98)#(98)#(5*98
)";AT 18,7;"(18*98)";AT 15,7;"12
*98:91)"; INK 2;"eeee";AT 14,20;
"dddd"; INK 0;AT 16,7;"(18*98)"
  40 PRINT AT 13,7; INK 1;" b
        ";AT 14,7;" a
"
  50 LET a=a-2+INT (RND*4): IF a
>19 THEN LET a=19
  60 PRINT AT 13,a; INK 2;"d";AT
 14,a;"e": BEEP .1,40-a
  65 LET z$=INKEY$
  70 IF z$<"1" OR z$>"9" THEN GO
TO 120
  80 LET i=(CODE z$)-40
  90 FOR b=6 TO 14: PRINT AT b,i
;" ";AT b+1,i;"c": BEEP .01,20-b
: NEXT b
 100 IF i=a THEN LET d=d+1: FOR
f=1 TO 3: FOR g=0 TO 12: BEEP .0
05,g: NEXT g: NEXT f: GO TO 30
 110 PRINT AT 15,i;"(93)": BEEP
.1,0
 120 IF a<9 THEN GO TO 500
 125 PAUSE 10
 126 PRINT AT 20,10;"No. Dead=";
d
 130 GO TO 35
 500 PRINT AT 13,7; INK 2; FLASH
 1; BRIGHT 1;" b";AT 14,7;" a"
 510 FOR f=9 TO 19: BEEP .1,0-f:
 PRINT AT 13,f; INK 2;"d";AT 14,
f;"e": NEXT f
 520 INPUT "Again ? [y,n]  ";a$
 530 IF a$="y" THEN RUN
 540 IF a$="n" THEN STOP
 550 GO TO 520
9000 DATA 170,255,170,255,170,25
5,170,170
9010 DATA BIN 11000,BIN 111100,B
IN 1101010,BIN 1111110,170,255,1
70,255
9020 DATA 0,BIN 111000,BIN 11111
10,BIN 1011110,BIN 1110110,BIN 1
111100,BIN 11000,0
9030 DATA 0,0,BIN 1001100,BIN 10
01100,BIN 1000000,BIN 11101100,B
IN 1001110,BIN 111110,BIN 1100,B
IN 1100,BIN 10100,BIN 100100,BIN
 100100,BIN 100100,BIN 1100100,B
IN 1100
9100 FOR f=0 TO 39
9110 READ a: POKE USR "a"+f,a
9120 NEXT f
9130 RETURN
```

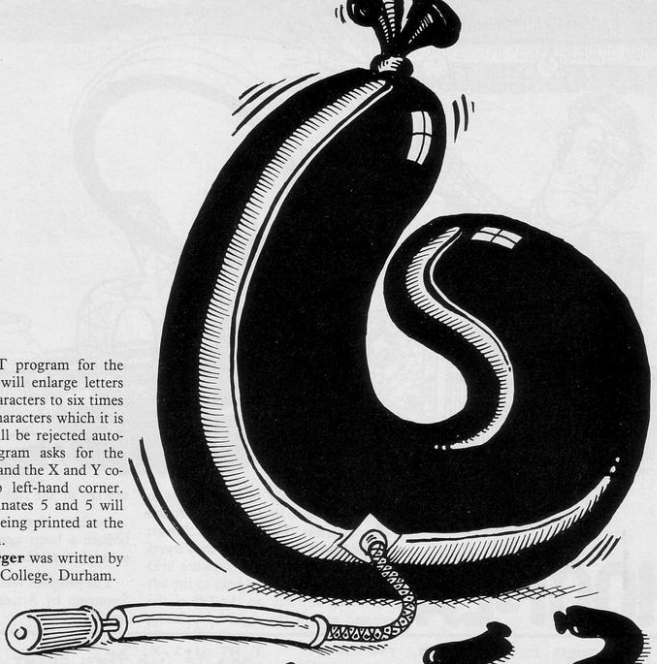
HOOP-LA

THE OBJECT of **Hoop-La** is to encircle 16 randomly-drawn asterisks. The hoops are thrown with the keys 1 to 0. How far they travel depends on how long the keys are held down. Their path can be bent to the left by pressing any key on the left of the keyboard and to the right by pressing any key on the right of the keyboard.

Double points are scored if you can bounce a hoop against the top of the screen before encircling an asterisk.

The program was written for the 16K Spectrum by Arthur Douglass of London E4.

```
 100 OVER 1: LET SC=0: PAPER 7: BORDER 6
 110 FOR J=USR CHR$ 144 TO USR CHR$ 147+7: READ A
 120 POKE J,A: NEXT J
 130 INK 3: FOR J=1 TO 5: READ A,B: PRINT AT A,B;"◠";AT A+1,B;"◡";AT A,B+18;"◠";AT A+1,B+18;"◡": NEXT J: PRINT AT 10,12;"HOOP-LA!";AT 11,15;"by";AT 13,9;"ARTHUR DOUGLASS": PAUSE 200: INK 2: CLS
 140 FOR C=0 TO 30 STEP 2: LET L=INT (RND*18)
 150 PRINT INK 1;AT L,C;"*": NEXT C
 160 FOR Q=49 TO 0 STEP -1
 170 LET A=CODE INKEY$: POKE 23672,Q: POKE 23673,0: BEEP .01,-10
 180 BEEP .01,-5: IF A<48 OR A>58 THEN GO TO 170
 190 IF INKEY$<>"" THEN BEEP .05,-5: GO TO 190
 200 LET T=256*PEEK 23673+PEEK 23672
 210 IF T>84 THEN LET T=84
 220 LET T=INT (T/2): IF A=48 THEN LET A=58
 230 LET T=21-T: IF T<-20 THEN LET T=-20
 240 LET X=(A-48)*3
 250 FOR J=21 TO T STEP -1
 260 IF IN 65022<>255 OR IN 64510<>255 OR IN 63486<>255 OR IN 65278<>255 THEN LET X=X-1
 270 IF IN 49150<>255 OR IN 61438<>255 OR IN 32766<>255 OR IN 57342<>255 THEN LET X=X+1: IF X=31 THEN LET X=30
 280 LET Y1=CODE SCREEN$ (J,X)
 290 LET Y2=CODE SCREEN$ (J,X+1)
 300 IF J>=0 THEN LET Y3=CODE SCREEN$ (J+1,X)
 310 IF J<0 THEN LET Y3=CODE SCREEN$ (J-1,X)
 320 IF J>=0 THEN LET Y4=CODE SCREEN$ (J+1,X+1)
 330 IF J<0 THEN LET Y4=CODE SCREEN$ (J-1,X+1)
 340 PRINT AT J,X;"◠"
 350 IF J<>21 AND J>=0 THEN PRINT AT J+1,X;"◡"
 360 IF J<0 THEN PRINT AT J-1,X;"◡"
 370 IF J<>T THEN PRINT INK 1;AT J,X;"◠": IF J<21 AND J>=0 THEN PRINT INK 1;AT J+1,X;"◡"
 380 IF J<0 AND J<>T THEN PRINT AT J-1,X;"◡"
 390 NEXT J: IF Y1=42 OR Y2=42 OR Y3=42 OR Y4=42 THEN GO SUB 510
 400 PRINT #0;AT 0,24;"HOOPS ";0;CHR$ 32
 410 BEEP .5,-30: PRINT OVER 0;AT J+1,X;" ": IF J>=0 THEN PRINT OVER 0;AT J+2,X;" "
 420 IF J<0 THEN PRINT OVER 0;AT J,X;" "
 430 NEXT Q
 440 CLS : PRINT "YOUR SCORE ";SC;
 450 IF SC>=25 THEN PRINT " [INCREDIBLE]": STOP
 460 IF SC>=20 THEN PRINT " [BRILLIANT]": STOP
 470 IF SC>=15 THEN PRINT " [VERY GOOD]": STOP
 480 IF SC>=10 THEN PRINT " [NOT BAD]": STOP
 490 IF SC>=5 THEN PRINT " [COULD DO BETTER]": STOP
 500 IF SC<5 THEN PRINT " [TERRIBLE]": STOP
 510 FOR K=-20 TO 20
 520 BEEP .05,K: NEXT K
 530 LET SC=SC+1: IF J<0 THEN LET SC=SC+1
 540 PRINT #0;AT 0,0;"SCORE ";SC
 550 PRINT OVER 0;AT J+1,X;" ";AT J+2,X;" "
 560 RETURN
9000 DATA 7,28,48,96,64,192,128,128,224,BIN 00111000,12,6,2,3,1,1
9010 DATA 128,128,192,64,96,BIN 00110000,BIN 00011100,7,1,1,3,2,6,BIN 00001100,BIN 00111000,224
9020 DATA 10,5,10,6,10,7,9,6,11,6
9998 FOR J=1 TO 10: SAVE "HOOP-LA": NEXT J
```

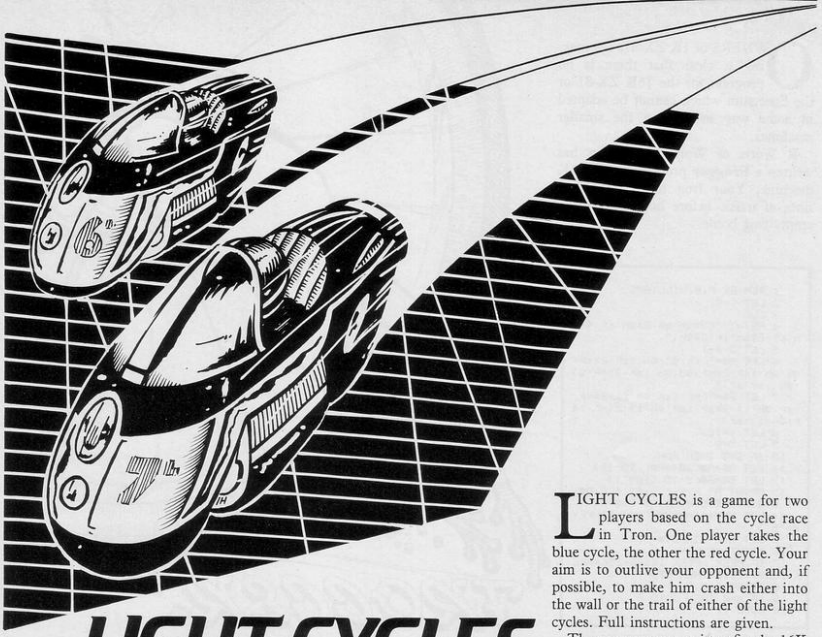


CHARACTER ENLARGER

THIS SHORT program for the 16K ZX-81 will enlarge letters and some characters to six times their normal size. Characters which it is unable to enlarge will be rejected automatically. The program asks for the letter to be enlarged and the X and Y co-ordinates of its top left-hand corner. Entering the co-ordinates 5 and 5 will lead to your letter being printed at the top left of the screen.

Character Enlarger was written by Paul Baylis of Grey College, Durham.

```
   1 PRINT AT 21,0;" WHICH LETTE
R SHALL I ENLARGE ? "
   2 IF INKEY$="" THEN GOTO 2
   3 LET C$=INKEY$
   4 LET J=(CODE C$*8)+7681
   6 IF J>8192 THEN GOTO 200
   8 PRINT AT 21,0;"
                   "
   9 PRINT AT 21,0;"y CO-ORD. FO
R TOP LEFT OF LETTER"
  10 INPUT Y
  11 PRINT AT 21,0;"x CO-ORD. FO
R TOP LEFT OF LETTER"
  12 INPUT X
  13 PRINT AT 21,0;"
                   "
  14 LET Y=Y-1
  15 IF Y>12 OR X>24 THEN GOTO 8
  18 FOR G=1 TO 6
  19 LET Y=Y+1
  20 LET PC=PEEK J
  25 LET J=J+1
  30 FOR I=X+7 TO X STEP -1
  40 PRINT AT Y,I;CHR$ ((PC-2*IN
T (PC/2))*128)
  50 LET PC=INT (PC/2)
  60 NEXT I
  70 PRINT AT 21,10;"(";J;")"
  80 NEXT G
  85 PRINT AT 20,0;"
"
  90 GOTO 1
 200 PRINT AT 21,1;"i cannot enl
arge that character"
 210 FOR F=0 TO 70
 220 NEXT F
 230 GOTO 1
9997 REM PAUL BAYLIS APRIL 1983
9998 SAVE "CHARACTER ENLARGER"
9999 RUN
```



LIGHT CYCLES

LIGHT CYCLES is a game for two players based on the cycle race in Tron. One player takes the blue cycle, the other the red cycle. Your aim is to outlive your opponent and, if possible, to make him crash either into the wall or the trail of either of the light cycles. Full instructions are given.

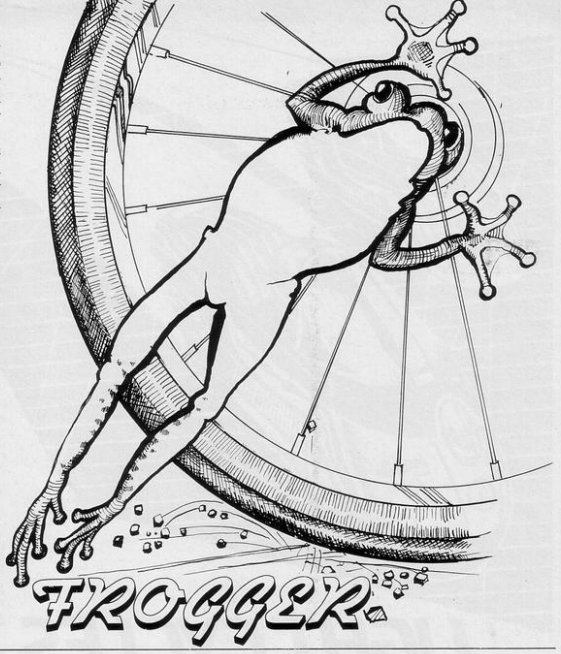
The program was written for the 16K Spectrum by Andrew Hardwick of Goring-by-Sea, West Sussex.

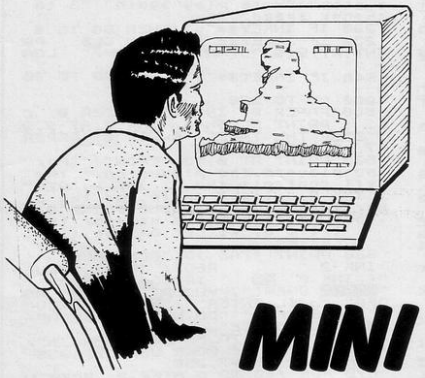
```
   2 REM   By Andrew Hardwick
   3 GO TO 500
   5 DIM z(22,32): FOR f=1 TO 22
: LET z(f,1)=1: LET z(f,32)=1: N
EXT f: FOR f=1 TO 32: LET z(1,f)
=1: LET z(22,f)=1: NEXT f
  10 LET z(15,10)=1: LET z(15,22
)=1: LET a=14: LET b=21: LET c=1
4: LET d=9: LET a1=-1: LET b1=0:
 LET c1=-1: LET d1=0: INK 6: PAP
ER 0: BORDER 7: CLS
  20 LET a$="▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒
▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒": PRINT INK 5;a$:
FOR f=1 TO 20: PRINT INK 5;"▒";
INK 6;"□□□□□□□□□□□□□□□□□□□□□□□□
□□□□□"; INK 5;"▒": NEXT f: PRINT
 INK 5;a$: BEEP .5,30
  30 IF IN 49150<>255 THEN LET a
1=0: LET b1=-1
  40 IF IN 32766<>255 THEN LET a
1=1: LET b1=0
  50 IF IN 57342<>255 THEN LET a
1=0: LET b1=1
  60 IF IN 61438<>255 THEN LET a
1=-1: LET b1=0
  70 PRINT AT a,b; INK 5;"■": LE
T a=a+a1: LET b=b+b1: LET a2=z(a
+1,b+1): PRINT AT a,b; INVERSE 1
;"□": LET z(a+1,b+1)=1
  80 IF IN 65022<>255 THEN LET c
1=0: LET d1=-1
  90 IF IN 65278<>255 THEN LET c
1=1: LET d1=0
 100 IF IN 64510<>255 THEN LET c
1=0: LET d1=1
 110 IF IN 63486<>255 THEN LET c
1=-1: LET d1=0
 120 PRINT AT c,d; INK 2;"■": LE
T c=c+c1: LET d=d+d1: LET c2=z(c
+1,d+1): PRINT AT c,d; INVERSE 1
;"□": LET z(c+1,d+1)=1
 130 IF a=c AND b=d OR a2 AND c2
 THEN GO TO 170
 140 IF a2 THEN GO TO 180
 150 IF c2 THEN GO TO 190
 160 BEEP s/20,20: GO TO 30
 170 LET a$="YOU BOTH CRASHED!!!
!": GO TO 200
 180 LET a$="BLUE CRASHED !": GO
 TO 200
 190 LET a$="RED CRASHED !"
 200 PAPER 7: BORDER 7: CLS : IN
K 0
 210 PRINT AT 7,5;a$' INK 1'"N t
o stop"'"Y to play again"'"S to
change speed"
 220 IF INKEY$="y" THEN GO TO 5
 230 IF INKEY$="n" THEN CLS : PR
INT AT 9,9;"START THE TAPE": LOA
D ""
 240 IF INKEY$="s" THEN GO TO 70
0
 250 GO TO 220
 500 PAPER 0: INK 0: BORDER 0: C
LS : PRINT FLASH 1; INK 6;AT 9,9
;"STOP THE TAPE": PAUSE 0: PAPER
 7: BORDER 7: CLS
 600 PRINT AT 0,13;"TRON"''"For
two players.The player on   the
left controls the "; INK 2;"RED"
; INK 0;" light cycle,and the ot
her the "; INK 1;"BLUE"; INK 0;"
.Youmustn't hit the wall or the
    trail of either of the light
    cycles."
 650 PRINT 'TAB 10;"CONTROLS:-"'
 INK 2'"          RED"; INK 1,"BLUE
"' INK 0'"UP      12345","67890"''
"RIGHT QWERT","YUIOP"''"LEFT  AS
DFG","HJKL ENTER"''"DOWN   ZXCV"
,"BNM SHIFT"''"DO NOT PRESS CAP-
SHIFT OR SPACE"
 660 FOR f=1 TO 6: POKE USR "b"+
f,129: NEXT f: POKE USR "b",255:
 POKE USR "b"+7,255
 670 FOR f=0 TO 6 STEP 2: POKE U
SR "a"+f,170: POKE USR "a"+1+f,8
5: NEXT f
 700 INPUT "Speed(10-slow/0-fast
)? ";s: IF s<0 OR s>10 THEN GO
TO 700
 750 GO TO 5
 800 SAVE "TRON" LINE 500
```

OWNERS of 1K ZX-81s are making it clear that there is no program for the 16K ZX-81 or the Spectrum which cannot be adapted in some way to run on the smaller machines.

R Watts of Worthing, Sussex has written a **Frogger** program for the 1K machine. Your frog must cross four lines of traffic before hopping into an empty frog home.

```
   1 REM BY P.B.WILLIAMS
   2 LET S=0
   3 CLS
   4 PRINT "(3*9h:sP:3*9h:sP:4*9
h:sP:3*9h:sP:3*9h)"
   5 LET S=S+1
   6 LET A$="(sP:98:9h:isP:2*sP:
98:9h:isP:2*sP:98:9h:isP:2*sP:98
:9h:isP:sP)"
   7 LET B$="(sP:isP:9h:i):2*sP:
isP:9h:i):2*sP:isP:9h:i):2*sP:is
P:9h:i):sP)"
   8 LET Y=10
   9 LET X=9
  10 IF S=5 THEN RUN
  11 LET A$=A$(20)+A$( TO 19)
  12 LET B$=B$(2 TO )+B$(1)
  13 PRINT AT X,Y," ";AT 1,0;A$;
AT 3,0;B$;AT 5,0;A$;AT 7,0;B$
  14 LET Y=Y+(INKEY$="8")-(INKEY
$="5")
  15 LET X=X-(INKEY$="7")
  16 PRINT AT X,Y;
  17 IF PEEK (PEEK 16398+256*PEE
K 16399)>118 THEN STOP
  18 PRINT " "
  19 IF X=0 THEN GOTO 5
  20 GOTO 11
```





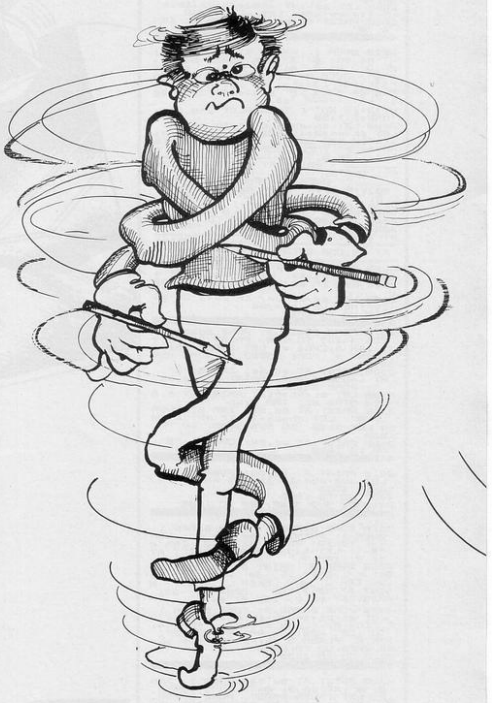
MINI MAP

STEVEN LAWTHER of Witton Gilbert, County Durham has written **Mini Map** for the 1K ZX-81. It will produce a map of England, Scotland and Wales on the screen. It is useful on its own for geography or as a routine in a larger program on a 16K machine.

Graphics instructions are, as usual, in lower-case letters in brackets.

```
   5 PRINT "(4*sP:93:94)",,"(sP:
94:93:2*96)",,"(98:91:98:isP:9e)
",,"(sP:94:2*isP:2*96:94)"
  10 PRINT "(sP:91:4*isP:95)",,"
sP:93:4*isP:91)",,"(2*sP:98:9r:i
sP:95)",,"(93:sP:95:99:2*isP:9w)
"
  15 PRINT "(sP:92:sP:4*isP:94)"
,,"(2*sP:93:4*isP:95)",,"(2*sP:9
2:sP:98:2*isP:9w:94)"


  20 PRINT "(3*sP:91:92:9r:3*isP
:94)",,"(5*sP:98:3*isP:95)",,"(3
*sP:9y:96:99:3*isP:9w)"
  25 PRINT "(3*sP:97:5*isP:9w:99
:94)",,"(4*sP:7*isP:95)",,"(2*sP
:93:7*isP:9e:91)"


  30 PRINT "(3*sP:92:97:9y:4*isP
:9w:94)",,"(3*sP:93:7*isP:91)",,
"(2*sP:93:isP:9e:2*97:92)",,"(sP
:92:97:isP:91:3*96)100 MILES"
```

```
  1 BORDER 6: PAPER 0: INK 7
  5 LET ov=0: CLS : GO TO 150
 10 LET a=0: LET b=0: LET f=0: LET f=0: LET i=.1
 20 LET h1=0: LET v1=0
 100 LET b=-(a*ra)/r: LET v=INT (((ra-r)*SIN (a)-d*SIN (b))+.5): LET h=INT (((ra-r)*COS (a)-d*COS (b))+.5)
 110 IF f=2 THEN PLOT 128+h1,88+v1: DRAW h-h1,v-v1
 115 IF f<2 THEN LET f=f+1
 120 LET h1=h: LET v1=v: LET a=a+i
 125 LET a$=INKEY$: IF a$="" THEN GO TO 100
 130 GO TO 310
 150 PAPER 0: INK 7: CLS : PRINT '"      S P I R O G R A P H"'"
     --------------------"
 160 PRINT '"          by R.WRIGHT"'"   This Prog. Produces Patterns which can be Generated by two  Gears as follows:-"
 170 CIRCLE 60,51,40: CIRCLE 84,51,16: INK 3: PLOT 60,51: DRAW 0,40: PLOT 84,51: DRAW 0,16: PRINT AT 12,7;"R": PRINT AT 14,10;"r": PLOT 94,51: DRAW 16,32: PLOT 94,51: DRAW 18,30
 180 INK 7: PRINT AT 11,12;"Pen"
 190 PRINT AT 10,16;"  The smaller";AT 11,16;"Gear rotates";AT 12,16;"around the";AT 13,16;"inside of the";AT 14,16;"larGer Gear,"
 200 PRINT AT 15,16;"Producing a Pen";AT 16,16;"trace."
 210 PRINT AT 17,16;"  InPut R,r,and";AT 18,16;"radius of Pen";AT 19,16;"in small circle"
 220 PRINT AT 21,11;"Hit a key": PAUSE 0
 225 INPUT " Load A Pattern From TaPe?";x$: IF x$="y" THEN INPUT "filename ?";f$: CLS : LOAD f$CODE : PAUSE 0: GO TO 150
 230 INPUT "Radius R (R<=85) ?";ra
 240 INPUT "Radius r ?";r
 250 INPUT "Pen radius ?";d
 255 INPUT "ink colour ?";in: INK in
 256 INPUT "PaPer Colour ?";PaP
 300 PAUSE 50: IF ov=0 THEN PAPE R PaP: CLS : GO TO 10
 305 GO TO 10
 310 INPUT "OverPrint another Pattern ?";q$: IF q$="y" THEN LET ov=1: GO TO 230
 315 IF q$="y" THEN GO TO 10
 320 INPUT "Printer coPy ?";q$: IF q$="y" THEN COPY
 330 INPUT "TaPe coPy ?";q$: IF q$="y" THEN INPUT "Filename ?";q$: SAVE q$SCREEN$
 340 GO TO 150
```



SPIRODRAW

CHOOSE THE SIZE of a big circle, a small circle, and a pen. The pattern produced by putting the pen in the small circle and rolling it round in the large circle will be produced on-screen.

Spirodraw was written for the 16K Spectrum by R Wright of Liss, Hampshire.

```
  0>REM  DEFENDER @ M.J.Levers
  100 GO TO  8000: REM Graphics
  110 GO SUB 4000: REM Instr`
  120 GO SUB 7500: REM Skill
  130 GO SUB 7000: REM Variables
  140 GO SUB 8500: REM Screen
  150 GO SUB 6000: REM Intro

1000 REM Alien variables

1020 LET aa=31: LET da=aa: LET u
d=-INT (RND*2)-1: IF NOT ud THEN
 LET ud=1
1030 LET ad=INT (RND*10)+7: LET
 dd=ad
1040 LET as=INT (RND*3)+2+(wave>
15)+(wave>25): LET pts=as*50
1050 PRINT AT ad,aa; OVER 1; INK
 4;"@"
2000 REM Move aliens

2010 OVER 1: PRINT AT op,3;"▶";
AT dd,dp;"@": AT USR 65000-6078*(
dp=2): INK 5;"▶"; AT ad,aa; INK 4
;"@": OVER 0: PLOT 255,y: LET r=
PEEK (23)-13*(PEEK (23)<13): LET y
=y+2*(y<175): IF r THEN LET y=y+1+
INT (RND*4): LET i=SGN (aa-5)
2015 IF NOT r THEN PLOT 255,INT
 (RND*61)+50
2020 LET op=dp: LET L=USR 65278:
LET dp=dp+2*(L=253 AND dp<19)-2*
(L=251 AND dp>7): IF aa>3 AND IN
KEY$="m" THEN OVER 1: PRINT AT o
p,4; INK 5;"
                PRINT AT op,37-USR 650
57; INK 6;"
                OVER 0: INVERSE 1: PLOT
 32,170-op*8: DRAW 223,0: INVERS
E 0: IF op=ad THEN GO TO 2300
2030 IF ad=op AND aa>1 AND aa<4
THEN GO TO 2500
2040 IF RND>.5 THEN GO TO 2090
2050 IF aa>3 THEN OVER 1: PRINT
AT ad,1; INK 3;"
                (TO aa-2): PRINT
 AT ad,USR 65027-2;"
                (TO aa-2): (
OVER 0: IF ad=op THEN GO TO 2500
2090 LET oa=aa: LET ad=ad: LET a
a=aa-as: IF aa<4 THEN GO TO 240
0
2100 LET ad=ad+ud: IF ad<7 OR ad
>20 THEN LET ud=-ud
2110 GO TO 2010
2300 REM Hit by Bullet

2310 POKE 65056,2: POKE 65062,2:
 FOR x=147 TO 150: PRINT AT ad,a
a; INK 4;CHR$ x: LET L=USR 65057
: NEXT x: POKE 65062,5: POKE 650
59,1
2320 PRINT AT ad,aa; INK 5;"@":
LET L=USR 65057: PRINT AT ad,aa;
     POKE 65062,3
2330 LET sc=sc+ps: PRINT AT 4,8
-LEN STR$ sc; INK 5;sc
2340 PRINT AT od,oa; INK 0; OVER
 1;"@": LET nh=nh+1: IF nh=na TH
EN LET nh=0: GO SUB 3000: GO TO
1000
2350 PRINT AT od,oa; OVER 1;"@":
 GO TO 1000
2400 REM Move Bullet

2410 PRINT AT od,oa; OVER 1;"@":
 LET hu=hu-1: IF NOT hu= THEN
GO TO 4500
2420 GO TO 1000
2430 GO SUB 3000: GO TO 1000
2500 REM Hit by Alien

2510 POKE 65056,4: POKE 65062,1:
 OVER 1: PRINT AT ad,aa;"@": FOR
 x=1 TO 10: PRINT AT op,2; INK 2
;"▶": LET L=USR 65057: PRINT AT
 op,2; INK 7;"▶": NEXT x
2520 OVER 0: PRINT AT op,2; INK
6;"▶": BEEP .1,-30: PRINT AT op
,2; INK 4;"◎": BEEP .1,-30.1: P
RINT AT op,2;"◎": BEEP .1,-35:
PRINT AT op,2; INK 0;"▶"
2530 POKE 65062,3: POKE 65056,1:
 LET ships=ships-1: PRINT AT 4,2
7; INK 6; FLASH 1;ships: FOR q=1
TO 100: NEXT q: PRINT AT 4,27;
INK 5; FLASH 0;ships: IF NOT ship
s THEN GO TO 5000
2540 GO TO 2420
3000 REM Move Completed

3010 PRINT AT od,oa; OVER 1; INK
 0;"@";AT op,2;"▶": POKE 65062,
15: LET L=USR 65057: POKE 65062,
3: LET dp=op: LET a$="ATTACK WAV
E :"+STR$ wave+" COMPLETED"
3020 PRINT AT 0,(31-LEN a$)/2; I
NK 5;a$;AT 18,(31-LEN b$)/2; INK
 5;b$
3030 PRINT AT 12,(31-hu)/2;
3040 FOR x=1 TO hu: PRINT "!";:
 PAUSE 2: NEXT x
3050 LET sc=sc+hu*wave*5: PRINT
 AT 4,8-LEN STR$ sc; INK 5;sc
3060 LET wave=wave+1: LET na=na+
(wave/2=INT (wave/2)): IF na>25
THEN LET na=25
3070 FOR x=1 TO 350: NEXT x: PRI
NT AT 0,0,,AT 10,0,,AT 12,0,,,,,
3080 PRINT AT op,2; INK 6;"▶":
FOR x=1 TO 3: BEEP .01,50: BEEP
 .01,52: BEEP .01,53: NEXT x
3090 RETURN
4500 REM Hit by Bullet

4510 PRINT AT 6,0; OVER 1; INK 2
; FLASH 1;,,,,,,,,,,,,,,,,,,,,,,,
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
4520 FOR x=1 TO 9: FOR q=0 TO 7:
 BORDER q: BEEP .01,x*q: NEXT q:
 NEXT x: BEEP .5,-55
4530 BORDER 0: PRINT AT 6,0; OVE
R 1; FLASH 0; INK 7;,,,,,,,,,,,,
,,,,,,,,,,,,,,,,,,,,
```

```
5050 IF sc<>hs THEN GO TO 5100
5060 LET hs$="": PRINT AT 4,19-LE
N STR$ hs; INK 6;hs;AT 4,12; INK
5; FLASH 1; OVER 1;
5070 FOR x=1 TO 3: FOR y=0 TO 50
 STEP 5: BEEP .01,y: NEXT y: NEX
T x
5100 FOR x=1 TO 200: NEXT x
5110 PRINT AT 11,3; INK 6;"PRESS
 ENTER FOR ANOTHER GO"
5120 POKE 23560,0
5130 IF NOT PEEK 23560 THEN GO T
O 5130
5140 IF PEEK 23560=13 THEN GO TO
 120
5150 CLS : PLOT 72,143: DRAW 31,
0: PLOT 67,142: DRAW 0,-39: PLOT
 112,104: DRAW 0,40: PLOT 113,10
7: DRAW 29,0: PLOT 143,104: DRAW
 0,40: PLOT 143,104: DRAW -31,0:
 DRAW 0,40: DRAW 31,0: PLOT 153,
137: DRAW 22,0
5160 PLOT 183,32: DRAW -31,0: DR
AW 0,40: DRAW 31,0: PLOT 73,55:
DRAW 22,0: PLOT 112,32: DRAW 0,4
0: DRAW 31,-40: DRAW 0,40: PLOT
178,32: DRAW -14,0: DRAW 0,40: D
RAW 16,0: DRAW 0,-40: PLOT
5170 LET n=3: LET a=6: FOR x=0 T
O 31: PRINT AT 0,x; PAPER n; INK
 a; FLASH 1;" ";AT 21,31-x;" ";
LET n=a: LET a=n: NEXT
x
5200 LET n=6: LET a=3: FOR x=1 T
O 20: PRINT AT x,0; PAPER n; INK
 a; FLASH 1;" ";AT 21-x,31;" ";
LET n=n: LET a=n: NEXT
x
5250 PAUSE 0: STOP
6000 REM Intro
5010 PRINT #0; BRIGHT 1; INK 5;"
WHEN YOU'RE READY, PRESS ANY KEY
5020 IF INKEY$="" THEN BEEP .1,-
(35+RND*10): GO TO 6020
6030 LET L=USR 65027: INPUT "";
RETURN
6500 REM Scr& Att Setup
6510 PAPER 0: INK 7: BORDER 0: B
RIGHT 1: CLS
6520 PRINT AT 0,0;" DEFENDER ";
1982 "; M. J. LEVERS ": INK 5: PLO
T 0,150: DRAW 255,0
6530 INK 6: PRINT AT 2,2;"SCORE"
AT 2,11;"HIGH SCORE";AT 2,25;"S
HIPS"
6540 PRINT AT 3,1;"000000";AT 3
,8-LEN STR$ sc;sc;AT 3,18;"0000
20";AT 3,19-LEN STR$ hs;hs;AT 3,
27;ships
6550 INK 5: PLOT 0,130: DRAW 255
,0: PLOT 75,131: DRAW 0,3: PLOT
180,131: DRAW 0,31: PLOT 0,131:
DRAW 0,31: PLOT 255,131: DRAW 0
,31
6570 INK 7: PLOT 0,5: DRAW 25,25
: DRAW 30,-30: DRAW 10,10: DRAW
3,-5: DRAW 20,20: DRAW 25,-25: D
RAW 28,28
6580 DRAW 17,-17: DRAW 5,5: DRAW
 10,-10: DRAW 13,13: DRAW 15,-15
: DRAW 30,30: DRAW 20,-20
6590 FOR x=1 TO 10: PLOT INT (RN
D*245)+5,50+INT (RND*81): NEXT x
6600 PRINT AT dp,2; INK 5;"▙▄"
6700 RETURN
7000 REM Init Al,Ss Vel's&Loc
7010 LET sc=0: LET ships=3: LET
 r=0: LET aa=2: LET hu=15
7020 LET n=0: LET na=8: LET y=9
: LET ya=INT (RND*40)+1: LET l=5
58-(ya-y)
7200 LET dp=14: LET dp=dp
7400 RETURN
7500 REM Sc & Ships Update etc
7510 POKE 23560,0: BRIGHT 0: PAP
ER 3: INK 7: BORDER 3: CLS
7520 PRINT PAPER 0;0; FLASH 1;AT 1
,0;"  SELECT A SKILL LEVEL,( 1 -
 5 )";
7530 LET s=PEEK 23560: IF s<49 O
R s>53 THEN LET l=USR 65057: GO
TO 7530
7540 LET sk=VAL (";"+STR$ (s-20)
): POKE 65002,10: LET l=USR 65002
: POKE 65002,9: RETURN
8000 REM Scr& Att Setup
8005 CLEAR 63999: LET n=64000
8010 INK 7: PAPER 1: BORDER 1: C
LS : PRINT FLASH 1; PAPER 2;"
 PLEASE WAIT WHILE I POKE THE
M" : USER GRAPHICS ETC INTO PLACE
8020 FOR x=15616 TO 15743: POKE
 x,PEEK x: LET n=n+1: NEXT x
8030 RESTORE 8200
8040 FOR x=0 TO 88: READ c: POKE
 n,c: LET n=n+1: NEXT x
8050 FOR x=15804 TO 15879: POKE
 n,PEEK x: LET n=n+1: NEXT x
8060 FOR x=1 TO 200: READ c: POK
E n,c: LET n=n+1: NEXT x
8070 FOR x=16008 TO 16135: POKE
 n,PEEK x: LET n=n+1: NEXT x
8080 FOR x=1 TO 200: READ c: POK
E n,c: LET n=n+1: NEXT x
8090 FOR x=16344 TO 16375: POKE
 n,PEEK x: LET n=n+1: NEXT x
8095 FOR x=1 TO 8: READ c: POKE
 n,c: LET n=n+1: NEXT x
8100 FOR x=USR "a" TO USR "u"-1:
 READ c: POKE x,c: NEXT x
8110 FOR x=1 TO 4: READ c: POKE
 x+64999,c: NEXT x
8130 POKE 23608,0: POKE 23607,24
9
8140 GO TO 110
8200 DATA 0,126,78,74,82,98,126,
0,0,48,16,16,16,124,0,0,126,2
,2,126,64,126,0
8201 DATA 0,126,2,62,2,2,126,0,0
,20,36,68,68,126,4,4,4,126,64,12
8,2,66,126,0
8202 DATA 0,126,64,126,66,66,126
,0,0,126,70,8,8,8,8,8,60,96,12
8,66,66,126,0
8203 DATA 0,126,66,66,126,2,2,0
8204 DATA 0,60,36,36,126,66,66,0
,0,124,66,126,66,66,126,0,0,126,
```

NDER

number of ships you have to spare, and a neat display marks the end of the game.

Good sound effects, good explosions and a moving mountainous background complete this quality offering which occupies about 16.1K of the larger Spectrum. (48K Spectrum). Graphics notes:

1050, etc—Graphic C
2010, etc—Graphic A; graphic B
200—Graphic I; graphic L
2050—Graphic M
2320—Graphic H
2520—Graphic N, graphic O; graphic P, graphic Q; graphic R; graphic S
3040—Graphic T.

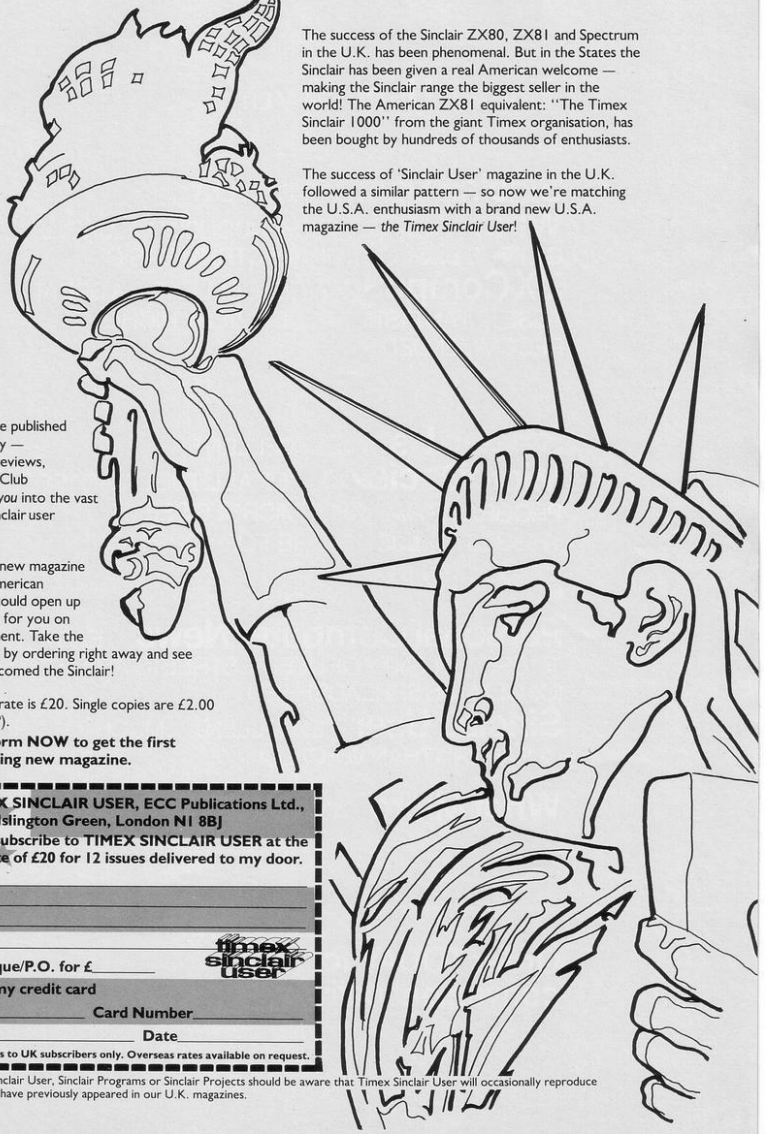
```
54,64,64,64,128,0
9205 DATA 0,124,70,68,66,78,120,
0,0,126,64,126,64,64,126,0,0,126
,64,126,64,64,64,0
9206 DATA 0,126,64,64,74,66,126,
0,0,66,66,126,66,66,66,0,0,124,1
8,16,16,16,124,0
9207 DATA 0,2,2,2,2,66,126,0,0,6
6,66,126,66,66,66,0,0,64,64,64,6
6,64,126,0
9208 DATA 0,108,182,90,66,66,66,
0,0,122,74,74,74,74,78,0,0,126,6
6,66,66,66,126,0
9209 DATA 0,126,66,66,66,126,64,64,
0,0,126,66,66,74,70,126,0,0,124,
66,126,66,66,66,0
9210 DATA 0,126,64,126,2,2,126,0
,0,254,16,16,16,16,16,0,0,66,66,
66,66,66,126,0
9211 DATA 0,66,66,66,66,102,36,60,0
,0,66,66,66,90,102,102,0,0,66,66
,36,24,24,102,66,0
9212 DATA 0,130,130,130,254,16,16,16
,0,0,126,8,8,16,126,0
9213 DATA 0,0,124,4,4,124,64,124,0
,0,64,64,124,66,66,124,0,0,0,124
,66,66,64,124,0
9214 DATA 0,0,4,4,124,66,66,124,0,
0,0,124,66,124,64,124,0,0,0,56,32
,56,32,32,32,32
9215 DATA 0,0,124,66,66,66,124,4,12
4,0,64,64,124,66,66,66,0,0,16,0,
16,16,16,16,0
9216 DATA 0,0,0,0,4,4,4,36,66,0,0
,0,0,60,36,36,36,0,0,32,32,32,32,
32,66,0
9217 DATA 0,0,124,64,64,64,64,0,
0,0,124,66,66,66,66,0,0,0,124,66
,66,66,124,0
9218 DATA 0,0,124,66,66,124,4,66,
0,0,0,124,66,66,124,4,6,0,0,124,
64,64,64,64,0
9219 DATA 0,0,124,64,124,4,124,0
,0,32,56,32,32,32,60,0,0,0,66,66
,66,66,124,0
9220 DATA 0,0,66,66,66,66,40,40,16,0,
0,0,64,64,64,64,128,0,0,0,66,66
,66,66,66,126,66,0
9221 DATA 0,0,66,66,66,124,4,66,124
,0,0,124,12,16,96,124,0
9222 DATA 0,60,66,66,66,66,66,0
,0,129,255
9223 DATA 0,28,62,255,127,255,12
7,62,0,0,0,192,254,255,127,128,0,
63,255,165,165,141,132,252
9224 DATA 0,0,0,0,24,24,0,0,0,0,0,0,
24,36,36,24,0,0,0,0,24,36,66,66,36
,24,0
9225 DATA 60,66,129,129,129,129,
66,60,80,54,9,160,5,144,2,40,0,0
,0,0,255,0,0
9226 DATA 0,0,0,0,0,0,0,178,0,0,0,0,0,
0,0,101,0,0,0,0,0,0,0,0,73,0,0
9227 DATA 0,0,0,0,24,231,24,6,0,0,
0,3,4,6,3,0,0,0,0,192,32,32,192,
0,0
9228 DATA 3,28,33,66,66,33,28,3,
192,56,132,66,66,132,56,192,3,16
,56,17,136,30,0,1
9229 DATA 16,56,16,1,0,0,138,32,6
,0,0,36,24,36,18,2,5,8
9230 DATA 33,33,73,22,0,30,65,14
,32,175,128,23,119,43,13,32,249,
85,82,80,0,104,0,3,43,80,255,201
,0,229,205,161,3,225,17,16,0,167
,237,82,32,206,193,16,233,201
9300 CLEAR 65023
```

```
9010 LET hs=0: PAPER 0: BRIGHT 1
: INK 0: BORDER 0: CLS
9020 PRINT AT 1,7; INK 7;"M. J.
Levers presents....."
9030 LET a$=" 
DER DEFEN
                    ": PRINT AT 8,0
; INVERSE 1;a$
9050 POKE 65028,10: LET L=USR 65
027: POKE 65028,1: POKE 65062,1:
PAUSE 10: INK 4: OVER 1: FOR x=
60 TO 111: PLOT 32,x: DRAW 191,0
: LET L=USR 65037: NEXT x
9060 POKE 65064,2: POKE 65062,1:
OVER 0: PAUSE 10: FOR x=0 TO 10
: PRINT INK 0;AT 0,x;a$: LET L=U
SR 65037: PAUSE 2: PRINT AT 8,0;
INK 6;a$: NEXT x
9070 POKE 65064,1: POKE 65065,0:
POKE 65062,20: LET L=USR 65067:
POKE 65062,3: PRINT AT 17,1; IN
K 5;"PLEASE PRESS ENTER TO CONTI
NUE": POKE 23560,0
9080 IF PEEK 23560<>13 THEN GO T
O 9080
9090 LET L=USR 65027: INK 7: CLS

9100 PRINT INK 6; FLASH 1;" DEFE
NDER  © 1982  M. J. Levers "
9110 PRINT " This is the Spectru
m version of the arcade game of
the same  name. The object is
to defend  your home planet aga
inst the  evil galactic slave
traders"
9120 PRINT "who attack your plan
et and take it's humanoid life f
orces to sellto the galactic slav
e trade."
9130 PRINT " You must destroy ev
ery ship  that you come across
while  flying low over the
planet. Each time you fail to do
so results  in the capture of an
other
9140 PRINT "humanoid. If all 15
humanoids  are taken then your
planet will explode and the game
will end.  KEYS: caps shift =
ship up, Z =ship down, M = fire.
"
9150 PRINT " SCORING: Aliens = 1
00 - 300 pts Bonuses after each
wave."
9160 PRINT INK 6; FLASH 1;"
PRESS ANY KEY TO BEGIN
"
9170 IF INKEY$<>"" THEN GO TO 91
70
9180 PAUSE 0: POKE 23658,0: RETU
RN
```

Now you can take a new

AMERICAN look at your Sinclair!

With the new Timex Sinclair User magazine to link YOU into a huge network of American enthusiasts



The success of the Sinclair ZX80, ZX81 and Spectrum in the U.K. has been phenomenal. But in the States the Sinclair has been given a real American welcome — making the Sinclair range the biggest seller in the world! The American ZX81 equivalent: "The Timex Sinclair 1000" from the giant Timex organisation, has been bought by hundreds of thousands of enthusiasts.

The success of 'Sinclair User' magazine in the U.K. followed a similar pattern — so now we're matching the U.S.A. enthusiasm with a brand new U.S.A. magazine — *the Timex Sinclair User*!

The first issue will be published in the U.S.A. in May — packed with news, reviews, programs and User Club information to link *you* into the vast American Timex Sinclair user network.

Remember, this is a new magazine written from the American viewpoint — but it could open up whole new horizons for you on your Sinclair enjoyment. Take the new, American view by ordering right away and see how the U.S.A. welcomed the Sinclair!

Annual subscription rate is £20. Single copies are £2.00 each (including P & P).

Fill in the order form NOW to get the first issues of this exciting new magazine.

Send to: TIMEX SINCLAIR USER, ECC Publications Ltd., 30-31 Islington Green, London N1 8BJ

Yes, I want to subscribe to TIMEX SINCLAIR USER at the special U.K. rate of £20 for 12 issues delivered to my door.

Name _____

Address _____

_____

_____

I enclose a cheque/P.O. for £_____

timex sinclair user

Please charge my credit card

Card Name_____ **Card Number**_____

Signature_____ **Date**_____

N.B. This offer applies to UK subscribers only. Overseas rates available on request.

N.B. Subscribers to Sinclair User, Sinclair Programs or Sinclair Projects should be aware that Timex Sinclair User will occasionally reproduce top articles that have previously appeared in our U.K. magazines.

What the experts say:

Sinclair User..."QUALITY"

•USE AND LEARN

Sinclair User..."EXCELLENT"
What Micro..."TREMENDOUSLY VALUABLE... GET THE BEST OUT OF SPECTRUM BASIC"
ZX Computing..."EXCELLENT...A GREAT ASSET...FANTASTIC VALUE...VERY HIGHLY RECOMMENDED"

•THE DATABASE

Sinclair User..."EXCELLENT"
MicroDecision..."OF ALL THE DATABASE-TYPE PROGRAMS AVAILABLE,MiCROL'S SEEMS THE BEST VALUE...MORE FOR YOUR MONEY"

•THE SPREADSHEET

Personal Computer News..."EASY TO USE...PLENTY OF USES...STREETS AHEAD" (OF GEMINI'S SPREADSHEET)
Sinclair User..."EXCELLENT...MUCH CLEARER" (THAN VU-CALC)

What Micro..."QUALITY"

MiCROL©

Order TODAY for fast convenient delivery

THE THOUGHT PROCESSOR

MiCROL ©

SERIOUS SPECTRUM SOFTWARE only £9.95 each!

USE AND LEARN

Your perfect Spectrum starter Kit. 25 original BASIC programs you can use immediately, PLUS 118 page manual to help you get the most from your 16or48K Spectrum. 25 programs include: Music Composer, World Atlas, Computer Term Glossary,Screen Designer, Star Maps – PLUS games and powerful routines to use in your own programs: graph-drawing, text-editing, sorting, searching and much more. 118 page manual includes detailed description of programming techniques, full listings of all programs, and articles to develop your own program-writing skills.

"Excellent" A.R. West, Surrey. "First-time loading, user-friendly, superb documentation" J.E. Mann, Leeds.

THE DATABASE

Whether you want to update mailing lists, manage customer accounts, or simply produce an index of your record collection, THE DATABASE makes it easy and enjoyable. A breakthrough in power *and* practicality, THE DATABASE allows you to store information on any subject in the way *you* want, and gives you a full range of commands to display, update, sort, search and print – even perform calculations. Massive storage capacity: 1,000 lines in memory at a time, over 7,000 names and addresses on a single C90 cassette. See for yourself why THE DATABASE is the most advanced 48K Spectrum database available – far more powerful *and* practical than Sinclair's VU-FILE and all other "competitors".

THE SPREADSHEET

Based closely on Visicalc, the world's best-selling program, THE SPREADSHEET turns your 48K Spectrum into a "super-Calculator" that helps you solve all kinds of number-based problems quickly and easily. Hundreds of applications in business, engineering and science – and just as versatile for home finance management. Invaluable in education too, helping develop maths ability and confidence. In power, flexibility and ease of use, THE SPREADSHEET outperforms all other Spectrum spreadsheets – including Sinclair's VU-CALC. See for yourself, with the security of MiCROL'S 14 day money-back Guarantee.

THE WORD PROCESSOR

The only full feature, professionally-written word processor for 48K Spectrums. Use it to produce memos, letters, reports – THE WORD PROCESSOR has the features you need, including flexible editing, justification, centering, and automatic "word wrap". Simplicity itself to use, THE WORD PROCESSOR uses the same "what you see is what you get" principle as word processors costing hundreds of pounds more. 20,000 character storage capability for real-work applications, and it's easily adapted to work with full size printers. Once again, MiCROL sets the standard in serious Spectrum software.

To order: (UK Orders Only). Simply complete the coupon, and FREEPOST with your cheque, made payable to MiCROL (UK Mail Order). All products normally available from stock and despatched by return. Credit Card Orders: By phone 9-5.30 Mon to Fri. stating name and address, Card No. and item(s) required.

Post to:– MiCROL (UK Mail Order) Freepost SP5
38 Burleigh Street, Cambridge CB1 1BR

Please send me.....copy/copies of USE AND LEARN Vol. 1
Please send me.....copy/copies of THE DATABASE
Please send me.....copy/copies of THE SPREADSHEET
Please send me.....copy/copies of THE WORD PROCESSOR

I enclose cheque/P.O. for.....(£9.95 + 50p p+p – £10.45 total each)

Or I wish to pay by Access/Barclaycard/Visa
Card Number .....
Please print name and address

Name .....

Address.....

.....

.....

Credit Card
holder's signature .....

MiCROL

38 Burleigh Street, Cambridge CB1 1BR.

(0223)312453

The Galaxy's FIRST ever computer comic!

Zooming into touchdown at WH Smiths, John Menzies and other good newsagents on **JUNE 23rd** and every fortnight . . . only 40p. **Order your copy NOW!**

Bursting with great new comic strips . . . exciting stories . . . astounding facts . . . big prizes . . . competitions . . . fascinating quizzes . . . star personalities. And that's just the start of Britain's newest, brightest, most fun-packed comic ever!

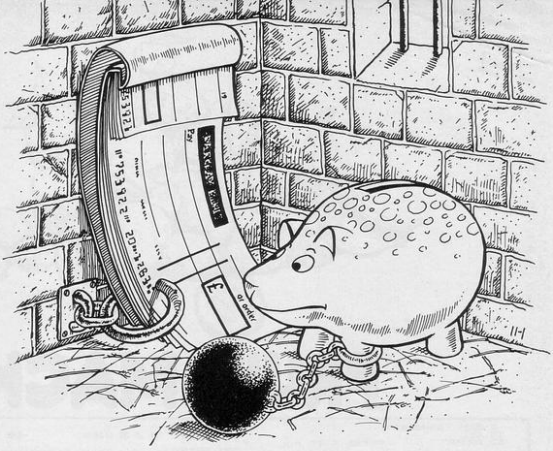
LOAD RUNNER

It's the only comic for the age of the computer – it puts the rest back with the dinosaurs!

JUNE 23rd

and every fortnight . . . order your copy NOW.

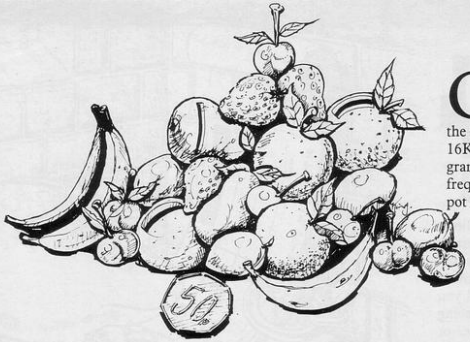
PERSONAL FINANCE



PERSONAL FINANCE allows 16K and 48K Spectrum users to keep track of their financial situations with an effective but relatively simple program. Once it is entered you are given five options—entering, saving or displaying data, saving the file, or preparing a statement. Entries will be arranged in date order and a statement of income and expenditure can be obtained at any point.

The program was written by Paul Weir of Shirley, Southampton.

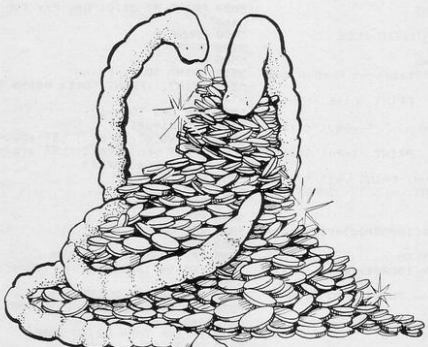
```
  10 LET n=0
  12 DIM x(150): DIM y(150): DIM
 z(150)
  15 DIM g$(1,8)
  20 DIM a$(150,8)
  30 DIM a(150)
  35 BORDER 0: PAPER 0: INK 7: C
LS
  40 PRINT "Welcome to Personal
Finance"
  55 PRINT : PRINT 150-n;" Free
Locations"
  60 PRINT : PRINT " MENU": PRIN
T "      "
  70 PRINT
  80 PRINT
  90 PRINT "  1:Enter Data": PRI
NT : PRINT "  2:Display Data": P
RINT : PRINT "  3:PrePare Statem
ent": PRINT
  95 PRINT "  4:Save This File"

  97 PRINT : PRINT "  5:Delete d
ata"
 100 PRINT AT 21,0;"InPut youn c
hoice"
 110 INPUT i
 120 IF i>5 OR i<1 THEN GO TO 11
0
 125 CLS
 130 GO TO i*1000
1000 REM
1001 REM DATA ENTRY
1002 REM
1010 PRINT "Enter Data Mode"
1015 PRINT
1020 LET n=n+1
1030 IF n>=101 THEN PRINT "Out o
f memory": GO TO 35
1035 LET k=n
1040 PRINT "InPut Name of item a
nd any otherdata you reQuire (No
 more than 8chrs)"
1050 INPUT a$(k)

1060 PRINT : PRINT a$(k)
1070 PRINT : PRINT "InPut amount
 of money"
1080 INPUT a(k)
1090 PRINT : PRINT "-";a(k)
1092 PRINT : PRINT "InPut Date/m
onth/year": INPUT x(k): PRINT x(
k);"/";: INPUT y(k): PRINT y(k);
"/";: INPUT z(k): PRINT z(k)
1100 PRINT : PRINT "Press ^M^ fo
r MENU": PRINT "Press any other
key to chan9e   this data"
1110 INPUT k$
1120 IF k$="m" OR k$="M" THEN GO
 TO 9000
1130 CLS   GO TO 1040
2000 REM
2001 REM DATA DISPLAY
2002 REM
2010 CLS
2020 PRINT "Data display mode"
2024 PRINT : PRINT "Press ^0^ to
 stop and start     display"
2030 PAUSE 0
2035 CLS
2060 FOR d=1 TO n
2070 PRINT a$(d);" ";x(d);"/";y(
d);"/";z(d);"  -";a(d)
2072 PRINT
2075 IF INKEY$="0" THEN PAUSE 0
2080 NEXT d
2090 PRINT : PRINT "Press any ke
y for menu"
2100 PAUSE 0
2110 GO TO 35
3000 REM
3001 REM STATEMENT MODE
3002 REM
3005 LET to=0
3010 PRINT "Statement PreParatio
n Mode"
3020 PRINT : PRINT "Last entry w
as on ";
3030 PRINT x(n);"/";y(n);"/";z(n
)
3040 PRINT : PRINT "InPut Statem
ent date"
3050 INPUT vx: PRINT vx;"/"; IN
PUT vy: PRINT vy;"/"; INPUT vz:
 PRINT vz
3055 PRINT
3060 LET vd=(10000*vz)+(100*vy)+
vx
3070 FOR s=1 TO n
3080 LET vn=(10000*z(s))+(100*y(
s))+x(s)
3090 IF vn>vd THEN GO TO 3190
3100 NEXT s
3130 LET s=s-1
3200 FOR h=1 TO s

3210 PRINT a$(h);" ";x(h);"/";y(
h);"/";z(h);"  -";a(h)
3220 LET to=to+a(h)
3230 NEXT h
3240 PRINT : PRINT "Balance at "
;vx;"/";vy;"/";vz;" = -";to
3250 PRINT : PRINT "any key for
menu"
3260 PAUSE 0
3270 GO TO 35
3999 STOP
4000 REM
4001 REM SAVE MODE
4002 REM
4010 PRINT "InPut name file is t
o be saved  under"
4015 INPUT e$: PRINT : PRINT e$
4020 SAVE e$ LINE 35
4030 GO TO 35
5000 REM
5001 REM DELETE DATA
5002 REM
5005 PRINT "Delete data mode": P
RINT
5010 PRINT "InPut title of data
to be     deleted"
5020 INPUT g$(1)
5030 PRINT : PRINT g$(1)
5040 FOR g=1 TO n
5050 IF g$(1)=a$(g) THEN GO TO 5
500
5060 NEXT g
5070 PRINT : PRINT "Data not fou
nd"
5080 PRINT AT 21,0;"Any key for
menu"
5090 PAUSE 0
5100 GO TO 35
5500 CLS
5510 PRINT "Data found"
5515 PRINT : PRINT "Data beinG d
eleted"
5520 FOR u=g TO n-1
5530 LET bi=u+1
5540 LET a$(u)=a$(bi): LET a(u)=
a(bi): LET x(u)=x(bi): LET y(u)=
y(bi): LET y(u)=y(bi)
5550 NEXT u
5560 LET n=n-1
5570 GO TO 35
9000 REM
9001 REM DATE SORT
9002 REM
9005 IF n<2 THEN GO TO 35
9007 LET t=(10000*z(n))+(100*y(n
))+(x(n))
9010 FOR s=n TO 2 STEP -1
9030 LET r=(10000*z(s-1))+(100*y
(s-1))+(x(s-1))
9040 IF t<r THEN GO TO 9500
9050 GO TO 35
9060 NEXT s
9070 GO TO 35
9500 LET j=s-1

9510 LET q$=a$(s): LET q=a(s): L
ET q=x(s): LET q=y(s): LET q=z(
s)
9520 LET a$(s)=a$(j): LET a(s)=a
(j): LET x(s)=x(j): LET y(s)=y(j
): LET z(s)=z(j)
9530 LET a$(j)=q$: LET a(j)=q: L
ET x(j)=qx: LET y(j)=qy: LET z(j
)=qz
9540 GO TO 9060
```



CHARLES GIERSH of Woodthorpe, Nottingham has written a program which simulates the working of a **Fruit Machine** on the 16K ZX-81. Unlike many similar programs it is not impossible to win fairly frequently, although the 50 pence Jackpot can prove elusive.

FRUIT MACHINE

```
   5 REM "GAMBLE"
  15 CLS
  20 PRINT "          PRESS R TO ROL
L"
  30 PRINT
  40 PRINT "                COST:"
  50 PRINT ,"1=5P"
  60 PRINT ,"2=10P"
  70 PRINT ,"3=13P"
  75 PRINT AT 10,0;"WITH A SUPER
JACKPOT OF:"
  76 PRINT
  77 PRINT "          50P"
  78 PRINT AT 16,0;"------------
------------------------"
  80 IF INKEY$="R" THEN GOTO 90
  85 IF INKEY$<>"R" THEN GOTO 80
  90 LET A=INT (RND*4+1)
 100 LET B=INT (RND*4+1)
 110 LET C=INT (RND*4+1)
 115 CLS
 116 PRINT "1 PAIR WINS          - 3
P"
 117 PRINT
 118 PRINT "3 THE SAME WINS   -10
P"
 119 PRINT
 120 PRINT "■ * ▞ WINS          -15
P"
 121 PRINT
 122 PRINT "■ ▞ ■ WINS          -20
P"
 123 PRINT
 124 PRINT "* ■ ■ WINS          -20
P"
 125 PRINT
 126 PRINT "▞ ■ * WINS          -30
P"
 127 PRINT
 128 PRINT "▞ ■ * WINS          -50
P"
 138 IF A=1 THEN PRINT AT 16,5;"
▒▒▒"
 139 IF B=2 THEN PRINT AT 16,13;
"▒▒▒"
 140 IF C=3 THEN PRINT AT 16,21;
"***"
 150 IF A=4 THEN PRINT AT 16,5;"
▞▞▞"
 160 IF A=2 THEN PRINT AT 16,5;"
▒▒▒"
 170 IF A=3 THEN PRINT AT 16,5;"
***"
 180 IF B=3 THEN PRINT AT 16,13;
"***"
 190 IF B=4 THEN PRINT AT 16,13;
"▞▞▞"
 200 IF B=1 THEN PRINT AT 16,13;
"▒▒▒"
 210 IF C=1 THEN PRINT AT 16,21;
"▒▒▒"
 220 IF C=2 THEN PRINT AT 16,21;
"▒▒▒"
 230 IF C=4 THEN PRINT AT 16,21;
"▞▞▞"
 240 IF A=B OR A=C OR C=B THEN P
RINT AT 18,8;"YOU WIN 3P"
 241 IF A=B AND B=C THEN PRINT A
T 18,8;"YOU WIN 10P"
 242 IF A=2 AND B=3 AND C=4 THEN
PRINT AT 18,8;"YOU WIN 15P"
 243 IF A=1 AND B=4 AND C=2 THEN
PRINT AT 18,8;"YOU WIN 20P"
 244 IF A=3 AND B=2 AND C=1 THEN
PRINT AT 18,8;"YOU WIN 20P"
 245 IF A=4 AND B=1 AND C=3 THEN
PRINT AT 18,8;"YOU WIN 30P"
 246 IF A=4 AND B=2 AND C=3 THEN
PRINT AT 18,0;"YOU HAVE WON THE
JACKPOT OF 50P"
 247 FOR N=1 TO 70
 248 NEXT N
 250 GOTO 10
```



BEWARE — the highly-intelligent **Giant Worms** are after your money and if they steal it all you will die. Shoot them before they can reach the gold. One worm contains the brains for the whole operation. Shoot at that worm with key 0 and both worms die. Shoot at the other and nothing will happen.

Giant Worms was written for the 16K ZX-81 by E Mitchelmore of Kingswear, South Devon.

```
   1 RAND
   5 LET L=CODE "("
   6 LET S=NOT PI
  11 LET A=CODE "(9s)"
  12 CLS
  13 LET K=INT (RND*2)+1
  30 LET C=INT (RND*L)
  40 LET D=CODE "3"
  50 FOR F=NOT PI TO L
  60 PRINT AT F,NOT PI;"%"
  70 NEXT F
 100 PRINT AT A,SGN PI;"(97)"
 105 PRINT AT A,SGN PI;" "
 110 LET A=A+(INKEY$="6" AND A<=
21)-(INKEY$="7" AND A>=0)
 125 LET D=D-SGN PI
 126 IF D=NOT PI THEN GOTO VAL "
400"
 130 PRINT AT C,D;" "
 135 PRINT AT C+CODE "(95)",D;"
"
 140 IF A=C AND INKEY$="0" OR A=
C+CODE "(95)" AND INKEY$="0" THE
N GOTO VAL "300"


 160 GOTO VAL "100"
 300 IF K=SGN PI AND A=C THEN GO
TO VAL "350"
 302 IF K=CODE "(92)" AND A=C+CO
DE "(95)" THEN GOTO VAL "350"
 310 GOTO VAL "100"
 350 LET S=S+CODE "(9s)"
 360 GOTO 11
 400 LET L=L-SGN PI
 420 IF L<NOT PI THEN PRINT "SCO
RE=";S;Q
 430 GOTO CODE "£"
```

GIANT WORMS

```
  1 LET a$="?": LET sh=0
  2 LET s=0: LET ox=1500
  3 LET l=3
  4 GO SUB 7000
 10 BORDER 0: PAPER 0: INK 7: F
LASH 0: BRIGHT 0: INVERSE 0: OVE
R 0: CLS
 11 RESTORE
 12 LET q=0: LET p=3: LET qinc=
1
 13 LET q1=30: LET p1=3: LET q1
inc=-1
 20 GO SUB 2000
 30 GO SUB 2100
 35 GO SUB 4500
 40 LET y=16: LET x=0: LET y1=y
: LET x1=x
 50 PRINT INK 5; OVER 1;AT y,x;
"▟";AT y+1,x;"▙"
 60 BEEP .01,y: IF (x=q AND y=(
p-1)) OR (x=q1 AND y=(p1-1)) THE
N GO TO 5000
 61 FOR h=1 TO 2
 62 GO SUB 3000
 64 GO SUB 4000
 65 IF (x=q AND y=(p-1)) OR (x=
q1 AND y=(p1-1)) THEN GO TO 5000
 66 NEXT h: LET ox=ox-10: LET d
$=STR$ ox
 67 IF LEN d$=4 THEN GO TO 69
 68 FOR j=1 TO 4-LEN d$: LET d$
="0"+d$: NEXT j
 69 PRINT AT 21,8;d$: IF ox=0 T
HEN GO TO 5000
 70 PRINT INK 6; OVER 1;AT y,x;
"▟";AT y+1,x;"▙"
150 LET x1=x1+(INKEY$="p")-(INK
EY$="o")
160 LET y1=y1+(INKEY$="c")-(INK
EY$="d")
170 IF ATTR (y+2,x1)=2 OR (ATTR
 (y+2,x1)=2 AND SCREEN$ (y+2,x1)
="") THEN LET x=x1
180 IF SCREEN$ (y1+2,x)="" THEN
 LET y=y1
190 LET y1=y: LET x1=x
199 IF y=2 AND x=16 THEN LET s=
s+ox: GO SUB 6000
200 GO TO 50
2000 FOR i=0 TO 7: READ a: POKE
 USR "a"+i,a: NEXT i: DATA 255,12
6,126,231,231,255,0,0
2010 FOR i=0 TO 7: READ a: POKE
 USR "b"+i,a: NEXT i: DATA 129,12
9,255,66,129,129,255,255
2020 FOR i=0 TO 7: READ a: POKE
 USR "c"+i,a: NEXT i: DATA 102,15
3,60,255,153,255,255,85
2030 FOR i=0 TO 7: READ a: POKE
 USR "f"+i,a: NEXT i: DATA 24,60,
60,60,60,189,189,189
2040 FOR i=0 TO 7: READ a: POKE
 USR "i"+i,a: NEXT i: DATA 60,60,
60,24,36,36,36,36
2090 RETURN
2100 PRINT "Score:";s,"Hi score:
";sh,,"by ";a$
2110 INK 2: FOR i=20 TO 4 STEP -
4: PRINT AT i,0;"▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀
▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀": NEXT i
2120 INK 4: PRINT AT 21,0;"OXYG
EN:"; INK 7;"1500"; INK 4;"
Life:";l;"▟▙"
2130 INK 6: FOR n=4 TO 16 STEP 4
: LET a=INT (RND*29)+1
2140 FOR n=0 TO 3: PRINT AT y+n,
a;"▒": NEXT n: NEXT y
2150 RETURN
3000 OVER 1: PRINT AT p,q; INK 6
;"▟▙"
3010 IF ATTR (p+1,q)<>2 THEN LET
 p=p+1: GO TO 3021
3020 LET q=q+qinc: IF q<0 OR q>3
0 THEN LET qinc=-SGN qinc: GO TO
 3020
3021 PRINT AT p,q; INK 4;"▟▙"
3025 IF q=0 AND p=19 THEN LET q=
0: LET p=3: PRINT OVER 0; INK 6;
AT 19,0;"  "
3030 OVER 0: RETURN
4000 OVER 1: PRINT AT p1,q1; INK
 5;"▟▙"
4010 IF ATTR (p1+1,q1)<>2 THEN L
ET p1=p1+1: GO TO 4021
4020 LET q1=q1+q1inc: IF q1<0 OR
 q1>30 THEN LET q1inc=-SGN q1inc
: GO TO 4020
4021 PRINT AT p1,q1; INK 4;"▟▙"
4025 IF q1=30 AND p1=19 THEN LET
 q1=30: LET p1=3: PRINT OVER 0;
INK 6;AT 19,30;"  "
4030 OVER 0: RETURN
4500 FOR i=1 TO 12: READ a: BEEP
.4,a+12: NEXT i: DATA 1,3,5,7,2
,4,6,8,10,12,0,7
4510 PAUSE 0: RETURN
5000 FOR i=30 TO 0 STEP -2: BEEP
 .01,i: BEEP .005,i+30: NEXT i
5005 FOR i=1 TO 200: NEXT i
5010 LET l=l-1: IF l=0 THEN GO T
O 5100
5020 LET ox=1500
5030 GO TO 10
5100 IF s>sh THEN LET sh=s: INPU
T "Name:";a$
5110 GO TO 2
6000 FOR i=1 TO 5: READ a: BEEP
.3,a: NEXT i: DATA 14,16,12,0,7
6005 LET ox=1500
6010 GO TO 10
7000 BORDER 1: PAPER 1: INK 7: C
LS
7010 PRINT INK 6;TAB (12);"Monst
ers"
7020 PRINT '''"Object of game is
 to get to the middle of the top
 bar,""without running out of ox
ygen  or getting killed.""'"Key
s to use.""'"c to go down""d to
 go up""p to go right""o to go
 left"
7030 PRINT INK 4;'''"     Press an
y key to begin.": PAUSE 0: RETUR
N
```

THE OBJECT of **Monsters** is to move your man from the bottom level to the middle of the top level by means of ladders. The monsters descend from the top level and, should they hit your man, a life is lost.

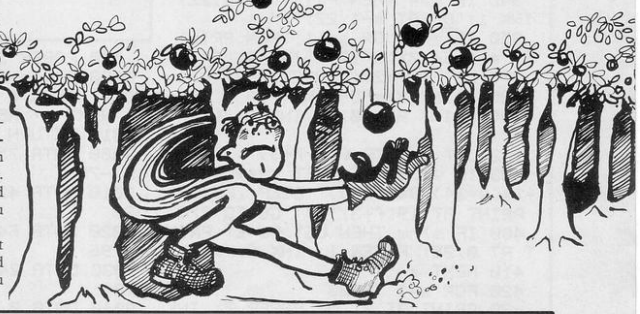
Scoring is calculated by the amount of oxygen remaining when the man reaches the centre of the top layer. The game includes full instructions. Monsters was written for the 16K Spectrum by Darren Girard of Colchester, Essex.

```
  5 FAST
 10 DIM A$(21,30)
 15 PRINT
 20 FOR A=1 TO 21
 30 LET A$(A)="(sp:30*isp)"
 40 PRINT A$(A)
 50 NEXT A
 60 LET X=2
 70 LET Y=15
 72 FOR B=1 TO 40
 75 FOR A=1 TO 10
 80 LET A$(X,Y)=" "
 90 PRINT AT X,Y;" "
100 LET D=INT (RND*4)+1
110 LET M=X+(D=3)-(D=1)
120 LET N=Y+(D=2)-(D=4)
130 IF M>20 OR M<2 OR N>29 OR N
<2 THEN GOTO 190
140 IF (A$(M+1,N)=" ")+(A$(M-1,
N)=" ")+(A$(M,N+1)=" ")+(A$(M,N-
1)=" ")<>1 THEN GOTO 180
150 LET X=M
160 LET Y=N
170 GOTO 80
180 NEXT A
190 LET X=INT (RND*18)+2
200 LET Y=INT (RND*28)+2
210 IF A$(X,Y)="(isp)" THEN GOT
O 190
220 NEXT B
230 FOR A=21 TO 2 STEP -1
240 FOR B=2 TO 30
250 IF A$(A-1,B)=" " THEN GOTO
280
260 NEXT B
270 NEXT A
280 FOR A=A TO 21
290 PRINT AT A,B;" "
300 LET A$(A,B)=" "
310 NEXT A
```

MAZE MAKER

WHEN RUN, **Maze Maker,** written by J D Webster of Wetherby, West Yorkshire will produce a random maze. The routine could usefully be added to many games programs. In each maze there will be a possible route from A$ (2, 15) to the bottom of the screen. The program takes two minutes to run, so be prepared to wait for your maze. (16K ZX-81).

ORCHARD

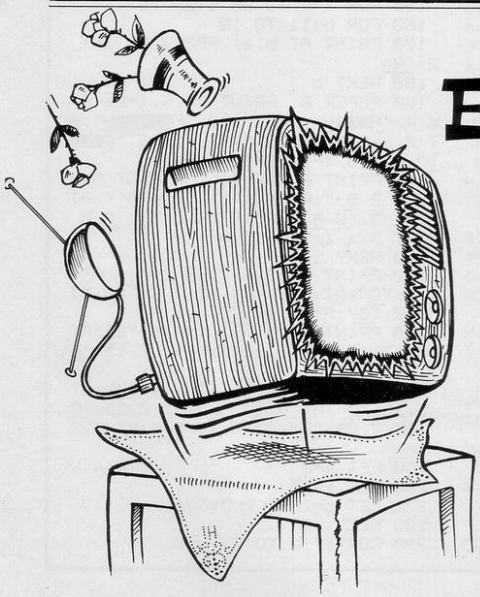


ANGUS LAVERY of Todmorden, Lancashire has written **Orchard** for the 16K Spectrum dealing with hardship and exploitation. You are the high-tech fruit catcher and your boss has threatened to dismiss you if you drop any item of fruit.

The small reward you earn per fruit means that you can often be sacked having earned less than £1. Can you beat the built-in high wage of £5?

```
  10 LET hw=500
  20 BORDER 1: PAPER 5: INK 0: C
LS
  30 GO SUB 8000
  40 PRINT AT 1,12;"ORCHARD"
  50 PRINT '" You are a 'high-
tech' fruit "'" picker, with
a basket that is "'" computer-c
ontrolled!"
  60 PRINT '" However your boss
, the farmer, "'" distrusts mo
dern technology "'" and has t
old you that you will "'" be sa
cked if you drop a single "'" f
ruit!"
  61 PRINT '"    More informatio
n follows"
  62 FOR b=1 TO 3: FOR a=-40 TO
40: BEEP .01,a: BEEP .01,10-a: N
EXT a: NEXT b
  63 CLS
  70 PRINT '" Your boss is a fa
ir man though,"'" and he is Pre
pared to Pay you "'" the follo
wing Paltry amounts "'" for y
our labour:"
  75 PRINT INK 6';TAB 12;"E"; IN
K 0;" = 1P"' INK 2;TAB 12;"C"; I
NK 0;" = 2P"' INK 1;TAB 12;"D"
INK 0;" = 3P"
  76 PRINT 'TAB 11;"CONTROLS"'"
    5 - LEFT      8 - RIGHT"
  80 PRINT '" Can you earn a dec
ent wage??"
  90 PRINT FLASH 1'"     Press a
ny key to Play      "
  95 FOR a=0 TO 40: BEEP .01,a
  97 IF INKEY$<>"" THEN CLS : GO
TO 110
 100 BEEP .01,10-a: NEXT a: GO T
O 95
 110 FOR a=12 TO 21
 120 PRINT AT a,0; PAPER 4;"
                            "
 130 NEXT a
 140 PRINT AT 0,4; PAPER 1; INK
6;"HIGHEST WAGE EARNED: ";hw;"P"
 150 FOR a=4 TO 26 STEP 11
 160 FOR b=11 TO 18
 170 PRINT AT b,a; PAPER 0; INK
2;"A"
 180 NEXT b
 190 PAPER 8: PRINT AT 4,a-2; IN
K 4;"A   H";AT 5,a-3;"F     H";A
T 8,a-3;"G     I";AT 9,a-2;"G
I";AT 10,a-1;"G I"
 200 PRINT PAPER 4; INK 0;AT 5,a
-2;" B B ";AT 6,a-3;" B B B ";AT
 7,a-3;"B B B B";AT 8,a-2;" B B
";AT 9,a-1;" B "
 210 NEXT a
 220 PRINT AT 5,4; INK 2;"C";AT
6,5;"C";AT 7,2;"C";AT 7,6;"C";AT
 8,2;"C";AT 8,4;"C"
 230 PRINT AT 5,15; INK 6;"E";AT
 5,17;"E";AT 6,12;"E";AT 7,15;"E
";AT 8,16;"E"
 240 PRINT AT 5,24; INK 1;"D";AT
 6,25;"D";AT 6,29;"D";AT 7,23;"D
";AT 7,28;"D";AT 8,26;"D";AT 9,2
5;"D"
 250 LET s=0
 260 LET f=15
 270 LET c=INT (RND*6)+1
 280 BEEP .02,.1
 290 FOR a=10 TO 21
```

```
 300 IF a>20 THEN GO TO 420
 310 IF c=1 OR c=6 THEN PRINT AT
 a,6; INK 2;"C";AT a-1,6;" "
 320 IF c=2 OR c=5 THEN PRINT AT
 a,16; INK 6;"E";AT a-1,16;" "
 330 IF c=3 THEN PRINT AT a,12;
INK 6;"E";AT a-1,12;" "
 340 IF c=4 THEN PRINT AT a,22;
INK 1;"D";AT a-1,22;" "
 350 IF a=10 OR a=11 THEN PRINT
AT a-1,6+10*(a-10); INK 4;"I"
 370 LET f=f+2*((INKEY$="8" AND
f<25)-(INKEY$="5" AND f>0))
 380 PRINT AT 20,f; INK 3;"▄
▟"
 382 LET g=ATTR (19,f+3)
 383 IF g>32 THEN LET s=s+(g=38)
+2*(g=34)+3*(g=33): BEEP .05,10:
 PRINT AT 19,f+3;" ": GO TO 270
 400 IF s>hw THEN LET hw=s: PRIN
T AT 0,25; PAPER 1; INK 6;hw;"P"
 410 NEXT a
 420 FOR a=1 TO 20
 430 PRINT AT 21,0; PAPER 7; INK
 1; FLASH 1;"YOU'RE SACKED!   WA
GES=";s;"P"
 440 BEEP .05,2: BEEP .01,-2
 450 NEXT a
 460 CLS
 470 PRINT AT 18,2; FLASH 0; PAP
ER 7; INK 0;"Press any key to pl
ay again"
 480 PAUSE 4e4
 500 PAPER 5: CLS : GO TO 110
8000 FOR a=144 TO 152: FOR b=0 T
O 7: READ c: POKE USR CHR$ a+b,c
: NEXT b: NEXT a
8010 RETURN
9000 DATA 75,-75,75,-75,75,-75,7
5,-75
9010 DATA 42,84,170,68,40,16,42,
20
9020 DATA 64,78,110,60,30,127,24
6,96
9030 DATA 24,60,60,126,126,60,60
,24
9040 DATA 0,24,126,255,255,126,2
4,0
9050 DATA 3,15,31,63,127,127,255
,255
9060 DATA 255,255,127,127,63,31,
15,3
9070 DATA 192,240,248,252,254,25
4,255,255
9080 DATA 255,255,254,254,252,24
8,240,192
```



EXPLODING BORDER

EXPLODING BORDER is a short routine for Spectrum users to include in their programs, written by M Birch of Kidderminster, Worcestershire. Running the short program produces the impression that the screen border is exploding.

```
9000 FOR g=1 TO 5
9001 FOR f=0 TO 7
9002 BORDER f
9003 BEEP .02,f
9004 NEXT f
9005 NEXT g
```

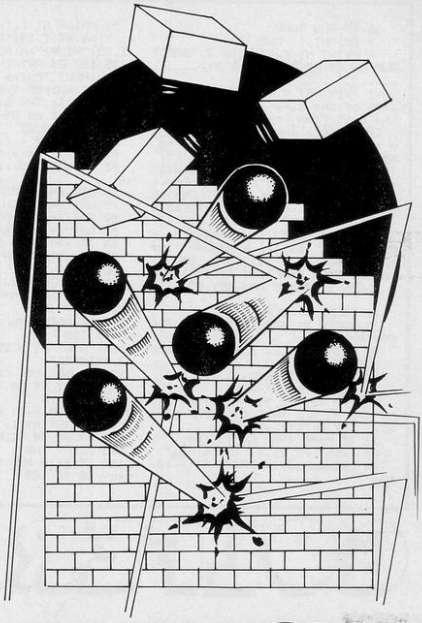
```
  2 GO SUB 9000
  3 BRIGHT 1: CLS
  5 PRINT AT 1,10; INK 2;"SPECT
RUM GOLF";AT 2,10; INK 5;"------
-------"
  7 PRINT AT 4,4; INK 4;"The ob
ject of the game is to""strike
the ball from your""position ("
; INK 0;"C"; INK 4;"), at such a
n angle""and strength so as to
make it ""land in the hole (";
INK 2;"A"; INK 4;")""." You must
also try to avoid""the bunker (
"; INK 6;"▬"; INK 4;")""One sh
ot only is given per hole""so m
ake the most of it."
  8 PRINT AT 13,0; INK 4;"The s
trength is usually a number""be
tween 340 & 500";AT 18,8; INK 2;
"ENJOY YOUR GAME";AT 20,5; INK 0
; FLASH 1;"PRESS ANY KEY TO STAR
T"
  10 PAUSE 0: CLS
  15 PAPER 7: BORDER 7: POKE 236
09,50
  20 LET h=0: LET sc=0: LET ho=0
: LET n$=""
  22 LET f=INT (RND*18)+15
  23 LET b=INT (RND*13)
  25 FOR g=0 TO 31: PRINT AT 21,
g; INK 4;"B": NEXT g: PRINT AT 2
0,0; INK 0;"C"
  27 IF ho=9 THEN GO TO 160
  28 PRINT AT 21,b; INK 6;"▬"
  30 LET ho=ho+1: PRINT AT 1,10;
ho
  35 PRINT AT 1,1; INK 1;"HOLE N
o. ";ho;AT 1,13;"SCORE = ";sc;AT
 1,25;"HI = ";h;AT 3,26;n$
  38 INK 2: PRINT AT 20,f-1;"A"
  40 INPUT "Swing = ";sw
  42 IF sw>=85 THEN PRINT AT 10,
0; FLASH 1; INK 2;"INVALID ENTRY
(angle must be 85->)": PAUSE 150:
 CLS : GO TO 22
  45 PRINT AT 4,1;"Swing = ";sw
  50 INPUT "Strength = ";st
  55 PRINT AT 5,1;"Strength = ";
st
  70 LET a=st*COS (PI*sw/180)
  75 LET b=st*SIN (PI*sw/180)
  80 FOR j=0 TO b/16 STEP .3
  85 LET c=.01*c(b*j-16*j*j)
  90 IF a*j>6200 THEN GO TO 130
  95 IF c>40 THEN GO TO 120
 100 INK 0
 105 PLOT .84*a*j,4*c+8
 110 BEEP .005,c+7
 115 NEXT j
 120 IF ABS (a*b/3200-f)<1 THEN
GO TO 135
 125 PRINT AT 9,20; FLASH 1; INK
 2;"MISSED"
 130 PAUSE 150: CLS : GO TO 22
 135 PRINT AT 18,4; FLASH 1; INK
 2;" HOLE IN 1 ": FOR n=-10 TO 1
0: BEEP .05,n+3: NEXT n: LET sc=
sc+1: PRINT AT 1,11;sc
 150 PAUSE 50: CLS : GO TO 22
 160 CLS : INK 1
 162 IF sc>0 AND h<sc THEN LET h
=sc: GO TO 180
 165 PRINT AT 5,2;"That is the e
nd of your game.""/"I hope you e
njoyed it.""/"Perhaps you would
like another ?";AT 10,14;"(y/n)"
 170 INPUT y$
 175 IF y$="y" OR y$="Y" THEN LE
T ho=0 AND sc=0: CLS : GO TO 22
 176 IF y$="n" OR y$="N" THEN NE
W
 180 INK 1
 185 PRINT AT 5,2;"Congratulatio
ns you have just""/"completed th
e best round of the""/"day.""/"P
lease enter your initials.",",MA
X 3 letters": INPUT n$
 190 LET ho=0: LET sc=0: CLS : G
O TO 22
9000 FOR n=0 TO 7: READ x: POKE
USR "a"+n,x: NEXT n
9005 DATA BIN 00000110,BIN 00001
110,BIN 00011110,BIN 0001110,BIN
 00000110,BIN 00000010,BIN 00000
010,BIN 00000010
9100 FOR n=0 TO 7: READ x: POKE
USR "b"+n,x: NEXT n
9105 DATA BIN 00010000,BIN 11001
00,BIN 01000101,BIN 01000011,BIN
 00100110,BIN 00010000,BIN 00001
,BIN 0
9200 FOR N=0 TO 7: READ X: POKE
USR "c"+n,x: NEXT n
9205 DATA BIN 00011000,BIN 00011
000,BIN 00001000,BIN 00111110,BI
N 01011101,BIN 00011100,BIN 0001
0100,BIN 00110110
9250 RETURN
9500 SAVE "sPec golf"
```

GOLFER

WHATEVER the weather, a game of golf is always possible with **Golfer,** written by Mark Ansdell of Tonbridge, Kent for the 16K Spectrum. You and the golf course are shown on the screen and once you have entered the angle and strength of your shot, the trajectory of the ball is also marked.

You are allowed only one shot at each hole, making it possible to complete the game without once holing-out. With experience the game becomes easier, thus offering the satisfaction of a hole in one.

```
   4 LET S=PI-PI
   5 LET A=VAL "5"
   6 LET B=PI/PI
   7 LET A1=PI/PI
   8 LET B1=PI/PI
   9 LET C=VAL "7"
  10 PRINT "   break-out"
  11 LET A$="("isP isP isP isP isP
sP isP isP isP isP isP isP isP isP i
sP)"
  12 PRINT
  13 PRINT A$
  14 PRINT " ";A$
  15 PRINT A$
  30 PRINT AT A,B;".";AT VAL "11
",C;"(sP 2*99 sP)";AT A,B;" "
  40 LET A=A+A1
  50 LET B=B+B1
  60 LET C=C+(INKEY$="8")-(INKEY
$="5")
  70 IF B=PI-PI THEN LET B1=PI/P
I
  75 IF B=VAL "15" THEN LET B1=-
PI/PI
  80 IF A=VAL "2" THEN LET A1=PI
/PI
  81 IF A<VAL "10" THEN GOTO VAL
 "90"
  82 IF B=C+PI/PI OR B=C+VAL "2"
 THEN LET A1=-PI/PI
  90 IF A<VAL "5" THEN LET S=S+P
I/PI
 100 IF A<VAL "12" THEN GOTO VAL
 "30"
 110 PRINT "SCORE:";S
 120 PAUSE 4E4
 130 CLS
 140 RUN
```



BREAKOUT

DAVID THICKET of Doncaster, Yorkshire has written a version of **Breakout** for the 1K ZX-81. Move your bat with cursor keys 5 and 8. Bounce the ball against the wall to destroy all the bricks.

ERRORS AND MISHAPS

TWO PRINTING ERRORS occurred in our last issue. Line 60 of **Pilot** contained a variable which was not clear because it had been inked-in so that it might have been interpreted as a 9 or a g. It was, in fact, an "a".

The last item of data was omitted from line 9210 of **Demolition.** The line should have ended with a 6.

Dock your games software into Britain's largest home-user database...

... one cassette reaches thousands of enthusiasts.

Micronet 800 is a powerful new service that opens up a whole new world of opportunities for microcomputer users.

When this huge database was launched just a few months ago, it attracted thousands of enquiries from home computer enthusiasts who could see the huge new vistas when you link microcomputers with Micronet 800... an 'Aladdin's Cave' of hundreds of games programs which can be downloaded to individual machines... hundreds of thousands of pages of news, reviews, product data and prices from the computer world and from *Prestel*... and an electronic mail-box for exchanging messages and ideas with other users right across the country.

All this for around a modest 15p a day. Subscribers are linked by telephone through a modem, making it the fastest and most direct means of selling your games software downline to machines like the BBC Micro, ZX Spectrum, ZX81, Apple II, Tandy TRS80 and PET.

Make a name for yourself in games software. Send your disk or cassette, together with the coupon to Micronet 800 at the address below.* We will validate the program, and let you know what you stand to gain from Micronet 800.

micronet 800

Micronet 800
Bushfield House
Orton Centre
Peterborough PE2 0UW

Name _____
Address _____
_____
_____ Tel: _____
Name of Program _____
Type of Program _____ Type of Micro _____
☐ Please tick box if you are interested in becoming a Micronet 800 subscriber.

SP 7

*We cannot return cassettes or disks unless a stamped addressed envelope is enclosed.

Play in the big league — with only the best, newest programs!

We've searched for brilliant new program sources throughout the U.K. and North America to find an exciting collection of new games — and business programs — many of which cannot be bought by mail order from any other source!

Every month, we'll be adding to our catalogue to bring you the best of new games, new business, educational and household software. And the good news is — **we're specialising in programs for your Sinclair!**

With our special new deal — you just CAN'T GO WRONG.

* A free offer every month [this time it's a free blank C20 cassette with every two games ordered]
* A money-back guarantee if you're not entirely satisfied with your purchase — that's how confident we are about the quality and value!

All you have to do is look at our first HOT selection, then order quickly to be among the first to own these games of skill, intelligence and excitement [fast delivery is another of our specialities — so you could be using these new programs SOON].

FREE BLANK C20 COMPUTER CASSETTE WITH EVERY TWO CASSETTES YOU ORDER!

Remember there's no limit to the number of free cassettes you receive if your order justifies them — so why not get together with friends or user group members and share the freebies?

GUARANTEE

Order with complete confidence. If you are not entirely satisfied with the quality of your purchase return it to us within 7 days and we will provide a replacement.

GREAT VALUE! TREMENDOUS SELECTION! PLUS A FREE OFFER EVERY TIME!

Fill in the order form right away — we're guaranteeing fast delivery, quality and satisfaction [after all, we want you to come back for more!]

The Software Workshop, Yew Tree, Selborne, Hants GU34 3JP

Here's a whole NEW selection of the latest games, the best-value software for your ZX-81 or Spectrum.

ZX81 Software

1-01 **Stock Market** — £3.95
Buy and sell your way to millions! 16K RAM

1-02 **Football League** — £3.95
First division fun for the soccer enthusiast. 16K RAM

1-03 **Test Match** — £3.95
Match your wits alongside the superstars. 16K RAM

1-11 **Arcade Action** — £4.95
Overtaker/Missile Man/Space Fighter/Pilot/Greedy Gobbler/Extra Terrestrial. 1K

1-12 **Avenger** — £4.95
Avoid missiles and bombs to become the ruler. 16K RAM

1-13 **Protector** — £4.95
Defend your own ship from oncoming attackers. 16K RAM

1-21 **Football Manager** — £5.95
Manage your team through a hectic league season! 16K RAM

1-31 **Comp-U-Share** — £9.95
Investment management program for unit trusts, shares and loan stocks. Complete documentation included. 16K RAM

1-32 **Comp-U-Tax** — £9.95
Accurate personal income tax calculator for 82/83 tax year. Full documentation included. 16K RAM

Spectrum Software

2-12 **Avenger** — £4.95
(See 1-12 under ZX81). 48K RAM

2-13 **Sentinel** — £4.95
Guard your mother ship against alien attacks. 48K RAM

2-14 **Meteor Storm** — £4.95
Spectrum version of the ever-popular arcade game. 16K or 48K RAM

2-15 **Star Trek** — £4.95
Popular space program brought to life by excellent graphics. 48K RAM

2-21 **Frogger** — £5.95
Manoeuvre the frog across the road avoiding heavy traffic. 48K RAM

2-22 **Crazy Balloons** — £5.95
Guide the balloons round the maze without bursting. 48K RAM

2-23 **Arcadia** — £5.95
The expert's version of the popular 'Invaders' game. 16K or 48K RAM

2-24 **Golf** — £5.95
The finest of golf handicap games. 48K RAM

2-25 **Test Match** — £5.95
More exciting than the real thing! 48K RAM

2-26 **Derby Day** — £5.95
This favourite has to be a winner. 48K RAM

2-27 **Rescue** — £5.95
Rescue the Princess from marauding patrols. 48K RAM

2-28 **The Orb** — £5.95
Discover the Orb in the depths of the temple but watch the monsters. 48K RAM

2-29 **Jackpot** — £5.95
The harmless way to take on the one-armed bandit. 48K RAM

2-31 **Football Manager** — £6.95
See 1-21 under ZX81. 48K RAM

2-41 **Comp-U-Share** — £9.95
See 1-31 under ZX81. 48K RAM

2-42 **Comp-U-Tax** — £9.95
See 1-32 under ZX81. 48K RAM

To: The Software Workshop, Yew Tree, Selborne, Hants GU34 3JP

I wish to order the following programs. I understand that:

* I will receive a FREE blank cassette with every 2 programs ordered
* I can return products within seven days if not entirely satisfied and receive a full refund or replacement programs to the same value.

Ref No	Qty	Title	Price

Postage, packing and handling: add 45p for the first cassette, and 25p for each additional cassette. Non-UK orders add extra 50%

Total

I enclose a cheque/postal order for _____

Name _____

Address _____

_____

(Allow 28 days MAXIMUM FOR DELIVERY)

SP7

Hardware or software lying around, unused?

From the August issue of *Sinclair Programs,* you can advertise it through our new classified section.
By placing a classified advertisement, you will reach over 150,000 Sinclair-using readers, and so exchange your goods for cash.
And it will cost you only £5 for up to 30 words!
Please write your advertisement in the boxes below, one word per box. Underline words required in bold type. Your name, address and/or telephone number should be included. *Please print in block capitals.*
Note—this service is open only to private advertisers. The advertisement will appear in the earliest possible issue.

Name:.....

Address:.....

..... Tel: .....

Have you included the fee of £5?

Conditions
The Advertisement Manager reserves the right to alter, reject or suspend an advertisement without assigning any reason. Advertisements are accepted subject to approval of copy and to the right of the Advertisement Manager to alter, reject or cancel any order without explanation. The Proprietors are not liable for any loss from any cause whatsoever, nor do they accept liability for printers' errors. The Advertisers shall indemnify the Publishers in respect of any claim, cost and expenses arising out of any libellous or malicious matter or untrue statement in any advertisement published for the advertisers, or any infringement of copyright, patent or design therein. The placing of any order will be deemed to be an acceptance of these conditions.

MAIL ORDER ADVERTISING

British Code of Advertising Practice

Advertisements in this publication are required to conform to the British Code of Advertising Practice. In respect of mail order advertisements where money is paid in advance, the code requires advertisers to fulfil orders within 28 days, unless a longer delivery period is stated. Where goods are returned undamaged within seven days, the purchaser's money must be refunded. Please retain proof of postage/despatch, as this may be needed.

Mail Order Protection Scheme

If you order goods from Mail Order advertisements in this magazine and pay by post in advance of delivery, *Sinclair User* will consider you for compensation if the Advertiser should become insolvent or bankrupt, provided:

(1) You have not received the goods or had your money returned; and

(2) You write to the Publisher of *Sinclair User* summarizing the situation not earlier than 28 days from the day you sent your order and not later than two months from that day.

Please do not wait until the last moment to inform us. When you do write, we will tell you how to make your claim and what evidence of payment is required.

We guarantee to meet claims from readers in accordance with the above procedure as soon as possible after the Advertiser has been declared bankrupt or insolvent (up to a limit of £4,250 per annum for any one Advertiser so affected and up to £10,000 per annum in respect of all insolvent Advertisers. Claims may be paid for higher amounts, or when the above procedure has not been complied with at the discretion of *Sinclair User*, but we do not guarantee to do so in view of the need to set some limit to this commitment and to learn quickly of readers' difficulties).

This guarantee covers only advance payment sent in direct response to an advertisement in this magazine (not, for example, payment made in response to catalogues etc, received as a result of answering such advertisements). Classified advertisements are excluded.

BARGAIN-HUNTERS READ *THIS!*

Whatever your model of Sinclair computer—you can get HOURS of fun, intellectual satisfaction and education for just 95p per month!

A bargain?
That's **Sinclair Programs** magazine—the fat, glossy magazine that's PACKED with original, tested programs for you to load and run.

With **Sinclair Programs** every month you can build the library of programs that suits your mood: in recent issues we have challenged our readers with programs to test their skill at Sharpshooter or Laser Cannon . . . jolt their brain cells with Quadratic Equation or Monster Maths . . . or take a practical turn with their own word processor program or graphic generator.

That is just a fraction of what you get from **Sinclair Programs**. Each month we have 40 programs for owners of ZX80s, ZX81s and Spectrums. But make sure you don't have to hunt TOO far for your bargains—**Sinclair Programs** always sells out quickly, so order yours TODAY from your newsagent, or fill in the form below and we will send it direct to you, every month.

Mail to: ECC Publications Limited, 30-31 Islington Green, London N1 8BJ Yes — I'd like to subscribe to **Sinclair Programs** (12 issues — price £13.20) I enclose a cheque for £ ____ Please charge my credit card Card: name _____ Number _____ Address _____ Name _____ Signature _____ Date _____

NB This offer applies to UK subscribers only. Overseas rates available on request.

EAST LONDON EXCLUSIVE

ZX81 RAM-PACKS FLAP

and when RAM packs flap, programs crash because of edgy connectors (so children! keep off!).
Now East London Robotics offer a unique product:-

TRADE IN YOUR ZX 81.

Introducing the **MAXIMEM ZX81**. A ZX81 with 32k or 64k RAM fitted INSIDE the case (children come back!)
MAXIMEM ZX81 – the most affordable 32 or 64k micro in the world.

EAST LONDON ROBOTICS

MAXIMEM ZX81

32k-£39 PLUS ONE USED 1k ZX81

64k-£59 PLUS ONE USED 1k ZX81

The MAXIMEM 32 and 64k is a modified ZX81 and not just a RAM pack. We give a six month guarantee on the computer, regardless of the age of your trade-in ZX81. The extra memory uses only a quarter of the power consumption of a 16k plug-in memory, and does not interfere with any standard add-ons, such as printers, RS232 or other interfaces.

Trade in your ZX81 by post or over the counter at our premises. (Phone first to check current delivery). Trade-in ZX81s must be clean and in working order. Send and receive the computer only, without manuals, power supplies etc.

EAST LONDON ROBOTICS

SPECTRUM SP48-£23

32k MEMORY EXTENSION

Plug the chip-set (Issue 2) or circuit board (Issue 1 £35) into the sockets provided by Sinclair and you have a standard 48k Spectrum, fully compatible with all Sinclair add-ons and very low in power consumption. No soldering is required. Fitting and removal are easy. The SP48 carries our full warranty and is upgradable on a part-exchange basis to the SP80.

SPECTRUM SP80-£46

PAGED 64k MEMORY EXTENSION

Fitting, power consumption and add-on compatibility are identical to the SP48 (Issue 1 version £50). It can be used as a standard 48k, but software instructions can switch to a second page of 32k. Although not recommended for the complete beginner, the SP80 is of tremendous benefit to the serious user.

Fit and Test Service: At our premises £3
By registered post £7

STOP PRESS

TRICKSTICK TEAM IN TRAINING

A Company team of four ready to take on all comers. Fabulous prizes for successful challengers.

ZX SLOWLOADER £10

Loads ZX81 tapes into your Spectrum. A recent letter describes it best.

Dear Sir, Just a line about your excellent Slowloader.
I bought it because I was nearing the completion of a project which uses practically everything in 16k RAM including a string array (DIM 629,7) which took 4 hours hard graft to bash in. I really did not fancy doing it all again.
SLOWLOADER twice found a tape-loading error. So I SAVEd again onto a short, high-quality tape – and this time it went straight in. Two minutes to take out the SLOW and FAST lines, 10 to renumber the PEEKs and POKEs, 20 to add some colour and a few BEEPs, and the thing was ready to SAVE again. What a little masterpiece!

All products on this order form are in stock at the time of going to press.

Same day dispatch for phoned Access and Visa orders.

To East London Robotics Ltd. Please send by return (tick items required).

	£	p
☐ MAXIMEM 32k. (£39 + ZX81)		
☐ MAXIMEM 64k. (£59 + ZX81)		
☐ SP48 (Issue 1 £35) (Issue 2 £23)		
☐ SP80 (Issue 1 £50) (Issue 2 £46)		
☐ SLOWLOADER £10		
☐ Free Catalogue (SAE only)		
Postage		65p

I enclose a cheque/PO for _____
My Access/Visa number is

Name _____

Address _____

SP 7

TRICKSTICK

A revolution in computer games control, for one to eight players simultaneously. On sale soon.

EAST LONDON ROBOTICS

GATE 11, ROYAL ALBERT DOCK, LONDON E16.
24 HOUR INFORMATION SERVICE TEL: 01 471 3308
24 HOUR ACCESS AND VISA ORDERING TEL: 01 474 4715
SPECIAL ENQUIRIES TEL: 01 474 4430

Push your Sinclair to the limit

ZX81/SPECTRUM ARCADE GAMES

NEW **ZX INVASION FORCE** (ZX81)
Use your skill to fire through the energy band to destroy the menacing alien ship — **£3.95**

NEW **SPEC INVADERS**
SPEC GOBBLEMAN
These exciting high-speed classic games incorporate hi-resolutiongraphics and sound to bring you the best in arcade action at only **£4.95** each (16/48K)

NEW **SPEC FROG 5/SHOWDOWN** (16/48K)
Hop across the dangerous road avoiding the lethal cars, then lorries. Go back to the wild west for a gunfight battle amongst cacti and wagons. Features include western music. **£4.95**

NEW **NAMTIR RAIDERS** (ZX81)
High speed, quick action arcade game with four separate groups of attackers. **£3.95**

Gobbleman also available for ZX81 at **£3.95**

UTILITIES

NEW **TOOLKIT**
Nine powerful new functions for your ZX81 (including re-number lines (goto, gosub), program merge, string finding and replacement. **£5.95**

SPEC BUG
A 30 in 1 machine code tool and disassembler for your ZX Spectrum. **£6.95**

ZX BUG
A 30 in 1 machine code tool and disassembler for your ZX81. **£6.95**

Improve your machine code programs with this new 48K Spectrum Assembler

Just released by Artic, this new professional quality assembler is also available for 16K ZX81 and features:—

* Word-processor-like text editor. * High-speed, versatile two-pass mnemonic assembler with labels and detailed error-trapping. Will assemble to any address. * Essential support facilities such as memory-edit, register inspect/modify and search for de-bugging. * Full output to ZX-printer. * Memory-status report and comprehensive user-manual.

ONLY £9.95

ZX81 & SPECTRUM

NEW LOW PRICE ADVENTURE GAMES

ONLY £5.95 for ZX81 and £6.95 for SPECTRUM

INCA CURSE (Adventure B)
In a jungle clearing you come across an ancient Inca temple. Your mission to enter, collect the treasure and escape alive. But beware! Includes a cassette save routine.

SHIP OF DOOM (Adventure C)
You are unavoidably drawn to an alien cruiser. Can you reach the control room and free yourself? Or will they get you first? Includes a cassette save routine.

ESPIONAGE ISLAND (Adventure D)
While on a reconnaisance mission your plane loses control and you are forced to land. Can you survive and escape with the island's hidden secret?

PLANET OF DEATH (Adventure A) 16/48K
You find yourself stranded on an inhabited alien planet. Can you reach your ship and escape?

also available for SPECTRUM

ZX FORTH
Supplied on cassette with editor cassette, user manuals and keyboard overlay. ZX Forth combines the simplicity of basic with the speed of machine code

now £14.95

THE ULTIMATE ADVENTURE FOR THE SPECTRUM/ZX81 for only £9.95

AND THE CHANCE TO WIN £10,000 or more IF YOU KRAKIT™

RULES AVAILABLE FROM ARTIC

Your eccentric father has left you £10,000 in his will. In order to claim your windfall you must solve twelve clues and gain access to a bank account in which the money has actually been deposited. Be the first to crack the puzzle and the prize is yours! Plus you will win two tickets to the city of the secret KRAKIT™vault location. The Prize money is increased weekly. A telephone number will be supplied so you have the opportunity to find out just how much you could win.

DON'T MISS YOUR CHANCE TO WIN A FORTUNE!

SPECTRUM MICRO CHESS

The only Chess program for a 16K or 48K Spectrum. Allows all legal moves, castelling; en-passant and pawn promotion. Options to play black/or white. Sets board in any position. Full colour and graphics display.

ONLY £6.95

new releases for 16K & 48K SPECTRUM

SPECTRUM INVASION FORCE

A popular arcade game for 16K or 48K Spectrum. Fires through the force field to destroy the menacing alien ship. Sounds easy?? Two levels of play — normal or suicidal. Full colour. Sound and hi-res. graphics.

NOW ONLY £4.95

A GREAT CHESS GAME FOR YOUR ZX81 OR SPECTRUM*

*SPECTRUM CHESS 48K

ZX CHESS I
Very popular machine code program, with six levels of play and an analysis option. Available for ZX81. **£6.50**

ZX CHESS II
A new improved version, with a faster response time, seven levels of play, analysis option and in addition a recommended move option. **£9.95**

ZX 1K CHESS
An incredible game in 1K for only **£2.95**

As featured on ITV

NEW **SPECTRUM VOICE CHESS**

This incredible program talks you through your game. It tells you its move, recommends a move, and contains a range of facetious comments. The game is based on the highly successful ZX Chess II and is offered at the Christmas offer price of £9.95.

SPECTRUM CHESS now only **£9.45**

ALWAYS AHEAD WITH ZX81/SPECTRUM SOFTWARE

Cheques & P.O. made payable to: Artic Computing Limited. Dealer enquiries welcome.
Please state whether your order is for ZX81 or Spectrum. Send S.A.E. (6in × 9in) for catalogue.

VISA

We welcome Access

ARTIC COMPUTING LTD.
396 JAMES RECKITT AVENUE,
HULL, N. HUMBERSIDE.

To: Artic Computing Ltd., 396 James Reckitt Avenue, Hull, N. Humberside, HU8 0JA.

Please supply.....

.....

.....

Cheque for total amount enclosed.

Name.....

Address.....

.....