

**NOW
ON SALE
EVERY MONTH**

NOW
ON SALE
EVERY MONTH

Sinclair

95p

Programs

May 1983 An Independent Magazine produced by ECC Publications

the Spectrum, ZX-81 and ZX-8

apman

May 1983 An Independent Magazine produced by ECC Publications
Spectrum, ZX-81 and Lapma

Program
May 1983 An Independent Magazine produced by ECC Publications
40 Programs for the Spectrum, ZX-81 and ZX-80
Lapman
Star
Curve
Di
J
T
V



SPECTRUM COMES TO LIFE !

ABBEX

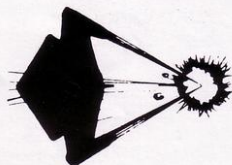
THE GAMES PEOPLE

SPOOKYMAN



EAT THE PILLS AND KEEP AWAY FROM THE GHOSTS. EAT THE VITAMINS AND CHASE THE GHOSTS. FULL MACHINE CODE ARCADE ACTION AND SOUND. DESIGNED TO MAKE YOUR ADRENALINE RUN HIGH. PRICE £4.95

COSMOS



YOU HAVE THE JOB OF PROTECTING A CONVOY FROM ALIENS AND METEOR STORMS. WATCH OUT FOR THE SPACE MINES AS YOU PLAY THIS AMAZING MACHINE CODE ARCADE ACTION SIMULATION PROGRAM. PRICE £4.95

**OTHER GAMES IN OUR SPECTRUM RANGE INCLUDE:
ANDROIDS RUN, HIGH NOON, ETX, INVASION,
FAUST'S FOLLY (Adventure), HARRIER - ALL AT £5.95**

ABBEX ELECTRONICS LTD.

20 ASHLEY COURT, GREAT NORTHWAY, LONDON NW4

Tel: 01-203 1465

PLEASE COMPLETE IN BLOCK CAPS

NAME (Mr/Mrs/Miss)

ADDRESS

(CARD HOLDERS)

POST CODE PHONE NO.

Make cheques payable to ABBEX ELECTRONICS LTD.

I enclose my cheque for £

I wish to pay by ☐ CHEQUE ☐ ACCESS

Please debit my creditcard a/c

NUMBER ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐ date

Signed

Please send me the following
(Allow 14 days for delivery)

☐ SPOOKYMAN
PRICE £4.95

☐ COSMOS
PRICE £4.95

☐ OTHER GAME
PRICE £5.95

☐ CATALOGUE

Contents

Editor
Nigel Clark

Production editor
Harold Mayes MBE

Design
Elaine Bishop and Bill Scolding

Program Reviews
Rebecca Ferguson

Editorial director
John Sterlicchi

Advertisement manager
John Ross

Sales executive
Annette Burrows

Editorial/production assistant
Margaret Hawkins

Managing director
Terry Cartwright

Chairman
Richard Hease

Sinclair Programs is published
bi-monthly by EGC 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,
EGC 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

- | | | | |
|-------|-----------------|----|-----------------|
| 7 | LETTERS | 38 | RALLY |
| | ERRORS AND | | 1K INVADERS |
| | MISHAPS | 40 | CAVE ADVENTURE |
| 30 | PROGRAM OF THE | 47 | SET RAGGED |
| | MONTH | | AQUA ATTACK |
| ZX-80 | | 49 | HIGH POWERS |
| 12 | PONTOON | | CALENDAR |
| ZX-81 | | 52 | SLUG SLITHER |
| 9 | HAZARD | | ALIEN ATTACK |
| 11 | FRUIT COLLECTOR | 53 | CURVE FIT |
| 13 | MINIPEDE | | SPECTRUM |
| 19 | ZAPMAN | 8 | PLING |
| 20 | SYMMETRY | 13 | STAR PATTERNS |
| | FAST DISPLAY | 14 | SPINVADERS |
| 21 | DIAGONO | 22 | SPECTRUM FILE |
| 24 | EVASION | 25 | PILOT |
| 25 | PLAGUE | 28 | SPECTRUM MORSE |
| 26 | PICMAN | 30 | PIPELINE |
| 27 | TAKE OFF | 34 | APPOINTMENTS |
| 29 | CLIMBER | 36 | UNDERSTANDING |
| | 1K LINK | | EVOLUTION |
| 33 | GUNSIGHT | 39 | DEMOLITION |
| 34 | OLYMPICS | 41 | ZX DEFENDER |
| 35 | DODGER | 48 | REVERSI |
| | | 50 | SUBMARINE |

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 the characters are shown as they appear in a game with instructions included in the accompanying text.

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 replace or provide a refund — whichever you specify.

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**
Buy and sell your way to millions!
16K RAM
- 1-02 Football League**
First division fun for the soccer enthusiast. 16K RAM
- 1-03 Test Match**
Match your wits alongside the superstars. 16K RAM
- 1-11 Arcade Action**
Overtaker/Missile Man/Space Fighter/Pilot/Greedy Gobbler/Extra Terrestrial. 1K
- 1-12 Avenger**
Avoid missiles and bombs to become the ruler. 16K RAM
- 1-13 Protector**
Defend your own ship from oncoming attackers. 16K RAM
- 1-21 Football Manager**
Manage your team through a hectic league season! 16K RAM
- 1-31 Comp-U-Share**
Investment management program for unit trusts, shares and loan stocks. Complete documentation included. 16K RAM
- 1-32 Comp-U-Tax**
Accurate personal income tax calculator for 82/83 tax year. Full documentation included. 16K RAM

Spectrum Software

- 2-12 Avenger**
[See 1-12 under ZX81]. 48K RAM
- 2-13 Sentinel**
Guard your mother ship against alien attacks. 48K RAM

- 2-14 Meteor Storm**
Spectrum version of the ever-popular arcade game. 16K or 48K RAM **£4.95**
- 2-15 Star Trek**
Popular space program brought to life by excellent graphics. 48K RAM **£4.95**
- 2-21 Frogger**
Manoeuvre the frog across the road avoiding heavy traffic. 48K RAM **£5.95**
- 2-22 Crazy Balloons**
Guide the balloons round the maze without bursting. 48K RAM **£5.95**
- 2-23 Arcadia**
The expert's version of the popular 'Invaders' game. 16K or 48K RAM **£5.95**
- 2-24 Golf**
The finest of golf handicap games. 48K RAM **£5.95**
- 2-25 Test Match**
More exciting than the real thing! 48K RAM **£5.95**
- 2-26 Derby Day**
This favourite has to be a winner. 48K RAM **£5.95**
- 2-27 Rescue**
Rescue the Princess from marauding patrols. 48K RAM **£5.95**
- 2-28 The Orb**
Discover the Orb in the depths of the temple but watch the monsters. 48K RAM **£5.95**
- 2-29 Jackpot**
The harmless way to take on the one-armed bandit. 48K RAM **£5.95**
- 2-31 Football Manager**
See 1-21 under ZX81. 48K RAM **£6.95**
- 2-41 Comp-U-Share**
See 1-31 under ZX81. 48K RAM **£9.95**
- 2-42 Comp-U-Tax**
See 1-32 under ZX81. 48K RAM **£9.95**

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%

I enclose a cheque/postal order for _____

Name _____

Address _____

[Allow 28 days MAXIMUM FOR DELIVERY]

Total



FANTASTIC VALUE

SKETCHPAD: DRAW from point to point easily. OFFSET cursor any distance or direction. CIRCLE reproduced any size or location. INSERT any character to screen 'User Defined' or 'Standard'. FRAME your creation and copy onto printer. SAVE & LOAD screens. LOCATION given on request for scale graphics. Many more features to discover.

DISASSEMBLER: Very compact and user friendly! hails Sinclair User. Full Z80 mnemonics plus RST28 and RTS08 data identified. List as characters or HEX block. HEX loader.

CHARACTER GENERATOR: Not just 21 characters. More than 210 sets of 21 characters on a 48K machine and over 20 sets of 21 characters on a 16K, plus room for your own program. All easily constructed on screen. Menu driven.

LUNAR LANDER: Four levels of complexity. Contains MIC. A favourite with everyone.

MASTERMIND: Crack the six digit colour code. Choice of five levels of complexity. Black & White pegs etc.

ANY TWO PROGRAMS FOR £4.95

ALL FIVE ONLY £7.95

(recorded on one cassette)

COSMIC INVADERS: The classic arcade game in super fast MIC. Six bases, on screen scoring and superb graphics.

SPIDER: A fast, quick thinking maze game. You'll need to be alert, cunning and respond almost immediately. Includes MIC.

VOYAGER: Land at each base and collect plutonium for the mother ship. Three screens and nine levels of play. Excellent graphics and sound etc. Includes MIC.

ONLY £3.95 each.

Send your written order, together with a cheque/postal order payable to 'SPECTRUM SOFTWARE'.

Address: Spectrum Software, Britannia House, 45-53 Prince of Wales Road, Norwich, NR1 1BL.

Allow 28 days for delivery.

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 800 tapes stocked, offering more than 100 different programs from 27 suppliers (all with their permission)
- Includes the latest arcade, adventure and simulation games, business and home utilities, graphics, education etc.
- Up to 40 maker's original copies of very popular tapes enable us to maintain good service
- Descriptive catalogue helps you choose the best tapes for your needs
- FREE quarterly, illustrated magazine posted to all members
- Full-time staff of three offer you a friendly, efficient welcome & service
- Tonight's hire for £1.40 inc p/p
- All tapes guaranteed loadable; help given with associated problems
- Overseas branches being set up (Malta already operating); franchises available for some countries
- Send SAE for details, or join on money-back no-risk approval today
- "An exceptionally professional and thriving organisation"—review in Eric Deeson's "Guide to ZX Spectrum Resources"



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.

51

C.C.S. MANAGEMENT GAMES

16K ZX81 Spectrum



DALLAS

A game of oil exploration and exploitation in Texas. Decisions are required on purchasing concessions, the movement and use of drilling rigs, and the building of platforms and pipelines. Can you take-over the Ewing Empire, or will you be taken-over in the attempt!

AUTOCHECK

As MD of a Catering Company you must negotiate for leases, decide on menu prices, level of wages, advertising and dividends. Each year you must predict the inflation rate. You will be made to resign if you are not successful. There are 3 levels of difficulty.



FARMER

is a simulation for running a large wheat farm. Decisions are required on when to plant, irrigate, fertilize, spray and harvest your land and whether to purchase seed corn, land or farm machinery or whether to employ more farm workers.

AIRLINE

Can you compete with British Airways? You must decide on the number of aircraft to operate, whether to buy or charter, and the levels of staffing and maintenance. Problems encountered are tax demands, strikes, cancelled flights, hijacks and aircraft crashes.

PRINT SHOP

You own a small printing company and are required to decide on (a) the number and type of staff you employ and when to increase or reduce staff (b) the amount and type of paper you stock (c) the week in which work is scheduled (d) the quotation for each. There are 3 scales of difficulty.



ALL PROGRAMS AVAILABLE FOR 16K ZX-81, SPECTRUM 16K AND 48K.

PRICES (MAIL ORDER) TO ORDER

ZX81 16K & SPECTRUM 16K, £5 for 1, £8.50 for 2, £12 for 3 £15.50 for 4 & £19 for 5. SPECTRUM 48K, £6 for 1, £10.50 for 2, £15 for 3, £19.50 for 4 & £24 for 5.

Please state computer type and send cheque to:-

DEPT. S., CASES COMPUTER SIMULATIONS 14 LANGTON WAY, LONDON SE3 7TL.

EXCELLENT ROYALTIES PAID FOR SINCLAIR SOFTWARE.

RETAIL STOCKISTS

LONDON

Buffer Micro Shop, 310 Streatham High Road, SW16.
Data-Assette, 44 Shroton Street, NW1.
The Games Centre, Oxford Street & Regent Street W1.
Micro Style, 29 Belvedere, Lansdown Road.
Zedtra, 5 School Lane, Kinson.
Gamer, 25 Gloucester Road.
Micro Style, 67 High Street.

IPSWICH

LEEDS
LEICESTER
MANCHESTER

NEWBURY

NEW ELTHAM
NORFOLK

Brainwave Micros Ltd, 24 Crown Street.
Dragon Byte, 51a Queen Street, Morley.
Microware, Unit 5, St. Peters Lane.
J. M. Computers, 136 Park Lane, Whitefield.
Micro-Link, 830 Hyde Road.
Micro Style, 47 Cheap Street.
Kayde Home Computers, 1 Station Approach.
Kayde Electronics Ltd, The Conge, Great Yarmouth.

BATH
BOURNEMOUTH
BRIGHTON
DAVENTRY

LETTERS

Machine balance

AS AN enthusiastic ZX-81 16K user and subscriber to *Sinclair Programs* and *Sinclair Projects*, I must call your attention to the trend apparent in the following table — approximate number of programs per issue of *Sinclair Programs*:

	Nov/Dec	Jan/Feb	Mar/Apr
Spectrum	7	10	14
ZX-80	2	3	2
ZX-81 — 1K	15	18	18
ZX-81 — 16K	16	9	6

I am alarmed by the collapse of the service to the 16K user, in favour of the Spectrum, while maintaining that to the 1K user.

I suggest that you favour the 1K program to achieve the 40 program figure as economically as possible.

The ZX-81 is the most widely-sold micro and the 16K RAM the most useful

and popular accessory. Without it the ZX-81 can only just demonstrate its ability.

The Spectrum, while being a superior machine, is still not so widespread as the ZX-81 and with the growing competition and delivery delays, may never be so.

In this field things are maturing fast and it is time you reconsidered your 40-program policy and opted for quality instead of quantity.

Why not offer readers a budget 16K RAM pack as a special offer and thus get into the hardware side?

I hope you find this useful as I mean my criticism to be constructive. We share the common aim, albeit for different reasons, of wanting a better, more comprehensive *Sinclair Programs* with even wider circulation.

Stanley McKeown,
Belfast.

Shortage of 1K listings

I AM writing to congratulate you on the decision to publish *Sinclair Programs* monthly. I have, however, one complaint. I have a ZX-81 and when I open this excellent magazine, to my dismay I find one-third of the programs are for the Spectrum.

I am sure many Spectrum owners feel the same, so why can we not have two magazines, one for each machine produced bi-monthly?

Chris Calvert,
Barrow-in-Furness.

game in *Sinclair Programs*. My dad and I enjoy playing the game. We became involved in the game when we first programmed it in that we nearly forgot to record it. I reached stage seven but did not succeed the jump.

T Calhoun (age 12),
Gillingham, Kent.

16K plea

I BOUGHT the March/April *Sinclair Programs*, only to discover that very few of the long 16K programs have been written for the ZX-81. I would be most grateful if you could include more long and complex games for the 16K ZX-81 as I am sure more people would like them.

Neil Churchill,
Wirral,
Merseyside.

Good worm

I WOULD like to say that the programs in your magazines are most enjoyable. I like especially *The Worm*

ERRORS AND MISHAPS

THE GREMLINS worried our printer again last month. Unfortunately what many regarded as the best program in the magazine, *Worm Game*, did not escape trouble. Lines 9008 and 9009 were in the incorrect order. Line 9009 found its way to the bottom of column two on page 27. The other problem with the game was that line 6050 should

read BEEP 3.3,X: NEXT X: GOTO 9000.

Blob Muncher had "=" missing at line 70. It should read 70 IF Y=40 THEN LET Y=40.

Frogger had line 1 missing from it. The line is 1 LET H=0.

Jackpot was the worst offender. Five lines were missing. They are:

75 PRINT AT 4, 12; F-10; " "
120 PRINT AT 1, 7;A
190 LET F=F-10
220 IF F=0 THEN STOP
221 GOTO 50

Unfortunately our reviewer claimed that **Beach Comber** and **Tank Attack** were 1K programs for the ZX-81. They are, in fact, 16K programs.

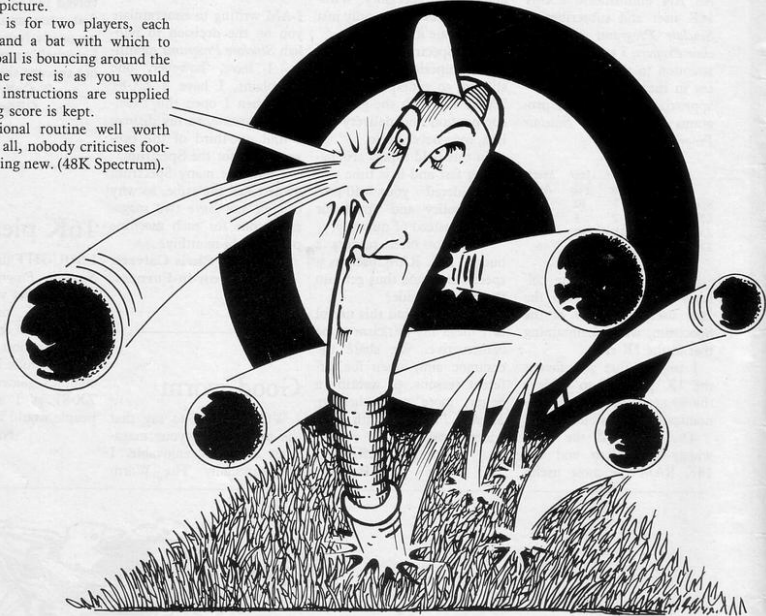


PLING!

PLING is an old routine. Its author, Ken Rylett of Manchester, reports it as very similar to the first video game he played and we believe him. It is worth taping, since nobody criticises the Mona Lisa for being an old picture.

The game is for two players, each with a goal and a bat with which to defend it. A ball is bouncing around the court and the rest is as you would expect. Full instructions are supplied and a running score is kept.

A conventional routine well worth having. After all, nobody criticises football for not being new. (48K Spectrum).

[illegible]

```

3741 IF b=1b=1: PRINT PAPER 0; AT 1, 1
3740 IF 1: THEN PRINT RETURN
3739 AT 1, 1: AT 1, 2: PRINT PAPER 1; AT 2, 2:
3738 AT 1, 2: PRINT PAPER 2; AT 3, 2:
3737 AT 1, 3: AT 2, 3: PRINT RETURN
3736 AT 1, 3: AT 3, 3: PRINT RETURN
3735 AT 1, 4: AT 2, 4: PRINT PAPER 3; AT 4, 4:
3734 AT 1, 4: AT 3, 4: PRINT PAPER 4; AT 4, 4:
3733 AT 1, 5: AT 2, 5: PRINT PAPER 5; AT 5, 5:
3732 AT 1, 5: AT 3, 5: PRINT PAPER 6; AT 5, 5:
3731 AT 1, 6: AT 2, 6: PRINT PAPER 7; AT 6, 6:
3730 AT 1, 6: AT 3, 6: PRINT PAPER 8; AT 6, 6:
3729 AT 1, 7: AT 2, 7: PRINT PAPER 9; AT 7, 7:
3728 AT 1, 7: AT 3, 7: PRINT PAPER 10; AT 7, 7:
3727 AT 1, 8: AT 2, 8: PRINT PAPER 11; AT 8, 8:
3726 AT 1, 8: AT 3, 8: PRINT PAPER 12; AT 8, 8:
3725 AT 1, 9: AT 2, 9: PRINT PAPER 13; AT 9, 9:
3724 AT 1, 9: AT 3, 9: PRINT PAPER 14; AT 9, 9:
3723 AT 1, 10: AT 2, 10: PRINT PAPER 15; AT 10, 10:
3722 AT 1, 10: AT 3, 10: PRINT PAPER 16; AT 10, 10:
3721 AT 1, 11: AT 2, 11: PRINT PAPER 17; AT 11, 11:
3720 AT 1, 11: AT 3, 11: PRINT PAPER 18; AT 11, 11:
3719 AT 1, 12: AT 2, 12: PRINT PAPER 19; AT 12, 12:
3718 AT 1, 12: AT 3, 12: PRINT PAPER 20; AT 12, 12:
3717 AT 1, 13: AT 2, 13: PRINT PAPER 21; AT 13, 13:
3716 AT 1, 13: AT 3, 13: PRINT PAPER 22; AT 13, 13:
3715 AT 1, 14: AT 2, 14: PRINT PAPER 23; AT 14, 14:
3714 AT 1, 14: AT 3, 14: PRINT PAPER 24; AT 14, 14:
3713 AT 1, 15: AT 2, 15: PRINT PAPER 25; AT 15, 15:
3712 AT 1, 15: AT 3, 15: PRINT PAPER 26; AT 15, 15:
3711 AT 1, 16: AT 2, 16: PRINT PAPER 27; AT 16, 16:
3710 AT 1, 16: AT 3, 16: PRINT PAPER 28; AT 16, 16:
3709 AT 1, 17: AT 2, 17: PRINT PAPER 29; AT 17, 17:
3708 AT 1, 17: AT 3, 17: PRINT PAPER 30; AT 17, 17:
3707 AT 1, 18: AT 2, 18: PRINT PAPER 31; AT 18, 18:
3706 AT 1, 18: AT 3, 18: PRINT PAPER 32; AT 18, 18:
3705 AT 1, 19: AT 2, 19: PRINT PAPER 33; AT 19, 19:
3704 AT 1, 19: AT 3, 19: PRINT PAPER 34; AT 19, 19:
3703 AT 1, 20: AT 2, 20: PRINT PAPER 35; AT 20, 20:
3702 AT 1, 20: AT 3, 20: PRINT PAPER 36; AT 20, 20:
3701 AT 1, 21: AT 2, 21: PRINT PAPER 37; AT 21, 21:
3700 AT 1, 21: AT 3, 21: PRINT PAPER 38; AT 21, 21:
3699 AT 1, 22: AT 2, 22: PRINT PAPER 39; AT 22, 22:
3698 AT 1, 22: AT 3, 22: PRINT PAPER 40; AT 22, 22:
3697 AT 1, 23: AT 2, 23: PRINT PAPER 41; AT 23, 23:
3696 AT 1, 23: AT 3, 23: PRINT PAPER 42; AT 23, 23:
3695 AT 1, 24: AT 2, 24: PRINT PAPER 43; AT 24, 24:
3694 AT 1, 24: AT 3, 24: PRINT PAPER 44; AT 24, 24:
3693 AT 1, 25: AT 2, 25: PRINT PAPER 45; AT 25, 25:
3692 AT 1, 25: AT 3, 25: PRINT PAPER 46; AT 25, 25:
3691 AT 1, 26: AT 2, 26: PRINT PAPER 47; AT 26, 26:
3690 AT 1, 26: AT 3, 26: PRINT PAPER 48; AT 26, 26:
3689 AT 1, 27: AT 2, 27: PRINT PAPER 49; AT 27, 27:
3688 AT 1, 27: AT 3, 27: PRINT PAPER 50; AT 27, 27:
3687 AT 1, 28: AT 2, 28: PRINT PAPER 51; AT 28, 28:
3686 AT 1, 28: AT 3, 28: PRINT PAPER 52; AT 28, 28:
3685 AT 1, 29: AT 2, 29: PRINT PAPER 53; AT 29, 29:
3684 AT 1, 29: AT 3, 29: PRINT PAPER 54; AT 29, 29:
3683 AT 1, 30: AT 2, 30: PRINT PAPER 55; AT 30, 30:
3682 AT 1, 30: AT 3, 30: PRINT PAPER 56; AT 30, 30:
3681 AT 1, 31: AT 2, 31: PRINT PAPER 57; AT 31, 31:
3680 AT 1, 31: AT 3, 31: PRINT PAPER 58; AT 31, 31:
3679 AT 1, 32: AT 2, 32: PRINT PAPER 59; AT 32, 32:
3678 AT 1, 32: AT 3, 32: PRINT PAPER 60; AT 32, 32:
3677 AT 1, 33: AT 2, 33: PRINT PAPER 61; AT 33, 33:
3676 AT 1, 33: AT 3, 33: PRINT PAPER 62; AT 33, 33:
3675 AT 1, 34: AT 2, 34: PRINT PAPER 63; AT 34, 34:
3674 AT 1, 34: AT 3, 34: PRINT PAPER 64; AT 34, 34:
3673 AT 1, 35: AT 2, 35: PRINT PAPER 65; AT 35, 35:
3672 AT 1, 35: AT 3, 35: PRINT PAPER 66; AT 35, 35:
3671 AT 1, 36: AT 2, 36: PRINT PAPER 67; AT 36, 36:
3670 AT 1, 36: AT 3, 36: PRINT PAPER 68; AT 36, 36:
3669 AT 1, 37: AT 2, 37: PRINT PAPER 69; AT 37, 37:
3668 AT 1, 37: AT 3, 37: PRINT PAPER 70; AT 37, 37:
3667 AT 1, 38: AT 2, 38: PRINT PAPER 71; AT 38, 38:
3666 AT 1, 38: AT 3, 38: PRINT PAPER 72; AT 38, 38:
3665 AT 1, 39: AT 2, 39: PRINT PAPER 73; AT 39, 39:
3664 AT 1, 39: AT 3, 39: PRINT PAPER 74; AT 39, 39:
3663 AT 1, 40: AT 2, 40: PRINT PAPER 75; AT 40, 40:
3662 AT 1, 40: AT 3, 40: PRINT PAPER 76; AT 40, 40:
3661 AT 1, 41: AT 2, 41: PRINT PAPER 77; AT 41, 41:
3660 AT 1, 41: AT 3, 41: PRINT PAPER 78; AT 41, 41:
3659 AT 1, 42: AT 2, 42: PRINT PAPER 79; AT 42, 42:
3658 AT 1, 42: AT 3, 42: PRINT PAPER 80; AT 42, 42:
3657 AT 1, 43: AT 2, 43: PRINT PAPER 81; AT 43, 43:
3656 AT 1, 43: AT 3, 43: PRINT PAPER 82; AT 43, 43:
3655 AT 1, 44: AT 2, 44: PRINT PAPER 83; AT 44, 44:
3654 AT 1, 44: AT 3, 44: PRINT PAPER 84; AT 44, 44:
3653 AT 1, 45: AT 2, 45: PRINT PAPER 85; AT 45, 45:
3652 AT 1, 45: AT 3, 45: PRINT PAPER 86; AT 45, 45:
3651 AT 1, 46: AT 2, 46: PRINT PAPER 87; AT 46, 46:
3650 AT 1, 46: AT 3, 46: PRINT PAPER 88; AT 46, 46:
3649 AT 1, 47: AT 2, 47: PRINT PAPER 89; AT 47, 47:
3648 AT 1, 47: AT 3, 47: PRINT PAPER 90; AT 47, 47:
3647 AT 1, 48: AT 2, 48: PRINT PAPER 91; AT 48, 48:
3646 AT 1, 48: AT 3, 48: PRINT PAPER 92; AT 48, 48:
3645 AT 1, 49: AT 2, 49: PRINT PAPER 93; AT 49, 49:
3644 AT 1, 49: AT 3, 49: PRINT PAPER 94; AT 49, 49:
3643 AT 1, 50: AT 2, 50: PRINT PAPER 95; AT 50, 50:
3642 AT 1, 50: AT 3, 50: PRINT PAPER 96; AT 50, 50:
3641 AT 1, 51: AT 2, 51: PRINT PAPER 97; AT 51, 51:
3640 AT 1, 51: AT 3, 51: PRINT PAPER 98; AT 51, 51:
3639 AT 1, 52: AT 2, 52: PRINT PAPER 99; AT 52, 52:
3638 AT 1, 52: AT 3, 52: PRINT PAPER 100; AT 52, 52:
3637 AT 1, 53: AT 2, 53: PRINT PAPER 101; AT 53, 53:
3636 AT 1, 53: AT 3, 53: PRINT PAPER 102; AT 53, 53:
3635 AT 1, 54: AT 2, 54: PRINT PAPER 103; AT 54, 54:
3634 AT 1, 54: AT 3, 54: PRINT PAPER 104; AT 54, 54:
3633 AT 1, 55: AT 2, 55: PRINT PAPER 105; AT 55, 55:
3632 AT 1, 55: AT 3, 55: PRINT PAPER 106; AT 55, 55:
3631 AT 1, 56: AT 2, 56: PRINT PAPER 107; AT 56, 56:
3630 AT 1, 56: AT 3, 56: PRINT PAPER 108; AT 56, 56:
3629 AT 1, 57: AT 2, 57: PRINT PAPER 109; AT 57, 57:
3628 AT 1, 57: AT 3, 57: PRINT PAPER 110; AT 57, 57:
3627 AT
```

```

0950 DATA 60,126,255,255,255,255,255
0960
0970
0980 LET I:=10: LET I:=11
0990 LET I:=13: LET I:=11
1000
1010 BORDER 2: PAPER 5: BRIGHT 1
1020
1030 PRINT PAPER 0; AT I, 2: " "
1040 PRINT PAPER 0; AT I, 3: " "
1050 PRINT PAPER 0; AT I, 4: " "
1060 PRINT PAPER 0; AT I, 5: " "
1070 PRINT PAPER 0; AT I, 6: " "
1080 PRINT PAPER 0; AT I, 7: " "
1090 PRINT PAPER 0; AT I, 8: " "
1100
1110 FOR n=1 TO 8
1120   IF I=13 THEN GOTO 1150
1130   AT n+13, 0; AT n, 0; "AT n+13,
1140   "AT n, 13;"
1150   GOTO 1120
1160 NEXT n
1170 LET n=0: LET gr=0
1180 RETURN
1190
1200 REM *****
1210
1220 BORDER 1: PAPER 1: INK 0:
1230
1240 PRINT PAPER 5; BRIGHT 1; AT
1250 12, PLING
1260
1270 PRINT AT 4,0: "This is P
1280 5; AT 10,0: "Let's p
1290 5; AT 12,10: "I've
1300 5; AT 14,10: "I've
1310 5; AT 16,10: "I've
1320 5; AT 18,10: "I've
1330 5; AT 20,10: "I've
1340 5; AT 22,10: "I've
1350 5; AT 24,10: "I've
1360 5; AT 26,10: "I've
1370 5; AT 28,10: "I've
1380 5; AT 30,10: "I've
1390 5; AT 32,10: "I've
1400 5; AT 34,10: "I've
1410 5; AT 36,10: "I've
1420 5; AT 38,10: "I've
1430 5; AT 40,10: "I've
1440 5; AT 42,10: "I've
1450 5; AT 44,10: "I've
1460 5; AT 46,10: "I've
1470 5; AT 48,10: "I've
1480 5; AT 50,10: "I've
1490 5; AT 52,10: "I've
1500 5; AT 54,10: "I've
1510 5; AT 56,10: "I've
1520 5; AT 58,10: "I've
1530 5; AT 60,10: "I've
1540 5; AT 62,10: "I've
1550 5; AT 64,10: "I've
1560 5; AT 66,10: "I've
1570 5; AT 68,10: "I've
1580 5; AT 70,10: "I've
1590 5; AT 72,10: "I've
1600 5; AT 74,10: "I've
1610 5; AT 76,10: "I've
1620 5; AT 78,10: "I've
1630 5; AT 80,10: "I've
1640 5; AT 82,10: "I've
1650 5; AT 84,10: "I've
1660 5; AT 86,10: "I've
1670 5; AT 88,10: "I've
1680 5; AT 90,10: "I've
1690 5; AT 92,10: "I've
1700 5; AT 94,10: "I've
1710 5; AT 96,10: "I've
1720 5; AT 98,10: "I've
1730 5; AT 100,10: "I've
1740 5; AT 102,10: "I've
1750 5; AT 104,10: "I've
1760 5; AT 106,10: "I've
1770 5; AT 108,10: "I've
1780 5; AT 110,10: "I've
1790 5; AT 112,10: "I've
1800 5; AT 114,10: "I've
1810 5; AT 116,10: "I've
1820 5; AT 118,10: "I've
1830 5; AT 120,10: "I've
1840 5; AT 122,10: "I've
1850 5; AT 124,10: "I've
1860 5; AT 126,10: "I've
1870 5; AT 128,10: "I've
1880 5; AT 130,10: "I've
1890 5; AT 132,10: "I've
1900 5; AT 134,10: "I've
1910 5; AT 136,10: "I've
1920 5; AT 138,10: "I've
1930 5; AT 140,10: "I've
1940 5; AT 142,10: "I've
1950 5; AT 144,10: "I've
1960 5; AT 146,10: "I've
1970 5; AT 148,10: "I've
1980 5; AT 150,10: "I've
1990 5; AT 152,10: "I've
2000 5; AT 154,10: "I've
2010 5; AT 156,10: "I've
2020 5; AT 158,10: "I've
2030 5; AT 160,10: "I've
2040 5; AT 162,10: "I've
2050 5; AT 164,10: "I've
2060 5; AT 166,10: "I've
2070 5; AT 168,10: "I've
2080 5; AT 170,10: "I've
2090 5; AT 172,10: "I've
2100 5; AT 174,10: "I've
2110 5; AT 176,10: "I've
2120 5; AT 178,10: "I've
2130 5; AT 180,10: "I've
2140 5; AT 182,10: "I've
2150 5; AT 184,10: "I've
2160 5; AT 186,10: "I've
2170 5; AT 188,10: "I've
2180 5; AT 190,10: "I've
2190 5; AT 192,10: "I've
2200 5; AT 194,10: "I've
2210 5; AT 196,10: "I've
2220 5; AT 198,10: "I've
2230 5; AT 200,10: "I've
2240 5; AT 202,10: "I've
2250 5; AT 204,10: "I've
2260 5; AT 206,10: "I've
2270 5; AT 208,10: "I've
2280 5; AT 210,10: "I've
2290 5; AT 212,10: "I've
2300 5; AT 214,10: "I've
2310 5; AT 216,10: "I've
2320 5; AT 218,10: "I've
2330 5; AT 220,10: "I've
2340 5; AT 222,10: "I've
2350 5; AT 224,10: "I've
2360 5; AT 226,10: "I've
2370 5; AT 228,10: "I've
2380 5; AT 230,10: "I've
2390 5; AT 232,10: "I've
2400 5; AT 234,10: "I've
2410 5; AT 236,10: "I've
2420 5; AT 238,10: "I've
2430 5; AT 240,10: "I've
2440 5; AT 242,10: "I've
2450 5; AT 244,10: "I've
2460 5; AT 246,10: "I've
2470 5; AT 248,10: "I've
2480 5; AT 250,10: "I've
2490 5; AT 252,10: "I've
2500 5; AT 254,10: "I've
2510 5; AT 256,10: "I've
2520 5; AT 258,10: "I've
2530 5; AT 260,10: "I've
2540 5; AT 262,10: "I've
2550 5; AT 264,10: "I've
2560 5; AT 266,10: "I've
2570 5; AT 268,10: "I've
2580 5; AT 270,10: "I've
2590 5; AT 272,10: "I've
2600 5; AT 274,10: "I've
2610 5; AT 276,10: "I've
2620 5; AT 278,10: "I've
2630 5; AT 280,10: "I've
2640 5; AT 282,10: "I've
2650 5; AT 284,10: "I've
2660 5; AT 286,10: "I've
2670 5; AT 288,10: "I've
2680 5; AT 290,10: "I've
2690 5; AT 292,10: "I've
2700 5; AT 294,10: "I've
2710 5; AT 296,10: "I've
2720 5; AT 298,10: "I've
2730 5; AT 300,10: "I've
2740 5; AT 302,10: "I've
2750 5; AT 304,10: "I've
2760 5; AT 306,10: "I've
2770 5; AT 308,10: "I've
2780 5; AT 310,10: "I've
2790 5; AT 312,10: "I've
2800 5; AT 314,10: "I've
2810 5; AT 316,10: "I've
2820 5; AT 318,10: "I've
2830 5; AT 320,10: "I've
2840 5; AT 322,10: "I've
2850 5; AT 324,10: "I've
2860 5; AT 326,10: "I've
2870 5; AT 328,10: "I've
2880 5; AT 330,10: "I've
2890 5; AT 332,10: "I've
2900 5; AT 334,10: "I've
2910 5; AT 336,10: "I've
2920 5; AT 338,10: "I've
2930 5; AT 340,10: "I've
2940 5; AT 342,10: "I've
2950 5; AT 344,10: "I've
2960 5; AT 346,10: "I've
2970 5; AT 348,10: "I've
2980 5; AT 350,10: "I've
2990 5; AT 352,10: "I've
3000 5; AT 354,10: "I've
3010 5; AT 356,10: "I've
3020 5; AT 358,10: "I've
3030 5; AT 360,10: "I've
3040 5; AT 362,10: "I've
3050 5; AT 364,10: "I've
3060 5; AT 366,10: "I've
3070 5; AT 368,10: "I've
3080 5; AT 370,10: "I've
3090 5; AT 372,10: "I've
3100 5; AT 374,10: "I've
3110 5; AT 376,10: "I've
3120 5; AT 378,1
```



HAZARD is a game of the surround type, in which two players take turns in steering their way among scattered obstacles in an attempt to corner an opponent. The game is very well laid out, full instructions being given to players and successive turns being indicated by a flashing of the PLOT position. Moves are entered with keys 5 to 8.

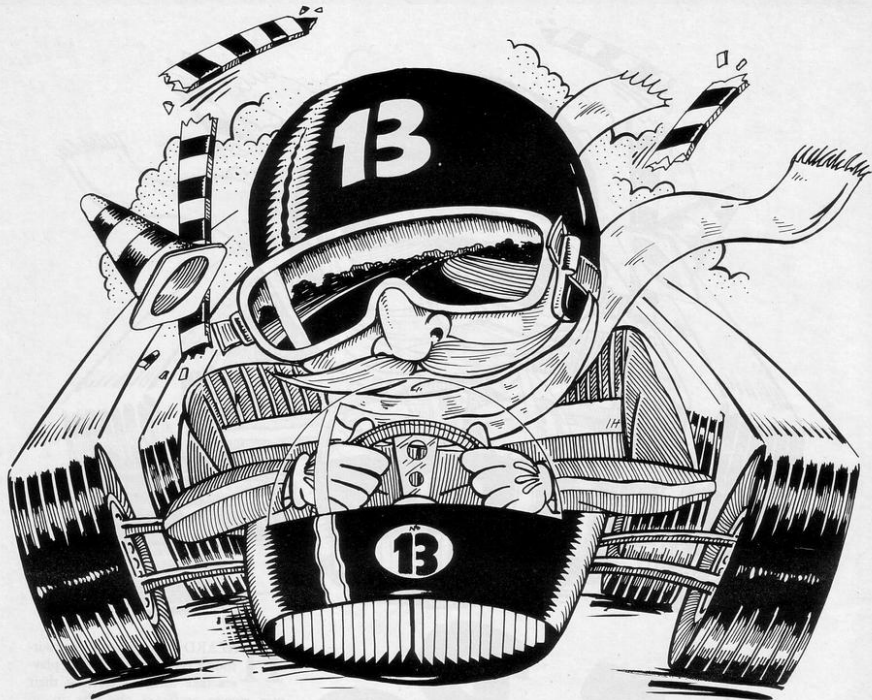
This diverting routine was sent by J Tempton of Market Weighton, Yorkshire. In our listing, lower-case letters indicate inverse video except when appearing in brackets, when they are graphics instructions. (16K ZX-81).

```
27 PRINT "YOU ARE BOTH CARRYI
NG FRAGILE EXPLOSIVES, ANY CONT
ACT WITH ANYBLOCK AND YOU'RE DEAD
YOU MUST STALK EACH OTHER UNT
ILL YOU CAN APPLY THE EXPLOSIVES
TO YOUR OPPONENT SAFELY.
          TO HELP CORNER THE
ENEMY YOU LAY BLOCKS ALSO."
28 PRINT "PLAYERS TAKE TURNS,
WITH FIVE BLOCKS A GO."
30 PRINT
32 PRINT "THE NORMAL KEYS (5
TO 8) ARE USED FOR CONTROL OF
YOUR VEHICLE
          PRESS "NEW LINE"
TO START."
```

```
34 INPUT A#
35 LET W=0
37 LET U=0
38 LET J=0
40 LET Z=0
45 FAST
```

```
50 CLS
51 DIM A(34,38)
52 FOR N=0 TO 80
53 LET A=INT (RND*34)+1
55 LET B=INT (RND*38)+1
60 LET A(A,B)=1
62 PLOT A+13,B+1
65 NEXT N
67 SLOW
70 LET Z=Z+1
72 LET S=0
73 LET Y=(Z/2)-INT (Z/2)
75 PRINT AT 0,0;" *1*      BE
CAREFULL *2*"
77 PRINT
78 PRINT "BLOCKS";TAB 26;"BLOC
KS"
80 PRINT "LEFT";TAB 26;"LEFT"
82 PRINT "R";TAB 26;"R"
86 PRINT AT 20,0;"GAMES"
89 PRINT AT 20,26;"GAMES"
90 FOR N=2 TO 20
```

```
92 PRINT AT 1,N+4;"(Graphic H)
"JAT 21,N+4;"(Graphic H)"
94 PRINT AT N,5;"(Graphic H)";
AT N,24;"(Graphic H)"
96 NEXT N
98 PRINT AT 21,2;U;AT 21,28;U
102 LET A=14
104 LET B=21
106 LET C=47
108 LET D=21
112 IF Y<0 THEN GOTO 600
115 LET H=5
117 PLOT A,B
118 PRINT AT 4,27;H
119 IF INKEY$<>" " THEN GOTO 119
120 PLOT C,D
125 IF INKEY$="5" AND C<>14 THE
N GOTO 318
135 IF INKEY$="7" AND D<>39 THE
N GOTO 330
145 IF INKEY$="6" AND D<>2 THEN
GOTO 350
```



```

155 IF INKEY$="B" AND C<47 THE
N GOTO 370
160 UNPLOT C,D
230 LET A=C-13,D-1)=1
235 IF H=0 THEN GOTO 600
240 GOTO 120
300 LET A=A-1
305 GOTO 400
310 LET C=C-1
315 GOTO 410
320 LET B=B-1
325 GOTO 400
330 LET D=D-1
335 GOTO 410
340 LET B=B-1
345 GOTO 400
350 LET D=D-1
355 GOTO 410
360 LET A=A-1
365 GOTO 400
370 LET C=C-1
375 GOTO 410
400 IF A=C AND B=D THEN GOTO 75
0
401 IF A=13,B-1)=1 THEN GOTO
500
402 LET G=G-1
403 PRINT AT 4,1;G," "
406 GOTO 650
410 IF C=A AND D=B THEN GOTO 70
0
413 IF A=C-13,D-1)=1 THEN GOTO
440
415 LET H=H-1
417 PRINT AT 4,2;H," "
430 GOTO 200
440 LET R=RABS (C-30)
442 LET T=RABS (D-18)
444 IF R>T THEN GOTO 448
446 LET P=T
447 GOTO 449

```

```

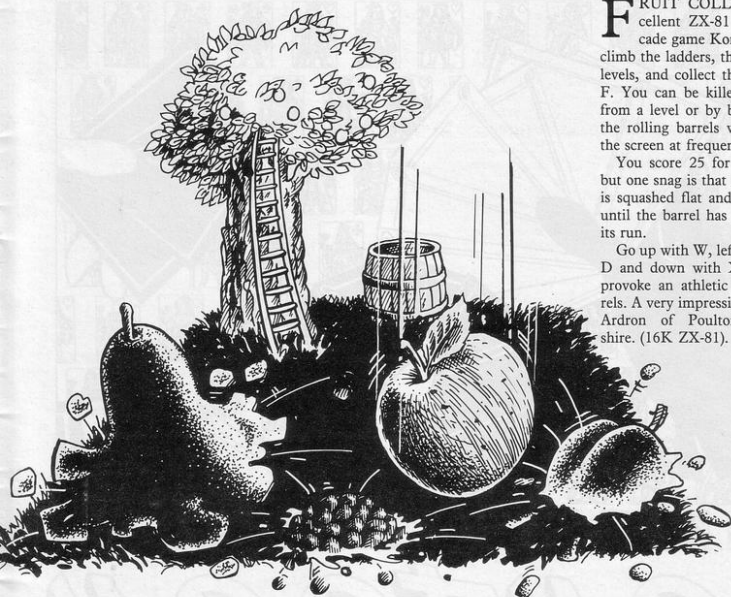
448 LET P=P-2
449 IF P>14 THEN LET P=14
450 FOR M=1 TO 16-P
452 PLOT C,D+M
453 PLOT C,D-M
454 PLOT C+M,D
455 PLOT C-M,D
456 PLOT C+M,D+M
457 PLOT C-M,D+M
458 PLOT C+M,D-M
459 PLOT C-M,D-M
460 UNPLOT C,D+M
461 UNPLOT C,D-M
462 UNPLOT C+M,D
463 UNPLOT C-M,D
464 UNPLOT C+M,D+M
465 UNPLOT C-M,D+M
466 UNPLOT C+M,D-M
467 UNPLOT C-M,D-M
470 NEXT M
473 IF S=3 THEN GOTO 760
474 IF S=2 THEN GOTO 705
475 IF S=1 THEN GOTO 530
476 LET J=157
477 LET W=W+1
480 PRINT AT 1,6;"Player 2 cr
ashed"
482 PRINT AT 21,2;W;"  game
to player";CHR$(J); "  ";J
484 LET C=STR$(W+U)
486 PRINT AT 21,1;CHR$(VAL C#
(1)+156)
488 IF (U+W)>9 THEN PRINT AT 21
,12;CHR$(VAL C#(2)+156)
490 PRINT AT 0,4;"PRESS "G" F
OR NEXT GAME"
492 IF INKEY$="G" THEN GOTO 45
495 PRINT AT 0,4;"
"
498 GOTO 486
500 LET C=A

```

```

505 LET D=B
508 LET U=U+1
510 LET S=1
515 LET J=159
520 GOTO 440
530 PRINT AT 1,6;"Player 1 cr
ashed"
535 GOTO 482
600 LET G=5
602 PLOT C,D
603 PRINT AT 4,1;G
604 IF INKEY$<>" " THEN GOTO 600
605 PLOT A,B
607 IF INKEY$="5" AND A<14 THE
N GOTO 300
610 IF INKEY$="7" AND B<39 THE
N GOTO 320
615 IF INKEY$="6" AND B<2 THEN
GOTO 340
620 IF INKEY$="8" AND A<47 THE
N GOTO 360
630 UNPLOT A,B
650 LET A=13,B-1)=1
660 IF G=0 THEN GOTO 115
680 GOTO 605
700 LET S=2
702 GOTO 440
703 GOTO 440
705 LET U=U+1
710 LET J=159
713 PRINT AT 1,6;" mission o
ver"
715 GOTO 482
750 LET S=3
755 GOTO 440
760 LET W=W+1
765 LET J=157
770 PRINT AT 1,6;" mission o
ver"
775 GOTO 482

```



FRUIT COLLECTOR

FRUIT COLLECTOR is an excellent ZX-81 version of the arcade game Kong. The object is to climb the ladders, through the different levels, and collect the fruit—an inverse F. You can be killed either by falling from a level or by being hit by one of the rolling barrels which career across the screen at frequent intervals.

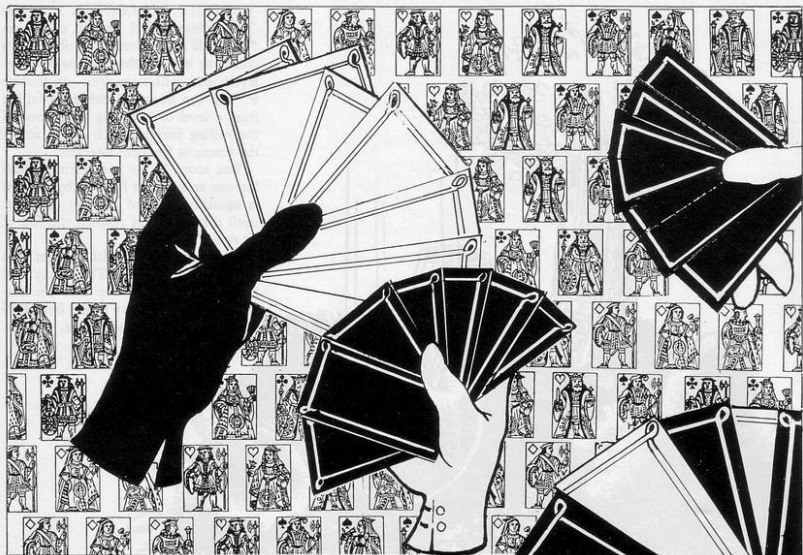
You score 25 for every fruit picked but one snag is that fruit hit by a barrel is squashed flat and will not re-appear until the barrel has reached the end of its run.

Go up with W, left with A, right with D and down with X. The E key will provoke an athletic leap over the barrels. A very impressive listing from R N Ardron of Poulton-le-Fylde, Lancashire. (16K ZX-81).

```

10 LET S=0
30 LET A=19
40 LET B=10
45 LET E=INT (RND*22)+2
46 CLS
50 LET D=INT (RND*4)
51 IF D=0 THEN LET F=10
52 IF D=1 THEN LET F=13
53 IF D=2 THEN LET F=16
54 IF D=3 THEN LET F=19
56 PRINT AT F,E;"(inverse F)"
70 PRINT AT 11,2;"(24*graphic
A)"
72 PRINT AT 14,2;"(5*graphic A
,SPACE,15*graphic A)"
74 PRINT AT 17,2;"(15*graphic
A,SPACE,7*graphic A)"
76 PRINT AT 11,2;"(24*graphic
A)"
78 FOR C=25 TO 1 STEP -1
90 PRINT AT 12,13;"H"
95 PRINT AT 13,13;"H"
100 IF A=F AND E=B THEN GOTO 50
99
110 PRINT AT 15,7;"H"
120 PRINT AT 16,7;"H"
140 PRINT AT 18,18;"H"
150 PRINT AT 19,18;"H"
160 PRINT AT A,B;"X"
200 PRINT AT 16,C;"O "
201 IF C=B THEN GOTO 4000
202 IF C=2 THEN GOTO 4400
203 IF INKEY$="E" THEN GOSUB 20
25
204 PRINT AT 19,C;"O "
205 PRINT AT 10,C;"O "
206 PRINT AT 13,C;"O "
210 IF INKEY$="W" THEN GOSUB 10
00
220 IF INKEY$="D" THEN GOSUB 10
20
230 IF INKEY$="A" THEN GOSUB 10
40
240 IF INKEY$="X" THEN GOSUB 10
80
290 NEXT C
300 GOTO 80
1000 IF A=19 AND B<>10 THEN RETU
RN
1001 IF A=16 AND B<>7 THEN RETUR
N
1002 IF A=13 AND B<>13 THEN RETU
RN
1010 PRINT AT A,B;" "
1012 LET A=A-1
1019 RETURN
1020 IF B=25 THEN GOTO 2000
1030 PRINT AT A,B;" "
1031 LET B=B+1
1032 IF B=C THEN GOTO 4020
1039 RETURN
1040 IF B=2 THEN GOTO 2000
1050 PRINT AT A,B;" "
1051 LET B=B-1
1059 RETURN
1060 IF A=10 AND B<>13 THEN RETU
RN
1001 IF A=13 AND B<>7 THEN RETUR
N
1002 IF A=16 AND B<>10 THEN RETU
RN
1003 IF A=19 THEN RETURN
1090 PRINT AT A,B;" "
1091 LET A=A+1
1100 RETURN
2000 PRINT "FELL OFF EDGE"
2010 PRINT AT 0,0;"SCORE=";S
2020 GOTO 4020
2025 PRINT AT A,B;" "
2030 LET A=A-1
2035 LET B=B+1
2040 PRINT AT A,B;"X"
2050 PRINT AT A,B;" "
2060 LET B=B+1
2070 PRINT AT A,B;"X"
2080 PRINT AT A,B;" "
2090 LET A=A+1
2095 LET B=B+1
2100 PRINT AT A,B;"X"
2110 PRINT AT A,B;" "
2120 RETURN
4010 PRINT "HIT BY A BARREL"
4015 PRINT AT 0,0;"SCORE=";S
4020 PRINT "ANOTHER GAME?Y/N)"
4030 INPUT A$
4040 IF A$="Y" THEN GOTO 1
4050 IF A$="N" THEN STOP
4060 GOTO 4030
4450 GOTO 50
5000 LET S=S+50
5010 GOTO 45

```



PONTOON

80

PONTOON

```

1 LET C=0
10 PRINT "HOW MANY
  PLAYERS?"
20 INPUT A
30 DIM F(A)
40 LET B=RND(11)
50 LET C=C+B
60 IF C>21 THEN GOTO 80
70 GOTO 40
80 LET C=C-B
90 FOR D=1 TO A
95 CLS
100 PRINT "YOUR TURN
  PLAYER"; D
105 PRINT
110 IF F(D-1)>21 THEN PRINT
  "PLAYER"; D-1; " BUST"
115 LET E = RND(10)
120 IF E=1 THEN GOSUB 260
125 LET F(D)=F(D) + E
130 PRINT
135 PRINT "(3×gW)"
140 PRINT
145 PRINT F(D)
150 PRINT "(3×gW)"
155 PRINT
160 IF F(D)>21 THEN GOTO 185

```

WE ARE becoming short of ZX-80 programs. Are all you oldie owners running out of steam?

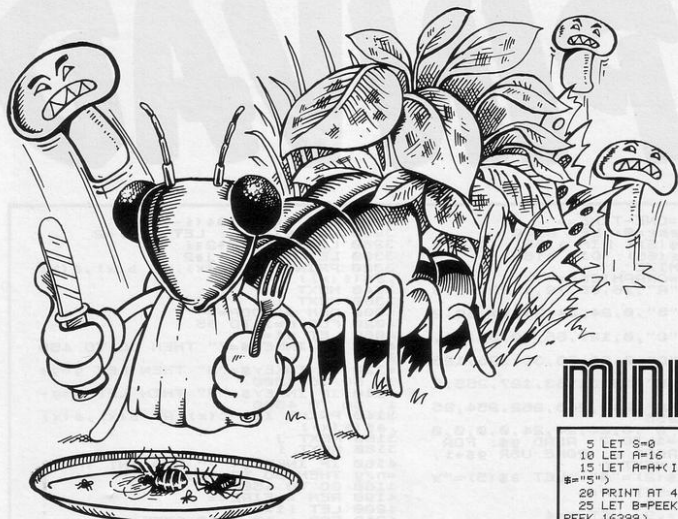
Pontoon 80 does what you would expect, enabling you to play the computer and other humans. Lines 40 to 80 determine the computer score and are arranged so that it cannot bust; perhaps readers might be able to find a more equitable method?

The routine is very straightforward, each player being supplied with prompts and the computer score being revealed at the end of the game. G Gill of Westerham, Kent wrote the listing. (1K ZX-80).

```

165 PRINT "ANOTHER CARD?
  (Y OR N)"
170 INPUT G$
175 CLS
180 IF G$="Y" THEN GOTO 115
185 NEXT D
190 CLS
200 FOR D=1 TO A
201 IF F(D)>21 THEN PRINT
  "PLAYER"; D; "BUST"
205 IF F(D)<22 THEN PRINT
  "PLAYER"; D; "SCORED";
  F(D)
210 PRINT
215 NEXT D
220 PRINT "I'VE GOT"; C
225 PRINT
230 PRINT "ANOTHER GAME?
  (Y OR N)"
235 INPUT H$
240 CLS
245 IF H$="Y" THEN RUN
250 STOP
260 PRINT "ACE-1 or 11?"
265 INPUT X
270 LET E=X
275 RETURN

```



MINIPEDE

```

5 LET S=0
10 LET A=16
15 LET A=A+(INKEY$="0")-(INKEY$="5")
20 PRINT AT 4,A:
25 LET B=PEEK (PEEK 16398+256*PEEK 16399)
30 LET S=S+(1 AND B=60)+(5 AND B=23)
35 IF B=57 THEN GOTO 100
40 PRINT "(inverse quotation mark";AT 11,RND*27;"*";AT 11,RND*27;"W";AT 11,RND*27;"W";AT 11,RND*27;"TTTTT"
45 SCROLL
50 GOTO 15
100 PRINT AT 4,A;"(Graphic A)";AT 10,0:S

```

MINIPEDE is a quick and easy program for the 1K ZX-81. You are the multi-legged insect creeping through the undergrowth, munching the flavoursome flies (W), crunching the savoury spiders (asterisks) and avoiding the murderous mushrooms (T).

Score one point for the flies and five for the spiders. Squirm left with the 5, turn right with the 8, and your score will be displayed when you die.

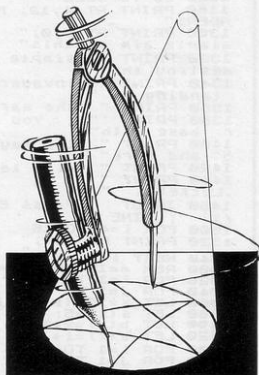
G Creasy of Ashford, Kent, who wrote the program, reports a personal best of 152.

STAR

YOU KNOW the intervals in the cinema when they sell ice-cream? You know when you walk into a lamp-post? You know those moments for which Channel 4 cannot find advertisements? This program for the 16K Spectrum makes patterns like that.

As a demonstration of the Spectrum high-resolution graphics, **Star** is very impressive, producing multi-faceted

polygons to order by means of the mathematics in lines 70 to 190. The program proceeds by dividing a circle into n parts to obtain the angle at the centre, finding the co-ordinates of those n points—where s is the radius and cx,cy the centre of the circle—and then drawing a line from every point to every other point. The listing was submitted by L J Wilkinson of Stockton-on-Tees.



```

2 CLS : PRINT AT 10,0; FLASH
1; "STOP THE TAPE "
4 PAUSE 300: CLS
5 BORDER 4: INK 1: PAPER 0
6 PRINT AT 4,0;"THIS PROGRAM
8 draws regular";n-sided figur
25
20 PRINT AT 7,0;"To stop the p
icture at any time press a key
, Pressing another key will begi
n the drawing again"
26 PRINT AT 10,0; FLASH 1;"TO
CONTINUE press any key"
27 PAUSE 0
30 CLS
40 INPUT "Type in how many poi
nts you want the star to have - th
en press the enter key";n
45 IF n<3 THEN CLS : GO TO 40
50 DIM X(n): DIM Y(n)
55 PRINT AT 0,0;n;"- sided fig
ure"

```

```

70 LET a=2*PI/n
80 LET cx=120: LET cy=90: LET
s=70
100 FOR i=1 TO n
110 LET t=a*(i-1)
120 LET X(i)=cx+s*cos t
130 LET Y(i)=cy+s*sin t
140 NEXT i
150 FOR j=1 TO n-1
170 FOR k=j+1 TO n
175 PLOT X(j),Y(j),X(k),Y(k)
180 DRAW X(j),Y(j),X(k),Y(k)
185 PAUSE 0
190 INKEY$="" THEN PAUSE 0
195 NEXT j: NEXT k
200 PRINT AT 20,0;"press x to e
xit, otherwise press any key"
205 IF INKEY$="" THEN GO TO 205
210 IF INKEY$="x" THEN CLS : PR
INT AT 10,10; FLASH 1;"** BYE **
215 STOP
220 GO TO 30

```

SPINVAD

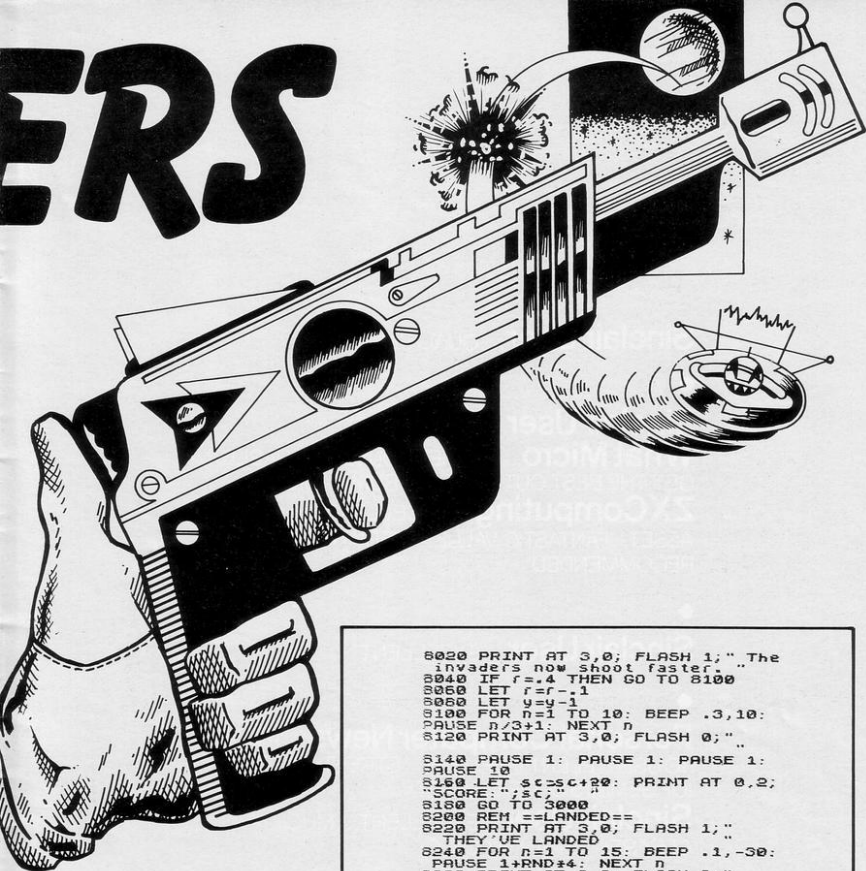
```

100 REM ==ONE-TIME==
120 LET game=0: LET hs=0
140 DIM a$(5): DIM a(65): DIM b
(65): DIM s(65): DIM c(65)
160 RANDOMIZE
500 REM ==GRAPHICS==
510 DATA "A",16,66,72,1,20,68,8
534
520 DATA "B",0,24,24,24,24,60,2
55,255
530 DATA "C",0,129,66,60,36,24,
36,0
540 DATA "D",0,36,60,36,126,126
,90,0
550 DATA "E",15,31,63,127,255,2
55,255
560 DATA "F",240,246,252,254,25
5,255,255,255
570 DATA "G",0,24,24,24,0,0,0
600 FOR n=1 TO 7: READ g$: FOR
i=0 TO 7: READ a: POKE USR g$+i,
a: NEXT i: NEXT n
620 LET a$(2)="A": LET a$(5)="X"
700 REM ==SET-UP==
720 LET sc=0
740 LET r=.9: LET y=4
760 LET f=.0: LET g=15
800 BORDER 0: CLS
820 PRINT AT 16,0;"
840 PRINT AT 17,0;"
860 PRINT AT 18,0;"
880 PRINT AT 20,9;"i"
900 PRINT AT 0,2;"Score:";sc
910 PRINT AT 0,23;"INK 1:";w;"I
NK 2:";s;"INK 2:";m;"INK 0:";
3"
920 IF game<0 THEN GO TO 3000
980 REM ==INTRO==
1000 FOR j=1 TO 3: FOR n=30 TO 5
0: BEEP 0; NEXT n: NEXT j
1020 PRINT AT 10,3; FLASH 1;"Do
you want instructions?"
1040 IF INKEY$="" THEN GO TO 104
2
1060 PRINT AT 10,0;"
1080 IF INKEY$="y" OR INKEY$="Y"
THEN GO TO 1140
1100 IF INKEY$="n" OR INKEY$="N"
THEN GO TO 3000
1120 GO TO 1020
1160 PRINT AT 4,12; FLASH 1;"INV
ADERS"
1300 PRINT AT 6,0;" The very
simple aim of this"
1320 PRINT " simple game is to
destroy the"
1340 PRINT " invaders that are
landing on"
1360 PRINT " the earth."
1380 PRINT " You control you
r base with"
1400 PRINT " the keys 'S' and '
S' and fire"
1420 PRINT " with key '7'." @ R
1440 PRINT " .Lockett."
1460 INPUT " Press ENTER to sta
rt: "; LINE x$
1500 FOR i=4 TO 15
1520 PRINT AT i,0;"
1540 NEXT i
3000 REM ==INVADERS==
3020 FOR i=1 TO 3
3040 FOR j=1 TO 13
3060 LET x=13*(i-1)+j
3080 LET s(x)=5: LET c(x)=1
3100 LET b(x)=2+2*j
3120 LET a(x)=1+j*2
3200 FOR i=1 TO 3
3220 FOR j=1 TO 13
3240 LET x=25+13*(i-1)+j
3260 LET s(x)=2: LET c(x)=2
3280 LET b(x)=6+2*j
3300 LET a(x)=1+j*2
3320 PRINT INK c(x);AT b(x),a(x)
;a$(x)
3340 NEXT j
3360 NEXT i
4000 REM ==LOOP==
4020 FOR n=1 TO 65
4060 LET g1=g
4100 IF INKEY$="" THEN GO TO 450
0
4120 IF INKEY$="8" THEN LET g=g+
1: GO TO 4300
4140 IF INKEY$="5" THEN LET g=g-
1: GO TO 4300
3140 PRINT INK c(x);AT b(x),a(x)
;a$(x)
3160 NEXT j
3180 NEXT i
4160 IF INKEY$="7" AND INT (n/y)
=n/y THEN GO TO 4200
4180 GO TO 4500
4190 REM ==FIRE==
4200 LET i1=19
4210 FOR i=18 TO 3 STEP -1
4220 IF POINT (g*8+2,(21-i)*8+4)
=1 THEN GO TO 4240
4230 PRINT AT i1,g;" ": PRINT AT
i1,g,INK 3;" ": LET i1=i: NEXT
i: GO TO 4260
4240 IF POINT (g*8,(21-i)*8)=1 T
HEN GO TO 4280
4250 IF POINT (g*6,(21-i)*6+6)=1
THEN LET sc=sc+3
4260 LET sc=sc+2: PRINT AT 0,8;sc
4270 IF sc=208 OR sc=436 OR sc=6
54 OR sc=892 THEN PRINT AT i1,g,
" ": PRINT AT i1,g,INK 2;" ": BE
EP .5,-50: PRINT AT i1,g;" ": GO
TO 6000
4280 PRINT AT i1,g;" ": PRINT AT
i1,g,INK 2;" ": BEEP .5,-50: PR
INT AT i1,g;" "
4290 GO TO 4500
4300 REM ==MOVE==
4320 PRINT AT 20,g1;" "
4340 IF g>29 OR g<2 THEN LET g=g
1
4360 PRINT AT 20,g;"1"
4500 REM ==INVADERS==
4520 IF a(n)=0 THEN GO TO 7000
4540 IF POINT (a(n)*8+2,(21-b(n)
)*8+4)=0 THEN LET a(n)=0: GO TO
7000
5440 PRINT AT b(n),a(n);" "
5460 LET a(n)=a(n)+1
5480 IF a(n)=30 THEN LET b(n)=b(
n)+2: LET a(n)=2: IF b(n)=18 THE
N GO TO 8400
5520 PRINT INK c(n);AT b(n),a(n)
;a$(n)
5540 REM ==ATTACK==
5020 IF RAND(r) THEN GO TO 7000
5040 LET h=INT (RAND*65)+1
5100 IF POINT (a(h)*8+2,(21-b(h)
)*8+4)=0 THEN LET h=h+1
5140 PRINT FLASH 1; INK c(h);AT
b(h),a(h);a$(h)
5160 FOR i=16 TO 18
5180 IF POINT (a(h)*8,(21-i)*8)=
1 THEN GO TO 6240
5200 NEXT i
5220 LET i=20
5240 PRINT AT i,a(h); INK 2;"*":
BEEP .1,-30: PRINT AT i,a(h);" "
5260 IF i=20 AND a(h)=9 THEN GO
TO 8300
5280 PRINT FLASH 0; INK c(h);AT
b(h),a(h);a$(h)
5300 GO TO 7000
7000 NEXT n: GO TO 4000
8000 REM ==WIN==

```



ERS



WE HEREBY inaugurate a new quest for the Sinclair Programmer. Our Spacman project is, we think, approaching its triumphant conclusion—we can feel you all closing in on that elusive muncher—so it is just the time to implant a new ambition in your heads.

Send us an arcade-quality Invaders game. Fast moving, colourful, with all appropriate effects.

R Luckett of Stratford-on-Avon has provided all you need to begin the project. His program gives you the laser base, the rows of descending aliens and the disintegrating bunkers to lurk behind. It is a little slow, however, and the power beams from the aliens are invisi-

ble. Race right with 8, lurch left with the 5, and 7 shoots your blaster beam. (48K Spectrum). Graphics notes:
620—Graphic D, graphic C

820—Graphic E, inverse space, graphic F.
880—Graphic B
4230—Graphic G.

```

6020 PRINT AT 3,0; FLASH 1;" The
    invaders now shoot faster."
6040 IF r=.4 THEN GO TO 8100
6060 LET r=r-.1
6080 LET y=y-1
6100 FOR n=1 TO 10: BEEP .3,10:
    PAUSE n/3+1: NEXT n
6120 PRINT AT 3,0; FLASH 0;"

6140 PAUSE 1: PAUSE 1: PAUSE 1:
    PAUSE 10
6160 LET sc=sc+20: PRINT AT 0,2;
    "SCORE:";sc;"
6180 GO TO 3000
6200 REM ==LANDED==
6220 PRINT AT 3,0; FLASH 1;"
    THEY'VE LANDED
6240 FOR n=1 TO 15: BEEP .1,-30:
    PAUSE 1+RND*4: NEXT n
6260 PRINT AT 3,0; FLASH 0;"

6300 REM ==LOSE==
6320 FOR n=1 TO 10: BEEP RND,60:
    PAUSE (RND*3)+1: NEXT n
6340 BORDER 7: CLS
6360 PRINT AT 6,0;" To
    o Bad!
6380 PRINT " Better luck nex
    t time!
6400 PRINT " Score:";
    sc;"
6420 IF sc>hs THEN LET hs=sc
6440 PRINT " High score:";
    hs;"
6500 PRINT AT 16,0; FLASH 1;"
    do you want another game?
6540 IF INKEY$="" THEN GO TO 854
6560 IF INKEY$="y" OR INKEY$="Y"
    THEN LET game=1: GO TO 700
6580 IF INKEY$="n" OR INKEY$="N"
    THEN CLS: GO TO 9900
6600 GO TO 8540
    
```

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"

● **THE SPREADSHEET**

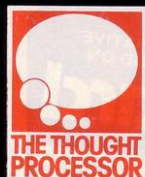
Personal Computer News... "EASY
TO USE... PLENTY OF USES... STREETS AHEAD"
(OF GEMINI'S SPREADSHEET)

Sinclair User... "EXCELLENT... MUCH
CLEARER" (THAN VU-CALC)

What Micro... "QUALITY"

MICROL[®]

Not available in any Store -
Order **TODAY** for fast
convenient delivery



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-world 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.

MiCROL[®]

31 Burleigh Street, Cambridge CB1 1BR.

(0223) 312453

Post to:- MICROL (UK Mail Order) Freepost
31 Burleigh Street, Cambridge CB1 1BR

SP5

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

At last . . .
Exciting AND Challenging Computer Games for Two Players.

CONFLICT A total war for two players involving both the machinery (armies, missiles, warships) and finance (stock market, oil, piracy) of conflict. "I enjoyed this strategy game" (Computer and Video Games).

GALAXY CONFLICT Raise a fleet of Battle Eoncrisers then move from bridge to bridge taking full control and responsibility in this battle for the heavens. Born galactic rulers will do well. "Galaxy battle sets new trend" (Sinclair User).

Games include — ZX81 (16K) and Spectrum (48K) programs on ONE cassette. Full size professionally printed board. Counters and markers. Two pads disposable maps (Conflict only). Comprehensive instructions/rules.

*Professionally packaged in high quality attractive box.

*Each game only £11.95 inc. Postage or £22 for both games.

*Available from W. H. Smith, Buffer, Games Centres and many other retail outlets or mail order from:

martech games

9 Dillingburgh Road, Eastbourne
 East Sussex BN20 8LY



ELECTRONIC
klik keyboard
 AN ALTERNATIVE
 NOT AN ADD ON



FOR
 ZX81

£24.95
 INC VAT
 P+P £1.00

Installed in 3 easy steps . . .

1. Peel off the touch sensitive key pad.
2. Plug in Klik-KeyBoard (no soldering) and place in position.
3. Apply self adhesive two-colour legends to the keys.

This full 40 key keyboard has a positive click feel as the keys are depressed but as it replaces the original touch pad it becomes a permanent part of the ZX81 without bulky boxes or trailing wires.

KEMPSTON
 MICRO ELECTRONICS

Dept SU5, 180a Bedford Road, Kempston, Bedford MK42 8BL

DON'T MISS THIS INCREDIBLE OFFER!

50 GAMES £9.95!

CASSETTE 50 FOR YOUR MICRO



GALACTIC ATTACK
 SPACE MISSION
 LUNAR LANDER
 PLASMA BOLT
 STARTREK
 RADAR LANDING
 ATTACKER
 GALACTIC DOGFIGHT
 ZION ATTACK
 WAVE ACTION
 OXO
 BOGGLES
 PONTOON
 SKI JUMP
 HANGMAN
 OLD BONES
 THIN ICE

MAZE EATER
 ORBITTER
 MOTORWAY
 FORCE FIELD
 NIM
 TUNNEL ESCAPE
 BARREL JUMP
 CANNONBALL BATTLE
 OVERTAKE
 SITTING TARGET
 SMASH THE WINDOWS
 SPACE SHIP
 JET FLIGHT
 PHASER
 INTRUDER
 INFERNO
 GHOSTS

SUBMARINES
 ROCKET LAUNCH
 PLANETS
 BLACK HOLE
 DYNAMITE
 DO YOUR SUMS
 DERRY DASH
 SPACE SEARCH
 UNIVERSE
 RATS
 TANKER
 PARACHUTE
 JETMOBILE
 HIGH RISE
 THE FORCE
 EXCHANGE



**CASCADE
 SOFTWARE**

NOW AVAILABLE FOR

**SINCLAIR
 SPECTRUM**

ZX81

LYNX

DRAGON

ATARI

apple (ON DISK & CASSETTE)

VIC-20

ACORN

ATOM

ORIC-1

SHARP

NEW BRAIN

BBC A/B



DIRECT MAIL ORDER FORM

**CASCADE
 SOFTWARE**

CASCADES HOUSE
 BARGAN'S LANE
 LLANDOGO
 GWENT
 S.WALES NP54PA

SUPPLY CASSETTE 50 FOR
 I enclose cheque/P.O.

Name

Address

COMPUTER

SPR1/3

MINIMUM SIZE COMPUTER REQUIRED ONLY



THE SPACMAN craze has spread. Adam Peel of Wylam, Northumberland is the latest victim of this mental epidemic and has sent a version of the game for the ZX-81.

Steer the gobbler round the maze and collect points by consuming dots, asterisks and ghosts. You can only get the ghosts if your power is above nought, otherwise you are vulnerable. Your power is decreasing all the time but you

boost it by 15 when you eat an asterisk and your score is also increased by 10. One score point is gained for every dot demolished.

Finish the phantom and you pull 20 points and win a wreath. The game ends when a ghost grabs you, when your power is nought, or when you wallop a

wall. Throughout the game your power is displayed; at the end of the game your score is displayed.

Gobbler is steered with the cursor keys; there are five levels of difficulty and as the game progresses it becomes more challenging. **Zapman** was submitted by Adam Peel of Wylam, Northumberland. In our listing, 'IS' signifies inverse space and lower-case letters are graphic instructions. (16K ZX-81).

ZAPMAN

```

2 LET P=0
3 LET AA=14
4 LET S=0
5 DIM C$(11,15)
9 LET BB=9
10 PRINT AT 14,0;"SKILL LEVEL"
  (1,2,3,4 OR 5)
11 INPUT SK
12 PRINT AT 13,0;"
13 IF SK>5 OR SK<0 THEN GOTO 1
0
15 PRINT AT 20,0;"TOUCH "R"
TO START"
20 IF INKEY$="R" THEN GOTO 20
25 LET A=2
30 CLS
35 LET B=10
40 LET C$(1)="IS.IS"
45 LET C$(2)="IS*.....*I
S"
50 LET C$(3)="IS.IS.IS.IS.I
S.IS.IS"
55 LET C$(4)="IS.IS.IS.IS.I
S.IS.IS"
60 LET C$(5)="IS.IS.IS.IS.I
S.IS.IS"
65 LET C$(6)="IS.....I
S"
70 LET C$(7)="IS.IS.IS.IS.I
S..IS.IS"
75 LET C$(8)="IS.....*IS...
IS"

```

```

80 LET C$(9)="IS.IS.IS.IS...
IS.IS.IS"
85 LET C$(10)="IS...IS.....
IS"
90 LET C$(11)="(15*IS)"
91 FOR N=1 TO 11
93 PRINT AT N,1;C$(N)
95 NEXT N
110 FOR N=1 TO 500
111 LET P=P-1
112 LET D=0
113 IF P<0 THEN LET P=0
114 PRINT AT 12,6;" "AT 12,0;
"POWER="P
118 PRINT AT B,A;" "
120 LET A=A+(INKEY$="B")-(INKEY
$="5")
130 LET B=B+(INKEY$="6")-(INKEY
$="7")
140 LET A$=CHR$(PEEK(PEEK 1639
6-255)PEEK(16397+1-A*(B*33))
150 IF A$="(IS)" THEN GOTO 250
160 IF A$="," THEN GOTO 3000
163 IF A$="*" THEN GOTO 1000
168 IF A$="(inverse quotation m
ark)" THEN GOTO 4000
169 PRINT AT B,A;"C"
170 PRINT AT BB,AA;C$(BB,AA)
171 IF BB=0 THEN GOTO 5000
172 GOTO 6000
174 IF AA=0 AND BB=B THEN GOTO
4000
180 PRINT AT B,A;"C"AT BB,AA;"

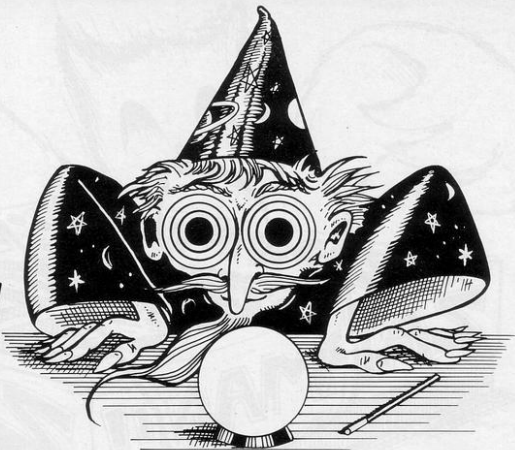
```

```

1"
190 LET SK=SK+.5
200 GOTO 100
250 PRINT AT B,A;"C"
260 PRINT AT 13,0;"YOUR SCORE I
S "S
270 PAUSE 30
280 GOTO 1
1000 LET P=15
1010 LET S=S+10
1020 GOTO 165
2000 PRINT AT BB,AA;"(inverse qu
otation mark)"
2010 PRINT AT 20,0;"SCORE="S
2020 GOTO 1
3000 LET S=S+1
3040 GOTO 170
4000 IF P=0 THEN GOTO 2000
4005 LET S=S+20
4010 LET AA=14
4020 LET BB=9
4040 GOTO 180
5000 IF INT(RND*SK)=0 THEN GOTO
180
5005 IF AA=9 THEN LET AA=AA-1
5010 IF AA=0 THEN LET AA=AA+1
5020 GOTO 174
6000 IF INT(RND*SK)=0 THEN GOTO
180
6010 IF BB=9 THEN LET BB=BB-1
6020 IF BB=0 THEN LET BB=BB+1
6030 GOTO 180

```

Fast Display



```

1 REM .....
2 DIM A$(704)
3 LET A$="ED 5B 10 40 05 06 1
3 10 FD 2B 0C 40 06 16 23 7E FE
76 28 04 12 13 18 F6 10 F4 C9"
4 FOR A=0 TO 26
5 POKE 16514+A,16*(CODE A$(A*
3+1)-28)+CODE A$(A*3+2)-28
6 NEXT A
10 DIM B$(10,704)
20 FOR J=1 TO 10
30 FOR I=0 TO J*12
40 PLOT 32+J*K2*5IN (I/(J*6)*PI
),22+J*K2*COS (I/(J*6)*PI)
50 NEXT I
60 RAND USR 16514
70 LET B$(J)=A$
80 NEXT J
90 FOR J=1 TO 10
100 PRINT AT 0,0;B$(J)
110 NEXT J
120 GOTO 90

```

DANIEL FREEMAN of Rams-gate, Kent, writes: "On page 12 of the printer manual is a Basic routine which puts the contents of the screen into the array A\$ so that it can be recalled instantly by using PRINT AT 0,0;A\$. Although very useful, even in FAST mode it takes a long time to RUN. My machine code version does the same job instantly."

In the listing displayed, the first six lines are the loader listing which can be

put at the beginning of your program and will POKE the machine code into the REM statement, so that it can be recalled by a line like LET A=USR 16514.

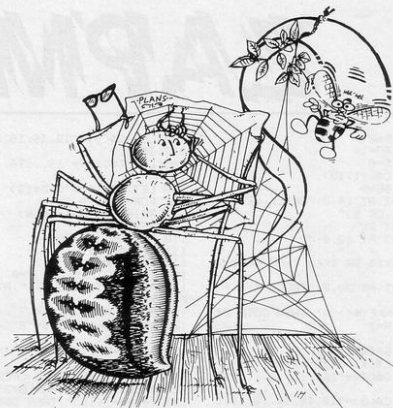
The rest of the listing is a demonstration of what the routine can achieve. Ten concentric circles are drawn very slowly and the display saved after every circle. The computer then replays the pictures at machine code speed. (16K ZX-81).

SYMMETRY

SYMMETRY is a useful subroutine to create a symmetrical pattern, acting as if a mirror has been placed vertically and horizontally across the screen. The routine should therefore be useful in creating mazes or crossword puzzles.

Listing 1 is entered first, then RUN; then lines 20 to 80 are deleted and the following command is then entered: POKE 16510,0. The demonstration program should then be entered. It will generate random characters at random positions in the top left-hand quarter, and then echo them at top right, bottom right and bottom left.

Symmetry was submitted by Paul Mott of Spalding, Lincolnshire. It manipulates the 16K display file and is therefore unsuitable for the unexpanded machine. (16K ZX-81).



```

10 REM (72 0s)
20 LET A$="2A0C400E16061054503
E211330FE0020FA231B7E1210FA3E112
330FE0020FA0D20E32A0C400E0B545D1
4143E051330FE0020FA062023137E121
8FA233E411B30FE0020FA0D20ECC9"
30 LET A=16514
40 FOR B=1 TO LEN A$ STEP 2
50 POKE A,(CODE A$(B)-28)*16+C

```

```

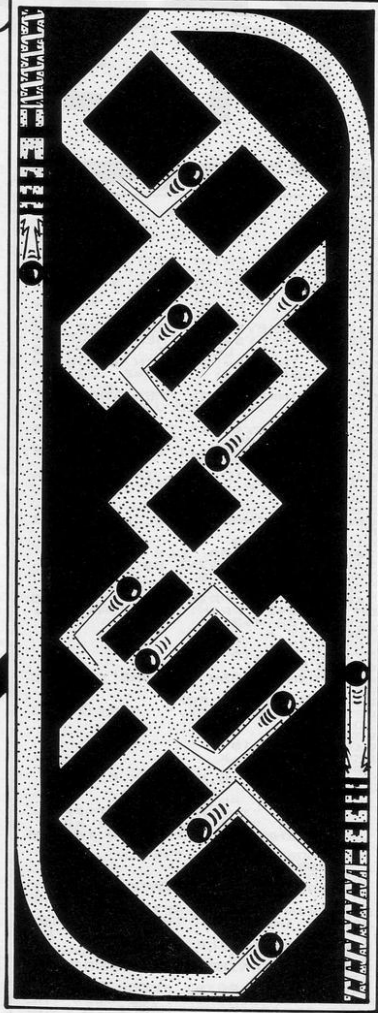
ODE A$(B+1)-28
60 LET A=A+1
70 NEXT B

```

```

10 REM DEMO
20 PRINT AT RND*10,RND*15;CHR$
(RND*255)
30 LET Z=USR 16514
40 GOTO 20

```



DIAGONAL

ANDREW KEY of Witney, Oxfordshire, sent **Diagono**, this intriguing man versus computer routine for the 16K ZX-81. In conception, it is a kind of low-tech version of our Program of the Month, requiring you to move the graphic A across the board from 0 to 0, the loser being the player who is forced to play into the top right-hand corner. You may move up (I), across (-), or diagonally (/), illegal moves being rejected.

As listed, the game is not too difficult but it will certainly interest readers exploring man/machine interaction. Lower-case letters in brackets are graphic instructions.

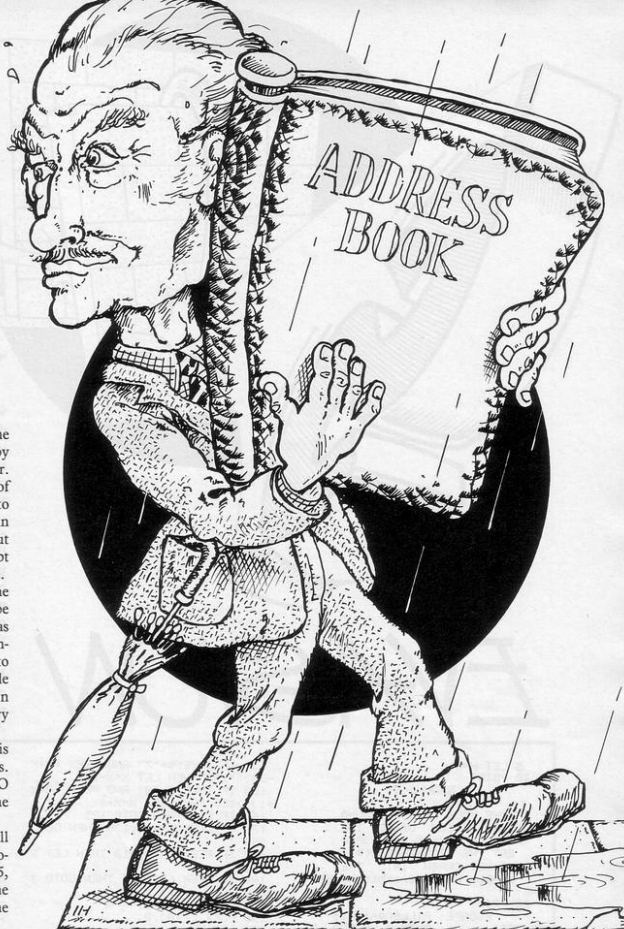
```
100 PRINT "DIAGONO",, "-----"
1000 FOR N=1 TO 9
1010 PRINT TAB 5;"0-0-0-0-0-0-0-0-0-0"
1020 IF N<9 THEN PRINT TAB 5;"I/
I/I/I/I/I/I/I"
1030 NEXT N
1040 PRINT AT 2,21;"(inverse 0)"
1050 LET Y=9
1060 LET X=1
2000 PRINT AT Y*2,X*2+3;"(graphi
c A)"
2010 PRINT AT 20,0;"YOUR MOVE?..
.(I,-,/) "
2020 INPUT M$
2030 IF M$<>"I" AND M$<>"-" AND
M$<>"/" THEN GOTO 2020
2040 IF (M$="I" OR M$="/" OR M$="
-") AND
X=9 OR (M$="I" OR M$="/" AND
Y=1) THEN GOTO 2020
2050 LET NY=X+M$="-" OR M$="/"
2060 LET NY=Y-M$="I" OR M$="/"
2070 PRINT AT Y*2,X*2+3;"0"
2080 LET X=NY
2090 LET Y=NY
2100 PRINT AT Y*2,X*2+3;"(graphi
c A)"
2110 IF X=9 AND Y=1 THEN GOTO 5E
3
2125 LET C$="0"
2130 IF X<9 AND Y>1 AND (M$="I"
OR M$="I") THEN LET C$="I"
2140 IF C$="/" THEN GOTO 3000
2150 IF (Y<X AND X<9) OR (Y>X A
ND Y=1) THEN LET C$="-"
2160 IF (Y>X AND Y>1) OR (Y<X A
ND X=9) THEN LET C$="I"
3000 PRINT AT 20,0;"I MOVE ";C$;
"
3003 LET QW=RND*XRND*XRND
3005 PRINT AT Y*2,X*2+3;"0"
3010 LET X=X+(C$="-" OR C$="I")
3020 LET Y=Y-(C$="I" OR C$="/"
3030 PRINT AT Y*2,X*2+3;"(graphi
c A)"
3040 IF X=9 AND Y=1 THEN GOTO 6E
3
3050 GOTO 2E3
5000 PRINT AT 20,0;"I WIN THIS G
AME
5010 GOTO 9999
6000 PRINT AT 20,0;"YOU WIN THIS
GAME
9999 STOP
```

Spectru FILE

```

2 REM @ WAEL SABBAGH
3 DIM A$(30,8,20)
4 LET FCF=1
10 BORDER 1: PAPER 1: INK 6: C
LS
15 POKE 23658,8
20 PRINT AT 10,8; FLASH 1;"FIL
E"
25 PRINT AT 11,3;"BY WAEL SABB
AGH"
40 INPUT "SECRET CODE TO ENTER
TO FILE";B$
50 IF B$(1) PMP THEN BEEP .3,-
10: GO TO 40
60 CLS
70 BEEP .1,10
80 PRINT AT 0,10;"MENU"
90 PRINT
100 PRINT "1 TO OPEN A NEW FILE
"
105 PRINT
110 PRINT "2 TO LOOK AT A CERTA
IN FILE"
115 PRINT
120 PRINT "3 TO HAVE A LOOK AT
EACH FILE (ON LY FILE CODE AND N
AME) AT THE SAME TIME"
130 PRINT
135 PRINT "4 SAVE FILES ON TAPE
"
140 PRINT
145 PRINT "5 LPRINT A FILE ON T
HE PRINTER"
150 PRINT
155 PRINT "6 SEARCH THROGH ALL
FILES"
160 PRINT
165 PRINT "7 CHANGE INFORMATION
FROM FILE"
175 PRINT "8 STOP"
180 INPUT "CHOICE PLEASE (1/8) "
C
190 IF C=1 THEN GO TO 300
200 IF C=2 THEN GO TO 500
210 IF C=3 THEN GO TO 1000
220 IF C=4 THEN GO TO 1100
230 IF C=5 THEN GO TO 1500
240 IF C=6 THEN GO TO 2000
250 IF C=7 THEN GO TO 2500
260 IF C=8 THEN GO TO 3000
270 GO TO 180
300 DATA "FILE CODE ","NAME ","
ADDRESS ","TOWN ","COUNTRY ","PO
STCODE ","TELEPHONE ","OTHER INF
O"
310 CLS : RESTORE 300
315 IF FCF=30 THEN BEEP .1,4: P
RINT "NO PLACE FOR DATA": GO
TO 410
317 LET A$(FCF,1)=STR$ FCF
320 PRINT AT 0,6;"NEW FILE ENTR
Y"
330 PRINT : READ B$: PRINT B$;F
CF
340 FOR X=2 TO 8: READ B$
350 INPUT (B$)A$(FCF,X)
360 IF LEN A$(FCF,X)>20 THEN GO
TO 350
370 PRINT B$;A$(FCF,X)
380 BEEP .2,X*5
390 PRINT
400 NEXT X
405 LET FCF=FCF+1
410 PRINT FLASH 1;"PRESS ANY KE
Y TO GO TO MENU"
420 IF INKEY$="" THEN GO TO 420
430 GO TO 60
500 CLS
510 PRINT AT 0,7;"FILE DISPLAY"
: PRINT
530 PRINT "HIT 1 IF YOU KNOW TH
E FILE CODE"
535 PRINT : PRINT "HIT 2 IF YOU
KNOW NAME (NOT ADVISABLE)"
536 PRINT : PRINT "HIT 3 IF YOU
KNOW TEL (NOT ADVISABLE)"
537 PRINT : PRINT "HIT 4 TO MEN
U"
540 IF INKEY$="" THEN GO TO 540
550 IF INKEY$="1" THEN INPUT "F
ILE CODE ";F: LET U=1: GO TO 700
560 IF INKEY$="2" THEN INPUT "N
AME PLEASE ";F$: LET U=2: GO TO
575
570 IF INKEY$="3" THEN INPUT "T
EL PLEASE ";F$: LET U=7: GO TO 5
75
571 IF INKEY$="4" THEN GO TO 60
572 GO TO 540
575 FOR X=LEN F$+1 TO 20: LET F
$=F$+" " : NEXT X
580 FOR X=1 TO FCF: IF A$(X,U)=
F$ THEN LET F=X: GO TO 700
590 NEXT X
595 CLS
600 PRINT "NAME / TEL NOT IN FI
LE"
610 GO TO 520
700 RESTORE 300: CLS
710 READ B$: PRINT B$;F
720 FOR X=2 TO 8
730 PRINT
740 READ B$: PRINT INK 6,B$;: B
EEP .02,X*2: PRINT INK 7,A$(F,X)
: BEEP .02,X*3
750 NEXT X
760 PRINT
770 GO TO 410
1000 CLS
1005 PRINT FLASH 1;"NAME","FILEC
ODE"
1010 FOR X=1 TO FCF
1020 PRINT A$(X,2); " ";A$(X,1)
: GO TO 3
1030 NEXT X
1040 GO TO 410
1055 BEEP .03,X
1100 CLS
1110 PRINT AT 0,5;"SAVE FILE ON
TAPE"
1120 PRINT : PRINT
1130 PRINT "INSERT BLANK TAPE"
1140 PRINT "THEN PRESS ANY KEY"
1150 IF INKEY$="" THEN GO TO 115
0
1160 SAVE "FILE" LINE 10
1170 BEEP .3,-10
1180 PRINT
1190 PRINT "REWIND TAPE TO VERIF
Y"
1200 PRINT "THEN PRESS ANY KEY"
1210 IF INKEY$="" THEN GO TO 121
0
1220 VERIFY "FILE"
1230 GO TO 410
1500 CLS: PRINT AT 0,4;"PRINTER
DISPLAY"
1520 PRINT : PRINT FLASH 1;"IF Y
OU ARE NOT SURE OF FILE CODE THE
N USE OPTION 3 (ON MENU) TO FIND
OUT"
1540 PRINT : PRINT "PRESS P TO P
RINT FILE ON PRINTER"
1550 PRINT "PRESS M TO GO TO MEN
U"

```



A VERY USEFUL routine for the 16K Spectrum has been sent by Wael Sabbagh of Colchester.

Spectrum File provides a method of storing the names and addresses of up to 30 individuals. Only 20 characters can be handled on each line of input but that should be no disadvantage, except perhaps on the Other Information line.

Since some of the information in the file may be confidential, the files can be accessed only when the secret code has been entered. STOP and LIST commands would allow the Sinclair user to crack that deadlock quickly. The code as listed is PMP but can be altered in line 50. The routine is served by a very useful menu.

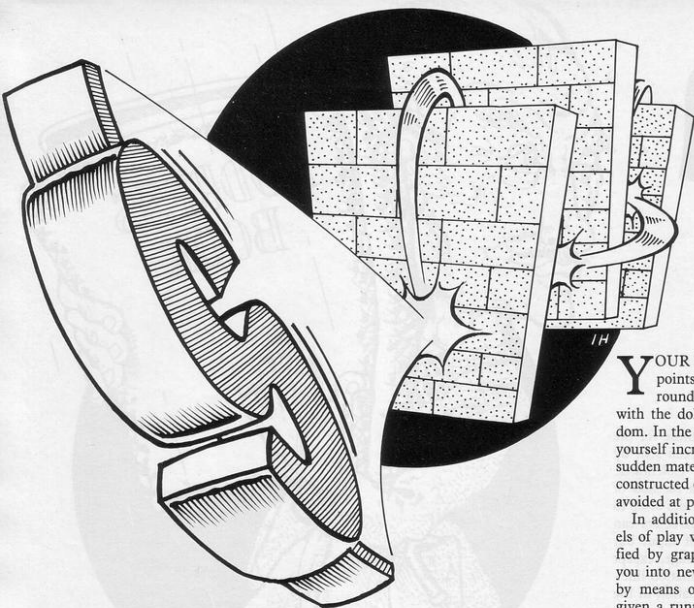
As with all filing routines, the user is well-advised to avoid RUN commands. If the program is broken into, then GO TO 60 will return you safely to the menu.

On a 48K machine, the routine will handle details on 150 individuals provided the number 30 in lines 3, 315, 1590 and 2520 is altered to 160. If the program is to be saved, option 4 of the menu should be used.

```
1550 IF INKEY$("<")="P" AND INKEY$(">")="M" THEN GO TO 1560
1570 IF INKEY$="M" THEN GO TO 41
0
1580 INPUT "ENTER FILE CODE ";F
1590 IF F<1 OR F>30 THEN GO TO 1
580
1600 RESTORE 300: LPRINT "SABBAGH SOFTWARE FILE PROG"
1610 LPRINT
1620 FOR X=1 TO 8
1630 READ K$: LPRINT K$;A$(F,X)
1640 LPRINT
1650 NEXT X
1660 LPRINT "
```

```
1670 GO TO 60
2000 CLS
2010 FOR X=1 TO FCF-1
2020 RESTORE 300
2030 FOR K=1 TO 8
2040 READ B$
2050 PRINT B$;A$(X,K)
2060 PRINT : NEXT K
2100 PRINT FLASH 1;"PRESS ANY KE
Y TO CON (M TO MENU)"
```

```
2110 IF INKEY$="" THEN GO TO 211
0
2120 IF INKEY$="M" THEN GO TO 60
2130 CLS: NEXT X
2140 GO TO 410
2500 RESTORE 300: CLS
2510 INPUT "WHAT FILE WOULD YOU
LIKE TO CHANGE INFO FROM ";F
2520 IF F<1 OR F>30 THEN GO TO 2
510
2530 PRINT FLASH 1;"WHAT WOULD Y
OU LIKE TO CHANGE"
2540 PRINT "INPUT 9 TO GO TO MEN
U"
2550 FOR C=1 TO 8
2555 READ B$
2560 PRINT FLASH 1,C; FLASH 0;B$
;A$(F,C)
2570 NEXT C
2580 INPUT "CHANGE (9 TO MENU)";
D
2590 IF D=9 THEN GO TO 60
2600 INPUT "THE NEW VERSION";A$(
F,D)
2610 CLS: RESTORE 300: GO TO 25
30
3000 CLS: PRINT AT 10,4; FLASH
1;"FILE CLOSED"
```



YOUR TASK is to collect as many points as possible by moving round the playing area colliding with the dollar signs appearing at random. In the course of play you will find yourself increasingly constrained by the sudden materialisation of deadly walls—constructed of graphic H. They must be avoided at peril of your life.

In addition, gateways on to new levels of play will appear. They are signified by graphic Ts and will transport you into new playing areas. You move by means of the cursor keys and are given a running score of your achievements. Full instructions are given with the listing.

16K Evasion was submitted by Peter Hawkin of Leeds. In our listing, lower-case letters indicate graphics instructions; IS signifies Inverse Space. (16K ZX-81).

EVASION

```

5 LET H=0
10 PRINT "SURROUND-81"

MOVE YOUR MAN(X) AROUND
THE SCREEN USING THE
CURSOR KEYS(5,6,7,8) AND
EAT THE POINT-PODS(S).
DO NOT CRASH INTO THE
DEADLY WALLS(Graphic H).EAT
THE"
20 PRINT "ESCAPE PILLS(Graphic T)
TO GET ONTO A HARDER LEVEL."
INPUT DIFFICULTY (1-4)"
LEVEL
25 LET AS=INKEY$
30 IF AS="" THEN GOTO 25
35 IF AS<"1" AND AS<"2" AND
AS<"3" AND AS<"4" THEN GOTO 25
40 LET L=VAL AS/8
45 LET S=0
50 CLS
60 LET A=1+PEEK 16396+PEEK 163
97*256
65 PRINT "2*IS)SURROUND-81*7*
IS)SCORE=(6,IS)"
70 PRINT "32*IS)"
80 FOR F=1 TO 13
90 PRINT "IS)",TAB 31;"IS)"
100 NEXT F
110 PRINT "32*IS)"
120 LET X=345
123 LET Y=336
130 IF INKEY$="5" AND PEEK (A+X
-1)*128 THEN LET X=X-1
140 IF INKEY$="6" AND PEEK (A+X
+33)*128 THEN LET X=X+33
150 IF INKEY$="7" AND PEEK (A+X
-33)*128 THEN LET X=X-33
160 IF INKEY$="8" AND PEEK (A+X
+1)*128 THEN LET X=X+1
165 IF X=Y THEN GOTO 125
170 IF PEEK (X+A)=136 THEN GOTO
360
175 IF PEEK (X+A)=13 THEN LET S
=S+100
180 IF PEEK (X+A)=6 THEN GOTO 3
00
185 POKE (X+A),61
190 POKE (Y+A),0
200 LET Y=X
210 IF (RND(L) AND (PEEK (A+X+2
X)*128) AND (PEEK (A+X+1)*128)
THEN POKE (A+X+INT (RND(X2)+1),13
6
220 IF (RND(L) AND (PEEK (A+X-6
6)*128) AND (PEEK (A+X-33)*128)
) THEN POKE (A+X-INT (RND(X2)+1
)*33),136
230 IF (RND(L) AND (PEEK (A+X+6
6)*128) AND (PEEK (A+X+33)*128)
) THEN POKE (A+X+INT (RND(X2)+1
)*33),136
240 IF (RND(L) AND (PEEK (A+X-2
X)*128) AND (PEEK (A+X-1)*128)
) THEN POKE (A+X+INT (RND(X2)-2),13
6
250 IF RND(.1) THEN PRINT AT INT
(RND(X19)+2,INT (RND(X30)+1),"H"
260 IF RND(.03) THEN PRINT AT IN
T (RND(X19)+2,INT (RND(X30)+1),"Gn
aphic T)"
270 LET S=S+10
280 PRINT AT 0,26;S
290 GOTO 125
300 LET S=S+300
305 POKE (A+Y),0
310 FOR F=1 TO 25
313 POKE X+A,61
315 POKE X+A,6
317 POKE A+X,134
320 NEXT F
325 CLS
330 PRINT "WELL DONE, YOU HAVE COMPLETED
ROUND ONE AND HAVE BEEN AWARDED
300 BONUS POINTS FOR DOING SO.
PRESS ANY KEY TO GET ONTO A
HARDER LEVEL."
335 LET L=L+.125
340 IF INKEY$="" THEN GOTO 340
350 GOTO 50
360 POKE A+Y,0
365 FOR F=1 TO 25
370 POKE X+A,61
375 POKE A+X,136
380 POKE A+X,0
390 NEXT F
400 CLS
410 PRINT "YOU CRASHED INTO A W
ALL. YOUR FINAL SCORE WAS ",S,
".",
420 IF S>H THEN LET H=S
425 PRINT
430 PRINT "THE HIGH SCORE IS ",
H,
435 PRINT
440 PRINT "PRESS ANY KEY FOR AN
OTHER GAME."
450 IF INKEY$="" THEN GOTO 450
460 CLS
470 GOTO 10
9000 SAVE "SURR"
9010 RUN

```



PILOT

```

1 BORDER 0: PAPER 0: CLS: IN
2 RESTORE
3 DIM I(10): FOR N=1 TO 10: R
4   LET I(N)=R: NEXT N
5 DIM A(51): DIM B(51)
6 INPUT "Which level (1-4)? "
7 IF I(1) OR I(4) THEN GO TO 20
8 LET A(1)=75: LET B(1)=75+X
9 SS RANDOMIZE: PRINT AT 0,0: "S
10  CORE 15
11 60 FOR N=2 TO 51: LET A(N)=A(N
12   -1)+(INT (RND*3)-1)*5: LET A(N)=
13   9(N)+19(N): (0) 85-(3(N)*275) 85:
14   LET B(N)=A(N)+X: NEXT N
15 70 PLOT 0,75: DRAW S,0: FOR N=
16   2 TO 51: DRAW S,0(N)-3(N)-1: NEX
17   T N
18 80 PLOT 0,75+X: DRAW S,0: FOR
19   N=2 TO 51: DRAW S,0(N)-3(N)-1: N
20   EXT N
21 90 FOR N=1 TO 10 STEP 2: BEEP
22   (N): I(N+1): NEXT N
23 110 PLOT 0,INT ((75+75+X)/2): L
24   ST B=0
25 120 FOR N=1 TO 51: LET B=0+IN
26   K 6/5+X: INKEY$="Q": 85: DRAW
27   INK 6/5+X: PRINT AT 21,0: "
28   REEP 31 N=10: IF PEEK 226
29   78: B(N) OR PEEK 226: 3(N) THE
30   N GO TO 145
31 130 LET S=5+1: PRINT AT 0,6,5:
32   NEXT N
33 135 CLS: GO TO 30
34 140 LET ALEN STR$ S: PRINT A
35   T 10,0: FLASH: INK 1: PAPER 6:
36   " YOU CRASHED " AT 0,0: OVER 1:
37   GO TO 1
38 145 FOR N=30 TO 4 STEP -5: BEE
39   P 100,N: NEXT N
40 150 INPUT "another go y/n? "; S
41   IF S="y" THEN RUN
42 160 DATA -3,-5,-4,0,-12,0,-1,0,
43   ,4,7

```

P ILOT is the simplest possible version of a popular arcade routine. In the arcade version you are required to steer through a scrolleddown tunnel, nailing assorted aliens along the way. There are no aliens to zap in this listing and your ship is signified only by its vapour trail but the

game can still hook the average arcade addict.

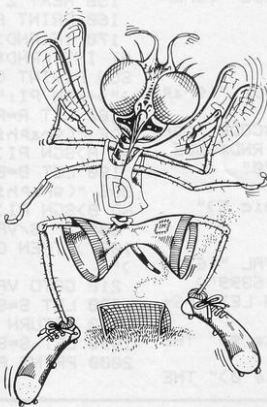
You have four levels of difficulty from which to choose; manoeuvre up with 7 and down with 6. The game was submitted by M Simper of Histon, Cambridgeshire. (16K Spectrum).

PLAGUE

PLAGUE is on the difficult side of impossible. You and your eight brave comrades are attempting to take supplies to a medical team which is battling to combat an outbreak of mosquito-carried plague. Unfortunately, a cloud of the infested insects is hovering between you and your goal.

Use the cursor keys to manoeuvre your men between the deadly flies and if you manage to reach the medical team and return—unlikely—you will be awarded 10 points.

As a measure of its difficulty, the author, Denis McCarthy of Todmorden, Lancashire, has a personal best score of 30. In our listing, lower-case letters are graphics instructions. (1K ZX-81).

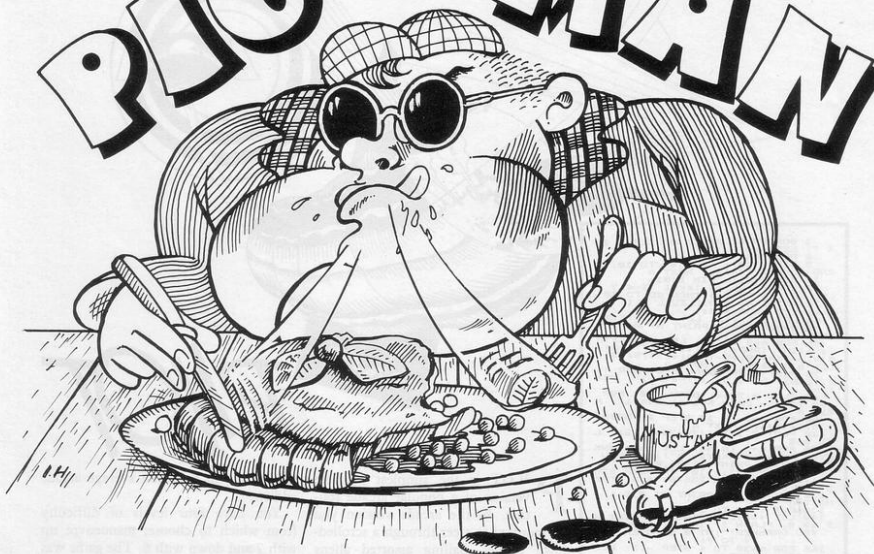


```

1 LET K=0
2 LET S=K
3 FOR N=K TO 9
4 LET T=K
5 LET J=CODE "<"
6 LET A=VAL "3"
7 LET D=VAL "4"
8 CLS
9 PRINT AT 4,K:"(inverse SPAC
E)inverse M)", "(inverse S)invers
e SPACE)", "(two inverse SPACES)",
"(two inverse SPACES)" AT D,J: "
"
10 PRINT AT RND*8,5: "+ + + "
AT RND*8,5: " + + " AT RND*8,5: " + + "
"
11 LET D=D+(INKEY$="6" AND D<A
)-(INKEY$="7" AND D>K)
12 LET J=J+(INKEY$="8" AND J<1
6)-(INKEY$="5" AND J>K)
13 PRINT AT D,J: "
14 LET Q=PEEK (PEEK 16398+256*K
PEEK 16399)
15 PRINT "(inverse Q)"
16 LET T=T+Q*CODE "(inverse M
)"
17 IF Q=CODE "(inverse S)" AND
T>=1 THEN GOTO 21
18 IF Q<>CODE "+" THEN GOTO A
19 NEXT N
20 PRINT S;2
21 LET S=S+10
22 GOTO 4

```

PIC MAN



PIC-MAN is a game for the unexpanded ZX-81 requiring speed and luck. The playing area comprises zeros and there are five inverse zeros. Move your man with keys 5 to 8 and score one for every zero and 10 for

an inverse zero. Instead of ghosts there are inverse dollar signs which appear at random, surrounding you and your food. Therefore you must act with cunning and despatch to consume as many of the tasty morsels as you can before

you are trapped in the money cage. Your score is displayed at the end of the game and a new playing area is made every 100 points. **Pic-man** was composed by Michael Porter of Harrogate.

```

1 LET S=SIN PI
10 FOR A=SGN PI TO CODE "<graphic S>"
20 FOR B=SGN PI TO CODE "<graphic S>"
30 PRINT AT A,B;"0"
40 NEXT B
50 NEXT A
60 FOR A=SGN PI TO CODE "<graphic S>"
70 PRINT AT INT (RND*CODE "<graphic S>")+SGN PI,INT (RND*CODE "<graphic S>")+SGN PI;"0"
80 NEXT A
90 LET A=CODE "<graphic S>"
100 LET B=A
110 PRINT AT B,A;
120 LET P=PEEK (PEEK VAL "16398" + VAL "256"*PEEK VAL "16399")
130 IF P=CODE "0" THEN LET S=S+SGN PI
135 IF P=CODE "<inverse S>" THEN N GOTO VAL "2E3"
140 IF P=CODE "<inverse 0>" THEN

```

```

N GOTO VAL "1E3"
150 PRINT "<"
155 FOR Z=1 TO 10
156 NEXT Z
160 PRINT AT B,A;"-"
170 IF RND>VAL ".4" THEN PRINT AT INT (RND*CODE "<graphic S>")+SGN PI,INT (RND*CODE "<graphic S>")+SGN PI;"<inverse S>"
180 LET A=A+(INKEY#="8" AND A<CODE "<graphic S>")-(INKEY#="5" AND A>SGN PI)
190 LET B=B+(INKEY#="6" AND B<CODE "<graphic S>")-(INKEY#="7" AND B>SGN PI)
205 IF S/VAL "100"=INT (S/VAL "100") THEN GOTO CODE "<graphic 2>"
210 GOTO VAL "110"
1000 LET S=S+CODE "<graphic S>"
1020 RETURN
1990 LET S=S+CODE "<graphic S>"
2000 PRINT AT 0,0;S

```

```

20 LET T=120
50 PRINT AT 15,21;"A"
60 PRINT TAB 21;"(inverse spac
e)"
70 PRINT TAB 21;"(inverse spac
e)"
80 PRINT TAB 20;"(graphic T,sp
ace,graphic Y)"
85 PRINT "(inverse space,twent
y two graphic Cs)"
100 FOR N=0 TO 19
105 PRINT AT 19,N;"(inverse spa
ce)"
110 LET A=INT (RND*10)
120 LET B=INT (RND*100)
130 PRINT AT 21,6;A+B;" - "B;"
= "
140 PRINT AT 19,27;" "
150 LET A#=INKEY#
160 PRINT ,,,A#;"(inverse space
)" AND A#=""
170 IF A#=STR# A THEN NEXT N

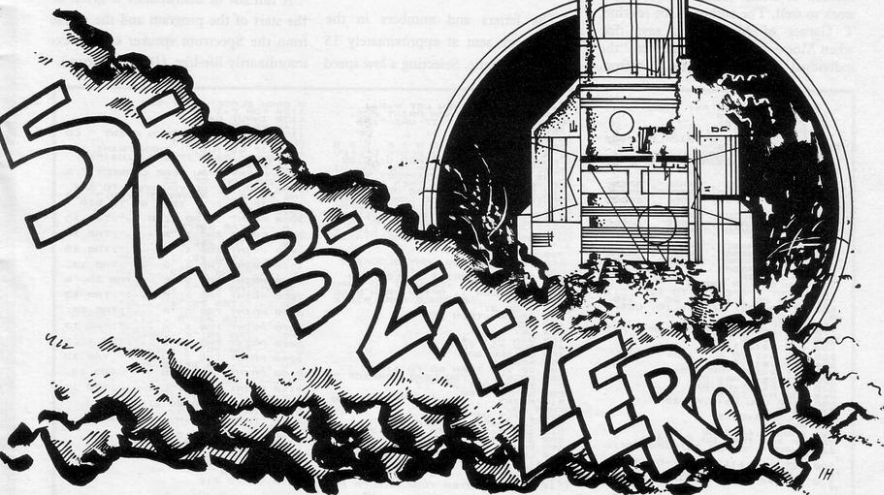
180 LET T=T-1
190 IF N<>20 THEN GOTO 140+(T<0
)*140
200 FOR N=1 TO 50
210 PRINT AT 18,21;" "
220 PRINT AT 18,21;"V"
230 NEXT N
240 POKE 16418,5
250 FOR N=1 TO 19
260 SCROLL
270 NEXT N

```

TAKE OFF for the 1K ZX-81, which was sent by C Robinson of Slough, Berkshire challenges your mathematical speed and accuracy. A rocket is on the launch pad and time is ticking away. Fuel must be delivered to the rocket along the underground pipeline by answering 20 questions correctly before the time reaches zero.

If your skill at subtraction is good enough for the test the rocket will blast into outer space; if not, it will be left stranded. Lower-case letters in brackets indicate graphics instructions.

TAKE OFF





C LIMBER is a reaction game guaranteed to test the co-ordination of the most lightning-fingered operator. You must make your way through a series of parallel walls in which a magical gateway appears at random positions. You are represented on-screen by A and manoeuvre yourself with keys 1 and 0.

If you are quick enough to position yourself under an opening you can proceed to the next level by pressing E. When you reach screen-top your time will be displayed.

Climber was written by David Cockburn of Manchester. (1K ZX-81).

CLIMBER

```

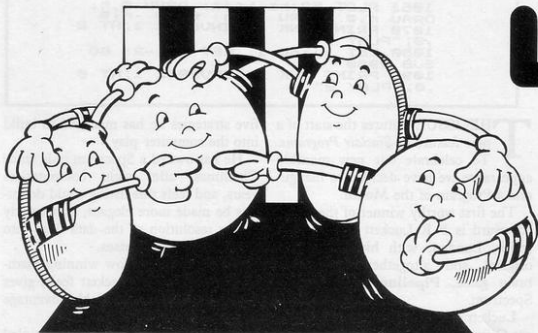
4 REM "A CLIMBER"
5 LET S=VAL "0"
10 LET X=VAL "15"
20 LET Y=1
25 LET Q=INT (RND*18)+1
30 FOR A=1 TO 9
40 PRINT AT R;2,1;"(eighteen i
verse SPACES)"
50 NEXT A
65 FOR W=0 TO 15
66 LET S=S+1

```

```

80 LET Y=Y+(INKEY$="Q")-(INKEY
$="1")
90 PRINT AT X-1,Q;" "
100 IF INKEY$="E" AND Y=Q THEN
LET X=X-2
110 PRINT AT X,Y-1;" A "
112 IF Y=1 THEN GOTO 300
115 IF INKEY$="E" AND Y=VAL "Q"
THEN GOTO 21
120 NEXT W
130 GOTO 25

```



LINK4

CELIA SIMS of Gt Yarmouth, Norfolk has managed to squeeze a **Link 4** game on to an unexpanded ZX-81. The display is surprisingly complete, even to the extent that the counters can be seen falling down-screen into position on the frame.

Link 4 is a version of the parlour game for two people in which you are required to place four counters in a row before your opponent. In this listing, the frame for the counters is represented by the numbers 1 to 8 and you are requested to enter the number appropriate to the column you wish to occupy.

The four counters can align horizontally, vertically or diagonally. Black always leads, so players should take turns in using it.

The listing does not check for winning shots so it is up to the player to shout "Yippee" as appropriate. (1K ZX-81).

```

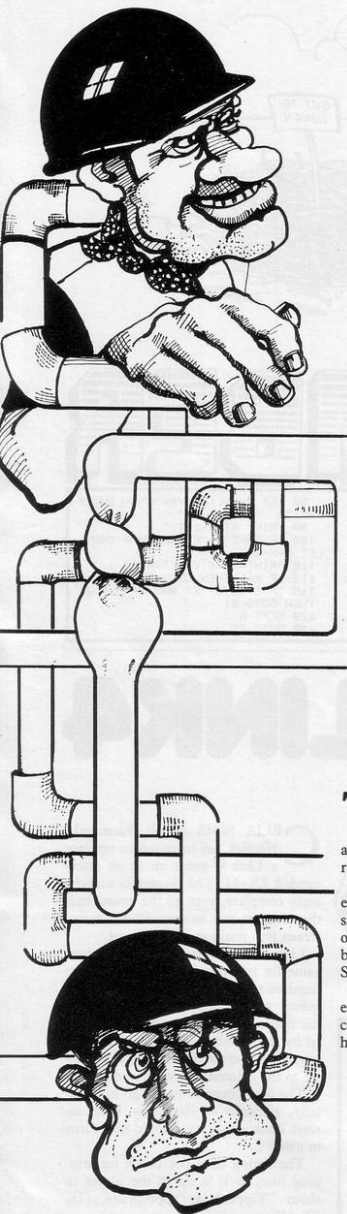
10 CLS
20 PRINT "CONNECT 4"
30 PRINT AT 21,1;"12345678"
40 FOR X=6 TO 1 STEP -1
50 PRINT AT X+14,0;7-X
60 NEXT X
70 LET G=0
80 LET C$="66666666"
100 IF G<0 THEN GOTO 200
110 LET G$="(inverse SPACE)"
120 GOTO 300
200 LET G$="(graphic H)"
300 LET G=NOT G
310 PRINT AT 2,0;G$;" COLUMN?"

```

```

400 INPUT C
410 IF C<=0 OR C>=9 THEN GOTO 4
420 IF C*(C)="0" THEN GOTO 400
430 PRINT AT 2,0;" "
500 FOR X=5 TO VAL (C*(C))+13 S
TEP 1
510 PRINT AT X,C;G$
520 PRINT AT X,C;" "
530 NEXT X
540 PRINT AT X,C;G$
600 LET C*(C)=STR$ (VAL (C*(C))
-1)
700 GOTO 100

```



```

1 REM PIPELINE
2 REM
3 REM © P R LUCKETT (1983)
4 REM
5 REM
10 PRINT AT 0,12;"PIPELINE"
20 PRINT AT 2,0;"AIM we must e
ach try to finish the pipeline
by playing into the upper right f
ield, or to force our opponent
off the board."
30 PRINT AT 7,0;"RULES alplaye
rs alternate moves - by each move
must extend the pipeline int
o an adjacent field"
40 PRINT AT 12,0;"I WILL LET Y
OU CHOOSE ""PLAY"" ORDER"" (1=Y
OU FIRST, 2=ME FIRST)"
50 PRINT AT 14,0;"YOU CAN ALSO
PICK ""PLAY LEVEL"" (1-BEGINNE
R, 2-ADVANCED) BUT BE CAREFUL WI
TH LEVEL 2 !! I'M VERY GOOD!!!!"
60 PRINT AT 21,0;"PRESS ANY KE
Y TO CONTINUE"
999 IF INKEY$="" THEN GO TO 999
1000 CLS
1001 DIM d(4,3): DIM e(13,13)
1002 RESTORE 2000: FOR i=1 TO 4:
FOR j=1 TO 3
1003 READ d(i,j): NEXT j: NEXT i
1005 BORDER 5
1010 PRINT INK 3; INVERSE 1;"PIP
ELINE": INPUT "PLAY ORDER(1or2)
";p1;"PLAY LEVEL(1or2)";p1;
1011 PRINT INK 5; INVERSE 1; AT 0
24;"ADVANCED"
1012 IF p1=1 THEN PRINT INK 3; I
NVERSE 1; AT 0,24;"BEGINNER"
1013 PRINT INK 4; AT 16,26; INVER
SE 1;"PLEASE"
1014 PRINT INK 4; AT 19,26; INVER
SE 1;"WAIT"
1015 PRINT INK 4; AT 20,26; INVER
SE 1;"FOR"
1016 PRINT INK 4; AT 21,26; INVER
SE 1;"PROMPT"
1020 PLOT 49,0: DRAW 157,0: DRAW
0,157: DRAW -157,0: DRAW 0,-157
1030 LET nn=12*(p1<p0): LET lw=
4*(p1<p0): LET bd=12+(p1=p0)
1040 LET j=1: LET ii=1
1050 GO SUB 2000
1060 LET n=(nn-1): LET hs=nn*(bd
-1)
1061 PLOT 50+hs,hs+1: DRAW 0,n:
DRAW n,0: DRAW 0,-n: DRAW -n,0
1070 PRINT INK 1; INVERSE 1; AT 2
,0;"PLAY 1"
1080 LET jj=bd-1: LET ii=-2: GO
SUB 2000
1090 PRINT INK 1; INVERSE 1; AT 8
,0;"PLAY 2"

```

THIS ISSUE features the start of a new feature in *Sinclair Programs*.

To celebrate our new monthly appearance we have decided to inaugurate a Program of the Month.

The first worthy winner of the coveted award is P R Lockett of Hammersmith, London, with his enthralling, original and altogether outstanding brain game, **Pipeline**, for the 48K Spectrum.

Lockett works at the European Patent Office in Munich, examining applications on digital signalling techniques; his mathematical bias is apparent in the

five strategies he has managed to build into the computer play.

He has owned a Spectrum only since Christmas, after eight computerless years, and feels this listing could doubtless be made more elegant, particularly in the resolution of the data lines into their mathematical bases.

The ability to follow winning mathematical strategies, Lockett feels, gives the computer an unassailable advantage in this type of game.

Pipeline casts you as an unprincipled pipe-laying engineer. You are shown the playing area and the choice of three

PIPE

```

1100 LET JJ=7: GO SUB 4000
1110 PRINT INK 1; INVERSE 1; AT 1
1120 PLAY 3
1130 LET JJ=2: GO SUB 6000
1140 LET JJ=1: LET JJ=1
1150 DIM b(15,15)
1160 FOR i=1 TO bd+2: FOR j=1 TO
bd+2
1170 LET b(i,j)=- (i=1)-(j=1)-(i=
bd+2)-(j=bd+2)
1180 NEXT j: NEXT i
1190 INPUT "SOLO? (y=yes, n=no)"; s
$
1200 LET b(2,2)=1: LET move=1
1210 LET move=move+1
1220 IF (po=1 AND (move/2=INT (mo
ve/2))) OR (po=2 AND (move/2<>I
NT (move/2))) THEN GO TO 3000
1230 GO TO 5000
1240 STOP
1250 LET ii=nn*(ii-1)+50: LET j
j=nn*(jj-1)+1
1260 FOR i=1 TO 4
1270 PLOT ii+i-1, jjj: DRAW 0,4
1280 PLOT ii+i-1, jjj+lw+4: DRAW
0,4
1290 PLOT ii+lw+3+i, jjj: DRAW 0
,4
1300 PLOT ii+lw+3+i, jjj+lw+4: D
RAW 0,4
1310 NEXT i
1320 RETURN
3000 IF s$="y" THEN GO TO 3091
3010 IF pl=2 THEN GO TO 8000
3020 IF move<2 THEN GO TO 3060
3030 LET ii=1+(RAND<0.5): LET JJ=
3-ii
3040 LET eg=3-2*(jj=2)
3050 LET play=((ii=1)*(eg=4)+(ii
=bd)*(eg=3)+(jj=1)*(eg=2)+(jj=bd
)*(eg=1))*(2+(RAND<0.5)))+(ii=1)*
(eg=1)+(jj=1)*(eg=3)+(ii=bd)*(eg
=2)+(jj=bd)*(eg=4))*(1+(RAND<0.5)
)+(ii=1)*(eg=2)+(jj=1)*(eg=4)+(i
i=bd)*(eg=1)+(jj=bd)*(eg=3))*(1
+2*(RAND<0.5))
3070 IF (ii<>1) AND (ii<>bd) AND
jj<>1 AND jj<>bd THEN LET play=
INT (1+RAND*2.999)
3080 GO SUB 7000
3090 GO TO 1190
3091 INPUT "MY PLAY (1,2or3)"; pla
y
3092 IF move<2 THEN GO TO 3080
3093 LET ii=1+(RAND<0.5): LET JJ=
3-ii: LET eg=3-2*(jj=2)
3094 GO TO 3080
4010 LET ii=nn*(ii-1)+50: LET j
j=nn*(jj-1)+1
4020 FOR i=1 TO 4
4030 PLOT ii+i-1, jjj: DRAW nn-i
, nn-i
4040 PLOT ii+i-1, jjj+nn: DRAW 1
-i, 1-i
4050 PLOT ii+lw+3+i, jjj: DRAW 4
-i, 4-i
4060 PLOT ii+lw+3+i, jjj+nn: DRA
W 4-i, (nn-5+i)-(nn-5+i)
4070 NEXT i
4080 RETURN
5001 IF move<2 THEN GO TO 5015
5002 INPUT "play right(r) or up (
u)"; r$
5003 LET ii=2
5004 IF r$="u" THEN LET ii=1
5005 LET jj=3-ii
5006 LET eg=3-2*(jj=2)
5015 INPUT "YOUR PLAY (1,2or3)"; p
lay
5020 GO SUB 7000
5030 GO TO 1190
6010 LET ii=nn*(ii-1)+50: LET j
j=nn*(jj-1)+1
6020 FOR i=1 TO 4
6030 PLOT ii+i-1, jjj: DRAW 1-i,
1-i
6040 PLOT ii+i-1, jjj+nn: DRAW (
nn-i)-(nn-i)
6050 PLOT ii+lw+3+i, jjj: DRAW 5
-nn-i, (5-nn-i)
6060 PLOT ii+lw+3+i, jjj+nn: DRA
W 5-nn-i, 5-nn-i
6070 NEXT i
6080 RETURN
7010 LET b(jj+1, ii+1)=play
7020 GO SUB 2000*play
7030 LET eg=d(eg, play)
7040 LET jj=jj+(eg=1)-(eg=2)
7050 LET ii=ii+(eg=3)-(eg=4)
7060 IF b(jj+1, ii+1)=0 THEN GO T
O 7100
7070 IF b(jj+1, ii+1)<0 THEN GO T
O 7100
7080 LET play=b(jj+1, ii+1)
7090 GO TO 7030
7100 IF ((move/2)=INT (move/2))
AND (po=1) OR (move/2<>INT (mo
ve/2) AND po=2) THEN GO TO 7130
7110 PRINT INK 2; AT 1,9; FLASH 1
;"BAD LUCK-YOU LOST"
7120 GO TO 7500
7130 PRINT INK 1; AT 1,9; FLASH 1
;"WELL DONE-YOU WIN"
7140 GO TO 7500
7150 IF JJ<>bd OR ii<>bd THEN RE
TURN
7160 IF ((move/2)=INT (move/2))
AND (po=1) OR (move/2<>INT (mo
ve/2) AND po=2) THEN GO TO 7130
7170 GO TO 7110
7500 INPUT "LIKE ANOTHER GO? (yes
=y, no=n)"; r$
7505 IF r$="n" THEN STOP
7510 CLS
7520 GO TO 1010
8000 IF move=2 THEN GO TO 8100

```

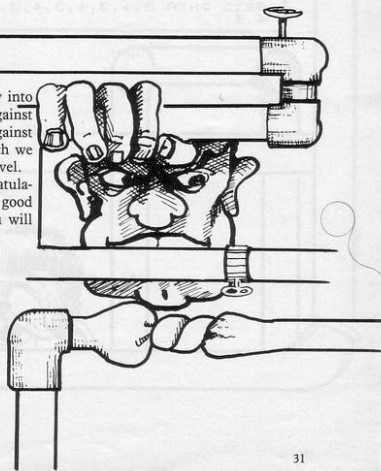
types of tiles which you can use to continue the pipe. Each tile is traversed by two white lines and a sharp eye must be kept to trace the twisting path of the pipe as it coils and flexes across the board.

The winner is the one who plays into the top right-hand corner of the screen,

or who forces an opponent to play into the side of the board. Play against another Sinclair programmer or against the Grand Master Spectrum, which we have not yet beaten at advanced level.

An astounding listing. Congratulations to our cunning author and good luck to our fortunate readers—you will love this one. (48K Spectrum).

LINE



```

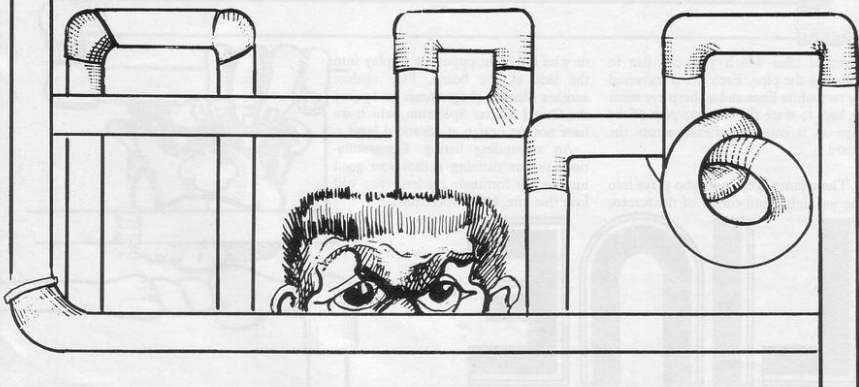
8010 IF move<3 AND move<4 THEN
GO TO 8070
8020 LET rest=9300+100*(b(3,3)=2
)+200*(b(3,3)=3)
8030 IF move=3 THEN LET rest=910
0+100*(b(3,3)=0)
8040 RESTORE rest
8050 FOR i=1 TO bd: FOR j=1 TO b
8060 READ e(i,j): NEXT j: NEXT i
8070 LET play=1
8080 IF d(eg,play)=e(j,j,i) THEN
GO TO 8110
8090 LET play=play+1: GO TO 8080
8100 LET ii=1: LET jj=2: LET eg=
1: LET play=2
8110 GO SUB 9000
8120 GO TO 1190
8000 DATA 1,3,4,2,4,3,3,1,2,4,2,
1,1
100 DATA 1,1,1,1,1,1,1,1,1,1,
1,1
101 DATA 2,2,2,2,2,2,2,2,2,2,2,
1,1
102 DATA 1,1,1,1,1,1,1,1,1,1,1,
1,1
103 DATA 2,2,2,2,2,2,2,2,2,2,2,
1,1
104 DATA 1,1,1,1,1,1,1,1,1,1,1,
1,1
105 DATA 2,2,2,2,2,2,2,2,2,2,2,
1,1
106 DATA 1,1,1,1,1,1,1,1,1,1,1,
1,1
107 DATA 2,2,2,2,2,2,2,2,2,2,2,
1,1
108 DATA 1,1,1,1,1,1,1,1,1,1,1,
1,1
109 DATA 2,2,2,2,2,2,2,2,2,2,2,
1,1
110 DATA 1,1,1,1,1,1,1,1,1,1,1,
1,1
111 DATA 2,2,2,2,2,2,2,2,2,2,2,
1,1
112 DATA 3,4,3,4,3,4,3,4,3,4,3,
1,1
1201 DATA 3,4,3,4,3,4,3,4,3,4,3,
1,1
1202 DATA 3,4,3,4,3,4,3,4,3,4,3,
1,1
1203 DATA 3,4,3,4,3,4,3,4,3,4,3,
1,1
1204 DATA 3,4,3,4,3,4,3,4,3,4,3,
1,1
1205 DATA 3,4,3,4,3,4,3,4,3,4,3,
1,1
1206 DATA 3,4,3,4,3,4,3,4,3,4,3,
1,1
1207 DATA 3,4,3,4,3,4,3,4,3,4,3,
1,1
1208 DATA 3,4,3,4,3,4,3,4,3,4,3,
1,1
1209 DATA 3,4,3,4,3,4,3,4,3,4,3,
1,1
1210 DATA 3,4,3,4,3,4,3,4,3,4,3,
1,1
1211 DATA 3,4,3,4,3,4,3,4,3,4,3,
1,1
1212 DATA 3,4,3,4,3,4,3,4,3,4,3,
1,1
1213 DATA 3,4,3,4,3,4,3,4,3,4,3,
1,1

```

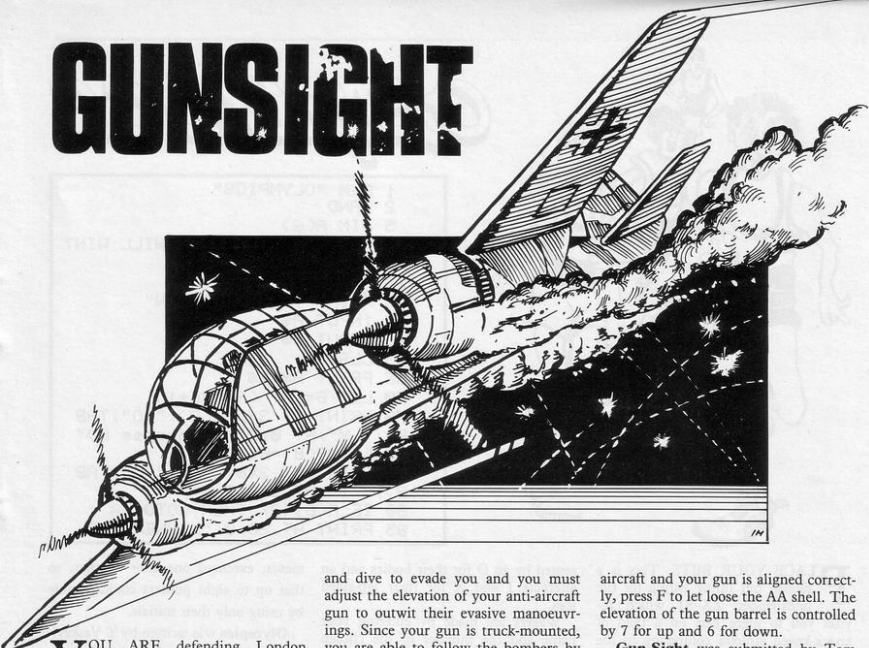
```

9301 DATA 1,1,1,1,1,1,1,1,1,1,1,
1,1
9302 DATA 2,2,2,2,2,2,2,2,2,2,2,
1,1
9303 DATA 1,2,1,1,1,1,1,1,1,1,1,
1,1
9304 DATA 2,1,2,2,2,2,2,2,2,2,2,
1,1
9305 DATA 1,2,1,1,1,1,1,1,1,1,1,
1,1
9306 DATA 2,1,2,2,2,2,2,2,2,2,2,
1,1
9307 DATA 1,2,1,1,1,1,1,1,1,1,1,
1,1
9308 DATA 2,1,2,2,2,2,2,2,2,2,2,
1,1
9309 DATA 1,2,1,1,1,1,1,1,1,1,1,
1,1
9310 DATA 2,1,2,2,2,2,2,2,2,2,2,
1,1
9311 DATA 1,2,3,4,3,4,3,4,3,4,3,
1,1
9312 DATA 2,3,4,3,4,3,4,3,4,3,4,
1,1
9401 DATA 1,1,3,4,3,4,3,4,3,4,3,
1,1
9402 DATA 2,1,4,3,4,3,4,3,4,3,4,
1,1
9403 DATA 1,1,1,1,1,1,1,1,1,1,1,
1,1
9404 DATA 2,2,2,2,2,2,2,2,2,2,2,
1,1
9405 DATA 1,1,1,1,1,1,1,1,1,1,1,
1,1
9406 DATA 2,2,2,2,2,2,2,2,2,2,2,
1,1
9407 DATA 1,1,1,1,1,1,1,1,1,1,1,
1,1
9408 DATA 2,2,2,2,2,2,2,2,2,2,2,
1,1
9409 DATA 1,1,1,1,1,1,1,1,1,1,1,
1,1
9410 DATA 2,2,2,2,2,2,2,2,2,2,2,
1,1
9411 DATA 1,1,1,1,1,1,1,1,1,1,1,
1,1
9412 DATA 2,2,2,2,2,2,2,2,2,2,2,
1,1
9501 DATA 1,3,4,1,1,1,1,1,1,1,1,
1,1
9502 DATA 2,1,4,2,2,2,2,2,2,2,2,
1,1
9503 DATA 1,2,1,1,1,1,1,1,1,1,1,
1,1
9504 DATA 2,1,2,2,2,2,2,2,2,2,2,
1,1
9505 DATA 1,2,1,1,1,1,1,1,1,1,1,
1,1
9506 DATA 2,1,2,2,2,2,2,2,2,2,2,
1,1
9507 DATA 1,2,1,1,1,1,1,1,1,1,1,
1,1
9508 DATA 2,1,2,2,2,2,2,2,2,2,2,
1,1
9509 DATA 1,2,1,1,1,1,1,1,1,1,1,
1,1
9510 DATA 2,1,2,2,2,2,2,2,2,2,2,
1,1
9511 DATA 1,2,3,4,3,4,3,4,3,4,3,
1,1
9512 DATA 2,3,4,3,4,3,4,3,4,3,4,
1,1

```



GUNSIGHT



YOU ARE defending London against the droning hordes of Dorniers during a night raid in World War Two. The bombers swoop

and dive to evade you and you must adjust the elevation of your anti-aircraft gun to outwit their evasive manoeuvres. Since your gun is truck-mounted, you are able to follow the bombers by pressing keys 5 and 8 to travel left and right. When the reading on your altimeter corresponds to the height of the

aircraft and your gun is aligned correctly, press F to let loose the AA shell. The elevation of the gun barrel is controlled by 7 for up and 6 for down.

Gun-Sight was submitted by Tom Meagher of Cork, Ireland. Lower-case letters indicate graphics instructions. (16K ZX-81).

```

1 REM "GUN-SIGHT"
10 LET H=15
20 LET D=17
30 LET K=5
40 LET O=5
50 FOR W=1 TO 19
60 PRINT AT W,0;"-"
70 NEXT W
80 PRINT AT 5,0:"(Graphic 4)";
AT 10,0:"(Graphic 4)";AT 15,0:"(
Graphic 4)"
90 FOR M=1 TO 20
100 PRINT AT 20,0:"(Graphic D)"
105 FOR I=30 TO 0 STEP -1
110 IF INKEY$="8" THEN LET D=D+
2
120 IF INKEY$="5" THEN LET D=D-
2
121 GOSUB 450
122 PRINT AT 21,5:"HEIGHT=";H;"
00 FEET "
130 PRINT AT 20,0:"(two Graphic
Ds;inverse I;two Graphic Ds)"
140 PRINT AT K,I:"(Graphic F) "
145 GOSUB 300
150 GOSUB 450
155 PRINT AT 21,5:"HEIGHT=";H;"
00 FEET "
156 PRINT AT K+1,I;" "AT K-1,I
" "
160 NEXT I
300 LET A=INT (RND*3)+1
310 IF A=2 THEN GOSUB 400
320 IF A=1 THEN GOSUB 430
330 RETURN
400 LET K=K+1
410 RETURN
430 LET K=K-1
440 RETURN
450 IF INKEY$="6" THEN GOSUB 50
0
460 IF INKEY$="7" THEN GOSUB 54
0
470 IF INKEY$="F" THEN GOSUB 60
0
480 RETURN
500 LET H=H-1
510 LET O=O+1
520 RETURN
540 LET H=H+1
550 LET O=O-1
560 RETURN
600 IF O=K AND I+2=D THEN GOTO
650
610 PRINT AT O,D+2:"(inverse X)
"
620 RETURN
650 PRINT AT O,I:"(inverse HIT)
"
```



OLYMPICS

```

1 REM "OLYMPICS"
2 RAND
5 DIM A(6)
20 PRINT AT 8,9;"WHO WILL WIN?"
"
26 PRINT
30 PRINT TAB 12;"6 RUN"
35 INPUT A$
45 INPUT B$
55 CLS
56 PRINT A$,B$
60 LET B=INT (RND*6+1)
70 PRINT AT 3*B,A(B);" O";TAB
A(B);" X";AT 0,27;"(inverse W)"
75 LET A(B)=A(B)+1
76 PRINT AT 3*B,A(B);" O";TAB
A(B);" I";AT 3*B,0;B
80 IF A(B)<27 THEN GOTO 60
85 PRINT AT 20,0;"WINNER ";B

```

PPLACE YOUR BETS. This is a foolish but funny listing for the unexpanded ZX-81 which invites you to place bets on a field of knock-kneed athletes competing in the next Olympics. The runners are repre-

sented by an O for their bodies and an alternate I and X for their lop-sided legs.

Wagers are made by entering your name and the number of the chosen competitor. There are two input state-

ments, executed one after another, so that up to eight punters could gamble by using only their initials.

Olympics was written by T Vaskevicius of St Ives, Cornwall. (1K ZX-81).



APPOINTMENTS

```

10 PRINT "Dates at stated inte
vals"
20 INPUT "Enter date: ";Day -
"d";Month - "m";Year - "y
30 INPUT "Enter no. of days be
tween dates: ";b
40 INPUT "How many times? ";
c
45 PRINT d;"-";m;"-";y
50 FOR n=1 TO c

```

```

50 LET d=d+b
70 IF a=2 AND y/4=INT (y/4) TH
EN LET a=a+(d/25); LET d=d-a*(d
/25)
80 IF a=2 AND y/4<INT (y/4) T
HEN LET a=a+(d/20); LET d=d-a*(d
/20)
90 IF a=4 OR a=6 OR a=9 OR a=1
1 THEN LET a=a+(d/30); LET d=d-3
0*(d/30)

```

AM TUCKER of Dorchester, Dorset, has sent a helpful program which will enable the user to fix the dates of future appointments. If, for example, you have an appointment on every third Friday, enter the date of the first Friday, then 21, then the number of dates required.

The program should be suitable for all reasonable requirements, though the author cautions that leap centuries are not catered for. Immortals, therefore, should write their own programs. (16K Spectrum).

```

100 LET a=a+(d/31); LET d=d-31*(
d/31); IF d/31=(a/4 OR a/6 OR a
/9 OR a/11)-25*(a/2 AND y/4=INT y
/4)-3*(a/2 AND y/4<INT y/4) THE
N GO TO 70
110 IF a/12 THEN LET a=a-12; LE
T y=y+1
120 PRINT d;"-";m;"-";y
130 NEXT n

```



THIS UNUSUAL routine enables you to play that old street-corner routine with the pea and the three cups. This time, however, you are playing against the computer and no cheating is allowed.

You have a stake of £100 and are told

under which cup the pea is hidden. Three dots are shown in the centre of the screen and after you have pressed a key they are moved around according to the difficulty level you have selected.

The difficulty level increases automatically with each gamble. When the

cups have finished moving, enter the position of the pea—1 to 3—and the amount you wish to gamble.

Dodger was written by Tim Grubb of Newton Linford, Leicester. (16K ZX-81).

```

1 LET I=1
10 LET DO=INT (RND*3)+1
15 PRINT AT 20,4;"THE DODGE IS
IN";DO
20 LET MO=100
30 PRINT AT 10,10;"LEVEL?"
35 INPUT L
36 CLS
50 PRINT AT 0,9;"**DODGE**"
95 LET K=0
100 DIM A(3)
115 PRINT AT 20,4;"PRESS ANY KE
Y TO START"
117 IF INKEY$="" THEN GOTO 115
120 FOR J=1 TO 3
130 LET A(J)=25+J*2
150 PLOT A(J),21
160 NEXT J
165 LET J=3
167 FOR H=1 TO L
170 PLOT A(J),21
175 PLOT A(1),21
200 LET J=INT (RND*3)+1
210 LET I=INT (RND*3)+1
211 IF I=J THEN GOTO 210

```

```

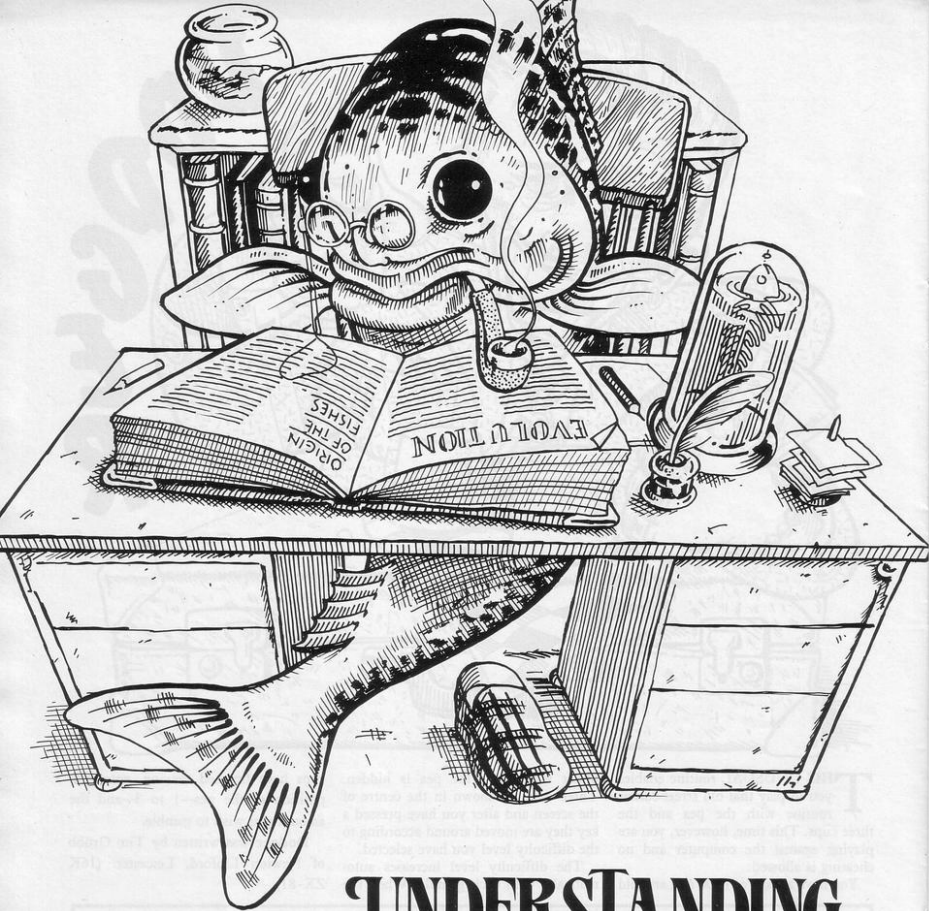
214 IF J<>DO THEN GOTO 217
215 IF J=DO THEN LET DO=I
216 GOTO 220
217 IF I=DO THEN LET DO=J
220 UNPLOT A(J),21
225 UNPLOT A(I),21
230 IF A(J)>A(I) THEN GOTO 400
290 FOR G=0 TO A(I)-A(J)
320 PLOT A(J)+G,22
323 PLOT A(I)+G,20
325 UNPLOT A(J)+G,22
327 UNPLOT A(I)+G,20
330 NEXT G
340 NEXT H
415 LET M=A(J)-A(I)
420 FOR G=M TO 0 STEP -1
425 PLOT A(J)+G,22
430 PLOT A(I)+G,22
440 UNPLOT A(I)+G,22
445 UNPLOT A(J)+G,22
450 NEXT G
470 NEXT H
471 FOR J=1 TO 3
472 LET A(J)=25+J*2
473 PLOT A(J),21

```

```

474 NEXT J
475 GOSUB 1000
479 FOR O=1 TO 20
480 PLOT A(DO),21
490 UNPLOT A(DO),21
500 NEXT O
550 LET L=L+1
560 GOTO 165
1000 PRINT AT 1,0;"YOU HAVE ";MO
;" POUNDS"
1010 PRINT AT 2,0;"HOW MUCH?"
1020 INPUT M
1030 IF M>MO THEN GOTO 1010
1050 PRINT "WHICH DODGE? (1 TO 3
)"
1060 INPUT S
1070 IF DO<>S THEN LET MO=MO-M
1080 IF DO<>S THEN LET MO=MO-M
1090 IF MO<=0 THEN PRINT 11,10;"
YOU'RE BUST"
2000 PRINT "YOU NOW HAVE ";MO;"
POUNDS"
2010 RETURN

```



UNDERSTANDING EVOLUTION

DR ELIOT GINGOLD, lecturer in genetics at Hatfield Polytechnic, has sent a Spectrum program to simulate the development of mixed populations under evolutionary pressures. He believes that the use of computers for the purpose has the great advantage over mathematical equations that random influences can be included in the model.

The listing sets up a small, local population of black and yellow mice

and follows it for successive generations. The variation in colour is controlled by two variant forms of a single gene, with the black-inducing gene dominant over yellow.

The user is invited to fix the population size and the differing selection pressures on the two types. An interesting finding is that small populations suffering no selection pressure eventually will resolve into entirely black or yellow types. Such results show the

importance of the random element.

"This so-called 'genetic drift' is an important factor in discussions of evolutionary theory. Many scientists believe that such random events are the basis for many of the observed differences between species," he says.

The listing is aimed at A level students but its avoidance of technical terms should assure it wider usefulness. In the listing, the mice should be entered as graphic M. (48K Spectrum).

```

1 DIM a$(250): DIM b$(51)
2 GO SUB 9000
3 BORDER 7: PAPER 7: CLS
25 PRINT INK 1;"This program s
imulates a local population of
mice. Two types are found, bla
ck mice and yellow
ice -- INK 6; and INK 2; TH
e difference is due to a gene"
with two alleles, Y (black) is
dominant over y (yellow). This
means that YY -- black, Yy
y -- black, yy -- yellow"
INK 1;"Remember a mouse could
be YY, or Yy, a carrier of yell
ow, yellow alleles can hide i
n black mice!" INK 0; INVER
SE 1;" Press any key to continue
"
26 IF INKEY$="" THEN GO TO 26
27 CLS: PRINT INK 2;"You may
follow the changes in this pop
ulation during up to 50 genera
tions. INK 1;"Each generation
the population will at first
double. But not all can surviv
e. You will be asked to fix th
e maximum numbers" capable of s
urviving.
28 PRINT INK 2;"Three situati
ons are possible: selection ag
ainst yellow, selection agai
nst black, or selection agai
nst both. i.e. yellow mice
more fit to survive, or no sele
ction -- i.e. both types equ
ally fit"
29 PRINT INK 2;"You can try an
y of these, and if you have se
lection you can determine its
strength." INK 0; INVERSE 1;"
Press any key to start.
30 IF INKEY$="" THEN GO TO 30
40 BORDER 7: PAPER 7: CLS
50 PRINT AT 7,0: INK 2;"Input
the maximum population" that th
e environment can hold. (can be
up to 325)
52 INPUT p0: IF p0<1 OR p0>125
THEN PRINT INK 0;"Must be bet
ween 0 and 125." GO TO 52
55 CLS: PRINT AT 7,0: INK 1;"
Selection could be: Against
yellow INPUT 1;" Against bl
ack INPUT 1;" Or no select
ion INPUT 2;"
57 INPUT d: IF d<0 OR d>2: A
ND d<2 THEN PRINT INK 0;"Must
be 0, 1 or 2" GO TO 57
58 IF d=2 THEN GO TO 75
60 CLS: PRINT AT 7,0: INK 2;"
What is the strength of select
ion measured as a % (100% w
ould mean that the unfit type
is lethal) Input a number up
to 100"
62 INPUT sp: IF sp<0 OR sp>100
THEN PRINT INK 0;"Must be betw
een 0 and 100" GO TO 62
70 LET s=100-sp
75 CLS: PRINT AT 7,0: INK 1;"
What is the starting % of yell
ow alleles? (xy) (remember
r that many will be hidden in
black mice!) Input a number u
p to 100"
77 INPUT y: IF y<0 OR y>100 TH
EN PRINT INK 0;"Must be between
0 and 100" GO TO 77
100 LET n:=p0
110 LET y:=y/100: LET b(1)=y
200 LET sb=1: LET sy=1: IF d=0
THEN LET sy=sb
201 IF d=1 THEN LET sb=s/100
215 BORDER 7: PAPER 7: CLS
220 LET n=n+1: GO SUB 1000
265 GO SUB 5000
266 IF n=51 THEN PRINT PAUSE 120: GO
TO 310
270 POKE 25692,255
280 PRINT BRIGHT 1; INVERSE 1;
INK 0;"PRESS M FOR MORE ,G FOR G
RAPH"
285 GO SUB 5000
290 IF I$="M" OR I$="H" THEN GO
TO 215
300 IF I$="G" OR I$="C" THEN GO
TO 310
305 GO TO 285
310 GO SUB 6000
311 GO SUB 5000
315 IF I$="M" OR I$="H" THEN GO
TO 215
320 IF I$="G" OR I$="N" THEN GO
TO 40
325 IF I$="S" OR I$="S" THEN PA
PER STOP
350 GO TO 311
1000 PRINT AT 0,7: INK 2; BRIGHT

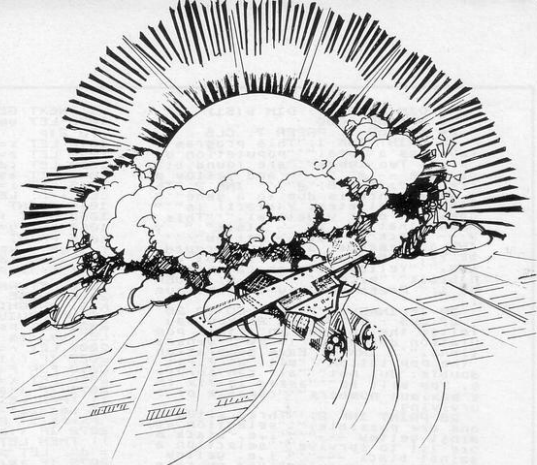
```

```

1;"NEXT GENERATION ("n-1;")"
1005 LET ym=0: LET cd=0: FOR f=1
TO 2xp
1010 LET x=RND: LET v=RND
1020 LET z=(x+y)/(v+y)
1030 LET cd=cd+z
1040 LET a$(f)=STR$(z)
1045 IF a$(f)="" THEN LET i=6: LET ym=y+1
1045 PRINT INK 1; a$(f)
1050 NEXT f
1055 LET y=(4*sp-cd)/(4*sp)
1065 PRINT AT 19,0: INK 2; BRIGHT
1; ym; " yellow mice out of "; (2
*xp-a$(f)+4*sp); " yellow alleles ou
t of "; 4*sp
1070 RETURN
2000 PAUSE 150: PRINT AT 0,7: IN
K 2; BRIGHT 1; FLASH 1; NOT ALL
CAN SURVIVE.
2005 LET ps=2*sp: LET bm=2*sp-ym:
LET bml=bm: LET yml=y
2005 LET r=p0/(5*bm+y*ym)
2007 IF r>1 THEN LET r=1
2010 FOR F=1 TO 2*xp
2050 LET x=RND
2071 IF ((a$(f)<="Y") AND (x>r*sb
)) THEN LET cd=cd-VAL(a$(f)):
LET bml=bml-1: LET a$(f)="" : LET
ps=ps-1: PRINT
2072 IF ((a$(f)="" OR (x>r*sy
)) THEN LET yml=yml-1: LET a$(f)
="" : LET ps=ps-1: PRINT
2075 IF a$(f)="" THEN PRINT OU
T AT 1; INK 5;
2080 NEXT f
2082 PRINT AT 20,31; "
2083 PRINT AT 0,0; "
2084 IF bm=0 THEN PRINT AT 19,0;
"
2085 IF bm>0 THEN PRINT AT 19,0;
BRIGHT 1; INK 2; bml; " BLACK SU
RVIVED FROM "; bm; INK 1; TAB (28)
; INT (100*bml/bm); "%
2085 IF yml>0 THEN PRINT AT 20,0;
BRIGHT 1; INK 2; yml; " YELLOW SU
RVIVED FROM "; ym; INK 1; TAB (28)
; INT (100*yml/ym+5); "%
2090 LET y=(2*ps-cd)/(2*ps): PRI
NT BRIGHT 1; INK 1; " (INT (y
+1000+.5))/100; " CLS Generat
ion = "; (INT (b(n-1)*1000+.5))/10;
"
2095 LET b(n)=y
2095 LET p=p0: IF ps<p0 THEN LE
T p=ps
2100 RETURN
5000 IF INKEY$="" THEN GO TO 500
0
5020 LET I$=INKEY$: RETURN
5030 BORDER 7: PAPER 1: CLS: IN
K: PLOT 47,156: DRAW 0,-120: D
RAW 200,0
5010 FOR f=35 TO 156 STEP 24: PL
OT 45,f: DRAW -3,0: NEXT f
6020 FOR f=47 TO 247 STEP 40: PL
OT f,35: DRAW 0,-4: NEXT f
6030 PRINT AT 9,0; "xy"; AT 2,2; "1
20"; AT 5,3; "80"; AT 10,3; "60"; AT 1
1,3; "40"; AT 14,3; "20"; AT 17,4; "0
5040 PRINT AT 18,6; "0 20
30 40 50"; AT 19,15; "Genera
tion"
5050 PRINT AT 1,6: INVERSE 1;"Po
pulation size"
5050 IF d=2 THEN PRINT AT 0,10;
INVERSE 1;"No selection"
5060 IF d=1 THEN PRINT AT 0,2; I
NVERSE 1; INT (sp); "% selection a
gainst black"
5080 IF d=0 THEN PRINT AT 0,1; I
NVERSE 1; INT (sp); "% selection a
gainst yellow"
5100 PLOT 46,120*b(1)+35: DRAW 0
VER 3,0
5110 FOR f=2 TO n: PLOT OVER 1,4
2+4*f,120*b(f)+35: NEXT f
5115 IF n=51 THEN GO TO 6200
5120 PRINT AT 20,0: INVERSE 1;"P
ress M for more,G for new star
t,S to stop"
5200 INK 0: RETURN
5210 LET n=1: LET b(1)=y
5210 PRINT AT 19,0: INVERSE 1; F
LASH 1; "GRAPH FULL " FLASH 0;"P
ressing M continues run, but"
5215 IF n=51 THEN PRINT AT 19,0:
INVERSE 1; "PRESS M FOR NEW STAR
T,S TO STOP"
5215 INK 0: RETURN
5000 DATA 0,BIN 00001001,BIN 000
00110,BIN 0011110,BIN 01111100,
BIN 01111100,BIN 10000000,BIN 1
111110
5010 FOR f=0 TO 7
5015 READ r
5020 POKE USR "M"+f,r
5025 NEXT f: RETURN

```

1K INVADERS



THE INVADERS are coming. You are the doomed defender of Earth, bravely blasting at the overwhelming might of the venomous Venusians. They are unstoppable but you are determined to litter the skies with their smouldering carcasses. Manoeuvre left and right with 5 and 8 and fire your neutron bolts with 0.

1K Invaders was written by G Brooks of Knowsley Village, Merseyside. In lines 30 and 60, the brackets contain graphics instructions. Ignore the semi-colons, enter the As and 6s in graphic shifted mode, and for S read Space. (1K ZX-81).

```

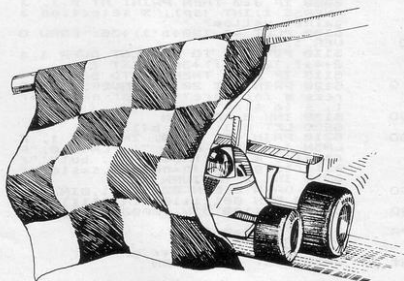
10 LET X=19
20 LET Y=7
30 PRINT AT 17,0;"(A;three S;A
,three S;A;three S;A;three S;A)"
40 FOR A=10 TO 17 STEP 0.02
50 PRINT AT A,RND*14+1;" 0 "
60 PRINT AT X,Y;"(S;6;inverse
S;6;S)"
90 IF INKEY$="5" THEN LET Y=Y-
1
100 IF INKEY$="8" THEN LET Y=Y+
1
110 IF INKEY$="0" THEN GOSUB 16
0
115 IF Y<0 THEN LET Y=0
120 NEXT A
130 PRINT "INVADERS HAVE LANDED"
140 SCROLL
150 STOP
170 FOR X=10 TO 9 STEP -1
180 PRINT AT X,Y+2;"+"
190 PRINT AT X,Y+2;" "
200 NEXT X
210 LET X=19
220 RETURN

```

```

1 REM 000000
5 CLS
6 LET A=3
10 LET S=0
15 LET X=16514
16 LET L=INT (RND*100)
20 PRINT AT 21,0;" ";TAB 4+INT
(RND*2);" "
25 IF L<20 THEN PRINT AT 21,IN
T (RND*4);" "
30 PRINT AT 12,A;
40 IF USR X=128 THEN GOTO VAL
"150"
50 PRINT AT 12,A;"V"
60 LET A=A+(INKEY$="8" AND A<1
5)-(INKEY$="5" AND A>0)
70 LET S=S+1
80 SCROLL
90 GOTO 16
150 PRINT "GAME OVER ";S

```



RALLY

RALLY is a very traditional type of scrolling race-track game but its inclusion of machine code will make it of interest to novice programmers. First enter the listing as printed and then the following commands, with NEWLINE between each one—POKE 16514,42; POKE 16515,14; POKE 16516,64; POKE 16517,78; POKE 16518,6; POKE 16519,0; POKE 16520,201; POKE 16510,0.

The program can then be RUN, your car appearing as V and requiring to be steered to avoid the side of the road and the occasional obstacles with keys 5 and 8.

The listing was composed by Damon Roberts of Romford, Essex. (1K ZX-81).

CAVE ADVENTURE



```

5 REM INITIAL PROG
10 LET P=INT (RND*10)+4
20 LET A=INT (RND*15)+5
30 LET B=INT (RND*10)+5
40 PRINT "POWER=";P;" ARMOUR H
ITS=";A;" BODY HITS=";B

```

```

10 PRINT "CAVE ADVENTURE"
20 PRINT "THE CAVE IS VERY DAR
K INSIDE AND YOU CAN JUST SEE"
30 PRINT
40 PRINT "WILL YOU ENTER? (Y/N
)"

```

```

50 INPUT A$
60 IF A$="N" THEN GOTO VAL "50
0"

```

```

70 CLS
80 LET P=INT (RND*3)
90 IF P=VAL "0" THEN GOTO VAL
"150"

```

```

100 IF P=VAL "1" THEN GOTO VAL
"200"
110 IF P=VAL "2" THEN GOTO VAL
"300"

```

```

150 PRINT "ENTER POWER"
153 LET E=INT (RND*12)
155 INPUT M
156 IF M>E THEN PRINT "YOU KILL
ED TWO GIANT RATS"

```

```

160 IF M<E THEN PRINT "LOSE FOU
R HITS. GIANT RATS ATTACKED"
170 GOTO 450

```

```

200 PRINT "THE CAVE HAS NO MONS
TERS"

```

```

220 GOTO 450
310 PRINT "A DRAGON ATTACKS. LO
SE 7 HITS"

```

```

320 GOTO 455
450 PRINT "THERE IS $50"
455 PRINT "WILL YOU GO FURTHER?
"

```

```

460 INPUT S$
465 CLS
470 IF S$="Y" THEN GOTO 80
500 PRINT "YOU ARE AT THE ENTRA
NCE"

```

PAUL FRAVIGAR of Skegness, Lincolnshire has sent an adventure game for the 1K ZX-81. As you might expect, some of the work has to be done with pencil and paper and the short initial program must be used to set the random values of your power

reserves and the number of armour and body hits you can sustain. Your armour naturally must be destroyed before you suffer any body hits. Run the initial program, lines 5 to 40, note the given values, clear the lines, then enter the main listing.

As you explore the cave, note the treasure you find and the hits you sustain. When the damage inflicted by the various monsters is approaching the fatal level, you should turn and run. The game can be played by more than one person.

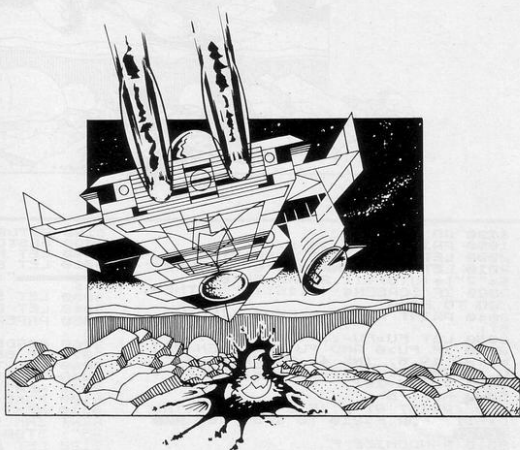
ZX DEFENDER

THIS EXCELLENT game for the 16K Spectrum sends you flying low over enemy territory armed with rockets and bombs, with orders to destroy as many enemy fuel dumps and aircraft as possible before your fuel—or your luck—runs out.

Under the control of keys 5 to 8 you can climb, descend and fly left or right. You release bombs with 9 and fire rockets with 0. The program occupies only about 5K and there is therefore plenty of room for additions to the user-defined graphics.

ZX Defender is the kind of vivid, entertaining game you want to amend, adapt, expand and generally play around with. The only serious problem is that it is a little slow but there are so many hazards and targets on offer that any armchair pilot will find himself fully-occupied.

It is a first-class listing which all Sinclair programmers will enjoy. It was written by Stephen King of Kennington, Oxford, who has included a number of useful REM statements to help with the graphics.



```

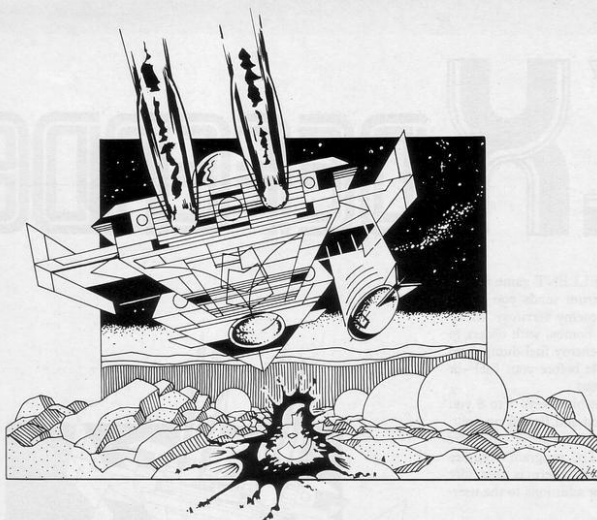
1 REM ZX DEFENDER © S.KING
10 LET BE=0
20 GO SUB 3000
30 GO TO 1000
40 REM 5000
50 LET FU=FU-2
60 FOR T=1 TO 15
70 LET I=15+(SGN S)*T
80 LET Q$=SCREEN$(U,I)
90 IF Q$="" THEN PRINT AT U,I
INK 0; "": BEEP .005; T: PRINT
AT U,I; INK 1; "": NEXT T: RETURN
100 IF Q$=">" OR Q$="<" THEN GO
SUB 3000: RETURN
110 IF Q$="e" THEN LET FU=FU+17
: FOR F=1 TO 8: RANDOMIZE F: LET
L=USR USR "a": NEXT F: BEEP .1,
40: RANDOMIZE S7: LET L=USR USR
"a": PRINT AT U,I: "": RETURN
120 IF Q$="[" OR Q$="]" THEN LET
T SC=SC+7: GO SUB 8000: RETURN
130 PRINT AT U,I: "": RETURN
200 BEEP .02,50
210 PRINT AT (21-(d/8)), (31 AND S
=1); "e"; AT (22-(d/8)), (31 AND S=1)
: "":
220 RETURN
500 LET FU=FU-1: REM 5000
510 FOR I=1 TO 14-U
520 LET I=15+(SGN S)*I
530 LET R=U+T
540 IF SCREEN$(R,I)="" THEN
GO TO 570
550 PRINT AT R,I; INK 2; "": BE
EP .005; T: PRINT AT R,I; INK 1; "
560 NEXT T: RETURN
570 IF SCREEN$(R,I)="" THEN
PRINT AT R,I; "": RETURN

```

```

580 LET FU=FU+11: PRINT AT R,I;
CHR$(144+(RND*4))
590 FOR F=1 TO 18: RANDOMIZE F
600 LET L=USR USR "A": BEEP .00
S,F
610 NEXT F
620 RANDOMIZE S7: LET L=USR USR
"A"
630 PRINT AT R,I: " "
640 RETURN
1000 FOR B=0 TO 1 STEP 0: LET I$
=INKEY$: IF I$="" THEN GO TO 103
0
1005 IF I$="0" THEN LET S=1
1010 IF I$="0" THEN GO SUB 50
1015 IF I$="5" THEN LET S=-1
1020 IF I$="9" THEN GO SUB 500
1030 IF S=-1 THEN FOR F=1 TO 8:
RANDOMIZE USR USR "C": PLOT 0,D:
DRAW 0,-D+48: NEXT F: RANDOMIZE
: IF RND*.7 THEN PRINT AT RND*(
21-(d/8)),0;"": IF RND*.8 THEN
PRINT AT (RND*(21-(d/8))/2),0;"J
"
1040 IF S=1 THEN FOR F=1 TO 8: R
ANDOMIZE USR USR "F": PLOT 255,D
: DRAW 0,-D+48: NEXT F: RANDOMIZE
: IF RND*.7 THEN PRINT AT RND*(
21-(d/8)),31;"": IF RND*.8 THEN
PRINT AT (RND*(21-(d/8))/2),31
;"I"
1050 IF d<50 AND d<190 AND SC<50
0 AND RND*.1 THEN GO TO 1900
1100 LET d=d+(10 AND d<60)-(10 A
ND d>190)
1110 IF SC<500 THEN LET FI=FI+1:
LET SC=0: PRINT AT 21,30; INK 5
: PAPER 0; FI: PRINT AT 19,6;"
": REM 20 space
S

```



VOLCANIC DUNGEON CHAMPIONSHIP



CARNELL SOFTWARE



**WIN A FABULOUS wings
HOLIDAY FOR 2 TO FLORIDA.**

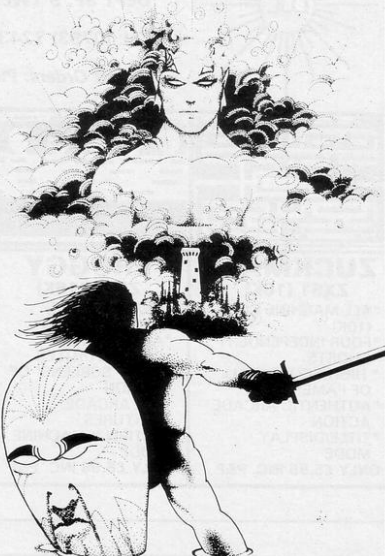
**VISIT THE AMAZING NEW
EPOT CENTRE**

Volcanic Dungeon, the addictive adventure. People have been known to venture into its maze of caverns to rescue the Princess Edora again and again. If you are one of them, or wish to be, then you could find yourself lying on a sun-drenched beach in Miami for a week. Followed by a further week at Orlando, visiting Disney World and Epcot. So what do you have to do for all this? Just be the best Volcanic Dungeon player in the UK, that's all! Ten finalists will battle it out in the championship at the London Computer Fair, Earl's Court, in June 1983. But first you must prove you are worthy.

Volcanic Dungeon is available on the 16K ZX-81, 48K Spectrum and Dragon 32. An entry form is supplied with every game. (Anyone who already owns the original ZX version can enter by sending a SAE for an entry form.) Order your copy NOW from CARNELL SOFTWARE, 4 Staunton Road, Slough, Berks. Only £5.00 including P&P. Also available from good microcomputer stores.

The 'Judges' decision is final and no correspondence will be entered into. All business associates of Carnell Software, and their relatives, are disqualified from entry. A copy of the rules of the Volcanic Dungeon championship will be supplied with the entry form.

SPECTRUM 48K : ZX81 16K SIX PART ADVENTURE



BLACK CRYSTAL THE QUEST IS ABOUT TO BEGIN

The ultimate role playing adventure for the SPECTRUM/ZX 81. You can become a warrior, elf or wizard on a quest to find and use the rings of creation: to destroy the Black Crystal and defeat the Lords of Chaos. Held within six programs lies a land of fabulous treasures and mythical monsters. Journey through the land of Beroff, explore the castle of shadows, descend into the Shaggoth's lair, search for diamonds in the sea of sand but beware of sand sharks! Confront the fire demon in his temple, battle against the Lords of Chaos and win your way to the Black Crystal.

By splitting Black Crystal into six programs we can provide more variety and detail than any other adventure for the Sinclair computers.

Real time monster battles. Superb graphics. Save game feature. All six parts are supplied together on cassette, boxed with instruction booklet.

**SPECTRUM 48K: 180K OF PROGRAM
IN SIX PARTS — ONLY £7.50
ZX81 16K: OVER 100K OF PROGRAM
IN SEVEN PARTS — ONLY £7.50
WHY PAY MORE FOR LESS OF AN
ADVENTURE**



To: CARNELL SOFTWARE, DEPT 2, 4 STAUNTON RD, SLOUGH, SL2 1NT.
Please send me: Black Crystal for my:

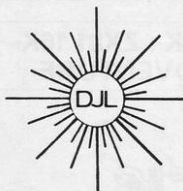
Spectrum 48K..... £7.50
ZX81 16K..... £7.50

I enclose a cheque/ postal order (payable to Carnell Software) for £

NAME.....

ADDRESS.....

TRADE ENQUIRIES WELCOME

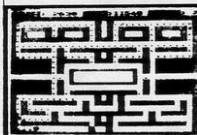


DJL SOFTWARE

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 ★ 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 BELIEVED!!

ONLY £5.95 INC. P & P



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 newsgagent, 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 No: _____ Number _____
 Name _____ Address _____
 Signature _____ Date _____
 NB This offer applies to UK subscribers only. Overseas rates available on request.

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

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 docking. 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.



(16K) Text Adventure

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 tip 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 abandoned 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 or Visa Card holders

please telephone (0344) 27317 (9am-6pm)



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

SIMPLE PLUG-IN CENTRONICS INTERFACE

For ZX Spectrum



ONLY £45 inclusive

- Recognises LLIST and LPRINT which allows programs to be listed directly from your Spectrum
- Also allows printout direct from BASIC listings without the need for special user calls
- Completely self contained with 1 metre of ribbon cable and connectors
- Works with any Centronics printer including all Epsoms, Seikosha 100A, OKI Microline 80 etc
- Includes driving software which allows up to 128 characters per line
- Full range of business software available
- Fully tested and guaranteed for 12 months

Trade Enquiries Welcome

KEMPSTON MICRO ELECTRONICS

180a Bedford Road, Kempston, Bedford, MK42 8BL

I wish to order:

Quantity	Item	Price
	Centronics interface	(r) £45.00
	Cheques/Postal orders should be made payable to Kempston Micro Electronics Ltd	£1.00
	Post & Package Total (VAT inc)	

For Access/Barclaycard please give your card number and signature

Card No _____

Signature _____

Address _____

Please post to Kempston (Micro) Electronics, Dept 180a Bedford Road, Kempston, Bedford MK42 8BL

THE NEW SPECTRUM 'ADD-ON' NOW WITH ADDITIONAL SWITCH-TYPE JOYSTICK PORT

ONLY **£22.50** PLUS VAT

COMPLETE your SPECTRUM with our Multi-purpose Sound Generator and Joystick-port Board!! With one low-cost purchase you can obtain the following outstanding improvements to your ZX SPECTRUM:

- THREE CHANNEL sound effects. PROGRAM three independent sounds with music, gun shots, explosions etc.
- AMPLIFICATION of the standard sound output.
- TWO ports for Potentiometer Joysticks;
- ONE port for Switch-type Joystick.

The 'ADD-ON' uses the amazing AY-3-8910 SOUND Chip, which gives you an enormous range of sound effects. The output and volume of each channel can be separately controlled, with gun shots, explosions, drums etc., produced under the 'sound envelope'. MOST IMPORTANT TO NOTE — the CHIP is 'processor independent'. This means that sounds can continue to be produced without any noticeable effect on the speed of your program!!

The 'ADD-ON' contains its own speaker and amplifier chip, and is supplied with a cassette containing sound demonstration routines and some sample sounds. The 'ADD-ON' simply plugs straight onto the back of your SPECTRUM. No soldering is required.

COMPLETE YOUR SPECTRUM NOW!!

JOYSTICKS (POTENTIOMETER-TYPE)
KIT (incl. case) each £5.35 + VAT

BUILT each £6.75 + VAT

NEW COWBOY SHOOT-OUT
(Machine Code) £3.95 + VAT
Full feature, TWO-PLAYER, cowboy shooting game. Hide behind the cactus plants and moving chuck wagons until they are shot away. Shoot your opponent and avoid getting hit yourself. The second player can be the computer, but you set its skill from 10 levels. Excellent colour graphics and sound.

CABMAN (Machine Code) £3.95 + VAT
You are the owner of a fleet of yellow taxis. A rival firm competes with you, trying to steal your fares and run you off the road, if they can. Ten skill levels determine the number of opposing taxis: the speed at which they drive and the amount you earn per completed journey. MAXIMIZE your earnings before you lose your entire fleet. This program is FIRST CLASS.



MACHINE CODE PROGRAMMERS —
ACS SOFTWARE NOW ONLY £5.95 + VAT
ASSEMBLER NOW ONLY £4.95 + VAT
DISASSEMBLER NOW ONLY £4.95 + VAT
BOOKS
LARGE RANGE FOR SPECTRUM AND ZX81

**BBC,
DRAGON &
ACORN
DEALERS**

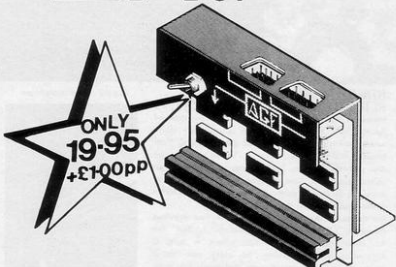
NOTE: We stock land market! PROGRAM POWER SOFTWARE for the BBC, ACORN, SPECTRUM and DRAGON 32. Send S.A.E. for appropriate catalogue

All programs are now available at all good dealers or direct from MICROPOWER LTD.

Dept. SP
81/82 REGENT STREET,
CHAPEL ALLERTON,
LEEDS LS7 4PL
Tel: (0532) 663188 or 690343

PLEASE add 55p
order P & P
+ VAT at 15%
WRITTEN BY OUR PROGRAMS!
WE PAY 20% ROYALTIES
FOR DRAGON, SPECTRUM
BBC PROGRAMS

....Introducing the AGF JOYSTICK INTERFACE II for sinclair ZX Spectrum 81



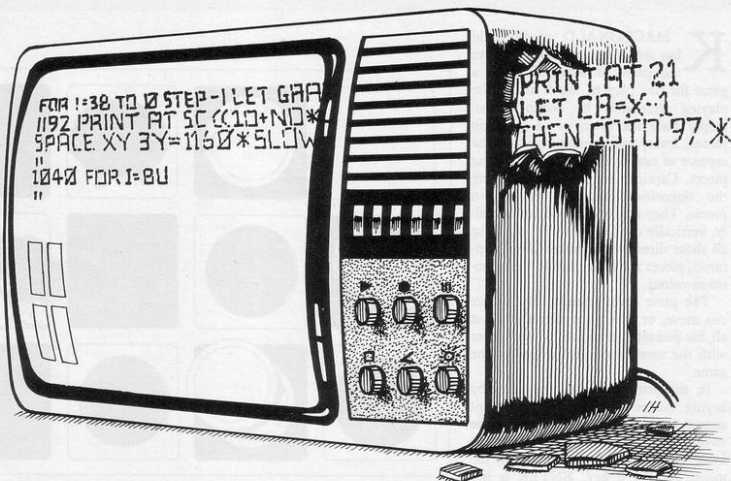
ONLY 19.95 + £1.00 P.P.

A SELECTION OF COMPATIBLE SOFTWARE

- ZX SPECTRUM**
- Abersoft**
Axis
Campbell Systems
DK 'Tronics
- ICL**
New Generation
Software
Psion
- Silversoft**
- ZX81**
Artic
J.K. Greye
P.S.S.
- Silversoft**
NB ☐ Available from us, please tick
Not suitable for original interface
- Mazeman**
Labyrinth
Gulpham
Metroids
Star Trail (Man. Dock)
Escape £4.95
3D Tunnel £5.95
Flight Simulation
VU-3D
Ground Attack
Cyber Rats £5.95
- Galaxians**
3D Monster Maze
Krazy Kong
Ghost Hunt
Maze Drag Race
Asteroids

JOYSTICKS
ATARI
CONTROLLERS
FOR USE WITH OUR INTERFACE
Module II or VR 20, Commodore 64,
Atari VCS, Atari 400, etc.
If you require extra Joysticks for our
original interface module make order
"OLEF Joysticks"
ONLY £7.54 inc. VAT + P&P

SEND C.W.O. ONLY TO: A.G.F. HARDWARE, DEPT. SPR 26 VAN GOGH PLACE, BOGNOR REGIS, WEST SUSSEX PO22 9BY			
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			



PETER BEEFTINK of Calgary, Canada has written a short subroutine to cause any length of text to be displayed neatly without cutting-off words halfway. The text must be defined initially as BS and the routine reached through a GOSUB command.

The listing checks for a space and ensures that it appears at the end of the line. (1K ZX-81).

SET RAGGED

```
1010 LET A=LEN BS
1020 IF A>32 THEN GOTO 1050
1030 PRINT BS
1040 RETURN
1050 LET B=A
1060 LET A=32
1070 IF CODE B*(A)=0 THEN GOTO 1
1080
```

```
1090 GOTO 1070
1100 PRINT BS TO A
1110 IF (B-A)>32 THEN GOTO 1140
1120 PRINT B*(A+1 TO B)
1130 RETURN
1140 LET B=B*(A+1 TO B)
1150 GOTO 1010
```



AQUA-ATTACK

AQUA-ATTACK is an unpretentious program for the 1K ZX-81. You are a submariner lurking in the depths of the Atlantic. Your submarine appears on-screen at random positions and must launch its torpedo, with any key, to hit the passing passenger ships amidsts.

When you succeed there is a satisfying explosion and the number of vessels which managed to evade your aggressive attentions is indicated alongside.

The program was submitted by Roy Spencer of Ilford, Essex.

In our listing, lower-case letters in brackets are graphics instructions.

```
10 LET S=PI-PI
20 LET A=CODE ">"
30 LET B=INT (RND*CODE "?")+5
40 LET C=CODE "(graphic 5)"
50 LET E=CODE " "
70 PRINT AT C,E-2;"(graphic W;
graphic G;graphic F;graphic Q;sp
ace)"
80 LET E=E-CODE "(graphic 1)"
85 IF E=CODE "(graphic 2)"<=1
THEN LET S=S+CODE "(graphic 1)"
90 IF E=CODE "(graphic 2)"<=1
THEN LET E=24
100 PRINT AT A,B;"(graphic V)"
```

```
110 IF INKEY$<">" THEN GOTO 400
111 PRINT AT 5,1;"-----"
120 GOTO 70
400 LET T=B
410 PRINT AT A,T;"(graphic T)"
411 PRINT AT A,T;" "
420 LET A=A-CODE "(graphic 1)"
430 IF A<0 THEN GOTO 410
440 IF A=C AND T=E THEN GOTO 50
450 GOTO 20
500 PRINT AT C,E-CODE "(graphic
2)";"XXXXX";S;
```

K MACDONALD of Sheffield has sent a listing which displays the game of **Reversi**. It is a game for two players, black and white playing alternately by occupying an empty space next to one of the opposing pieces. Every move must result in the capture of one or more of the opposing pieces. Captures are made by trapping the opposition between your own pieces. They can be trapped horizontally, vertically or diagonally, or in any or all those directions at once. When captured, pieces are converted to the opposite colour.

The game ends when neither player can move, or when one player has lost all his pieces; the winner is the player with the most pieces at the end of the game.

In this listing, moves are input by keying the co-ordinates of the vacant square, in the form "d6". Likewise, the co-ordinates of the pieces to be turned must then be keyed. At the end of the move, hit the 0 key. ENTER is not required for those operations. It should be possible to devise a subroutine to turn the captured pieces automatically. Can our readers supply one? (16K Spectrum). Graphics notes:

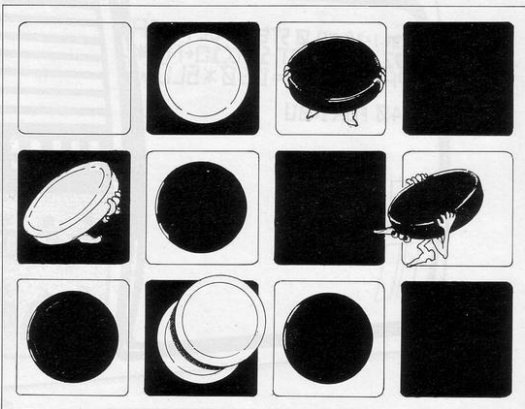
All user-defined graphics are entered in E mode 4 to produce a green background.

100—Graphic E, graphic F, graphic E, and so on.

110—Graphic H, graphic G, graphic H, and so on.

410—Graphic A, graphic B.

420—Graphic C, graphic D.



REVERSI IS REVER

```

5 BORDER 7: PAPER 7: CLS
7 LET q=0
10 FOR x=USR "a" TO USR "h":+7
20 READ a: POKE x,a: NEXT x
30 DATA 0,7,31,63,63,127,127,1
27 0,224,246,252,252,254,254,254
127,127,127,63,63,31,7,0,254,25
4,254,252,252,246,224,0
58 DATA 255,126,126,126,126,126,12
8,126,126
60 DATA 255,1,1,1,1,1,1,1
61 DATA 1,1,1,1,1,1,1,255
62 DATA 126,126,126,126,126,126,12
9,126,255
90 REM BOARD RECORD
100 LET a$=""
110 LET b$=""
120 PRINT INK 0: PAPER 4: a$ b$
a$ b$ a$ b$ a$ b$ a$ b$ a$ b$ a$ b$
b$ a$ b$
130 PRINT AT 16,0: "1 2 3 4 5 6
7 8"
140 FOR a=1 TO 8: PRINT AT a*2-
1,16;CHR$(64+a): NEXT a
150 GO TO 530
160 REM MOVE
170 BEEP :OS,35
180 LET a$=INKEY$
190 IF q=0 THEN PRINT AT 4,18;"
Black to move"
200 IF q=7 THEN PRINT AT 4,18;"
White to move"
210 PRINT AT 5,18:"POSITION:"
220 IF a$<"a" OR a$>"h" THEN GO
TO 180
230 PRINT AT 5,27;a$
240 LET b$=a$
250 LET a$=INKEY$
260 IF a$<"6" OR a$<"1" THEN GO
TO 250
270 PRINT AT 5,28;a$
280 LET b$=b$+a$
290 REM MOVE
300 LET c$=(1
310 IF c$="a" THEN LET z=0
320 IF c$="b" THEN LET z=2
330 IF c$="c" THEN LET z=4
340 IF c$="d" THEN LET z=6
350 IF c$="e" THEN LET z=8
360 IF c$="f" THEN LET z=10

```

```

370 IF c$="g" THEN LET z=12
380 IF c$="h" THEN LET z=14
390 LET c$=b$(z)
400 LET x=VAL c$*2-2
410 PRINT AT z,x: INK q;" "
420 PRINT AT z+1,x: INK q;" "
430 RETURN
440 LET p=q: LET e=e+1: IF e>65
THEN GO TO 810
450 IF p=7 THEN LET q=0: LET b1
360 black+1
460 IF p=0 THEN LET q=7: LET wh
ite=white+1
470 GO SUB 160
480 FOR g=1 TO 20
490 PRINT AT 21,0:"Enter the co
unters to be turned..."
500 IF q=0 THEN LET black=black
+1: LET white=white-1
510 IF q=7 THEN LET white=white
+1: LET black=black-1
520 LET a$=INKEY$
530 IF a$="0" THEN GO TO 610
540 IF a$<"a" OR a$>"h" THEN GO
TO 520
550 LET b$=a$
560 LET a$=INKEY$
570 IF a$<"1" OR a$>"8" THEN GO
TO 560
580 LET b$=b$+a$
590 GO SUB 200
600 NEXT g
610 PRINT AT 21,0;"..
620 GO TO 440
625 REM BOARD STATE
630 LET z=6: LET x=6: LET q=7
640 GO SUB 460
650 LET z=6: LET x=8: LET q=0
660 GO SUB 410
670 LET z=8: LET q=0: LET x=6
680 GO SUB 410
690 LET z=8: LET x=8: LET q=7
700 GO SUB 410
710 LET white=2
720 LET black=2
730 LET g=4
800 GO TO 440
810 PRINT AT 21,0:"Whites=";whi
te;" Blacks=";black

```

HIGH POWERS

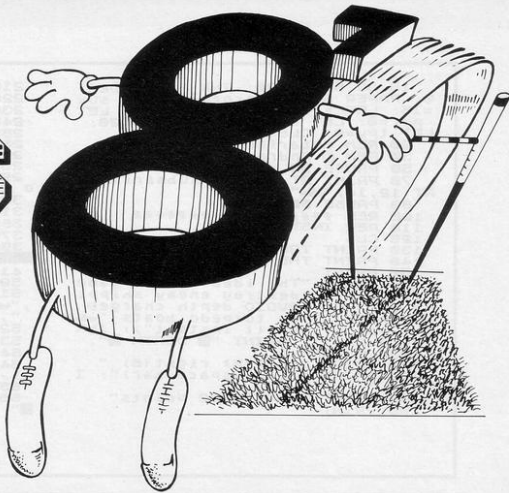
HIGH POWERS is designed to avoid the limitations of floating point arithmetic, which tackles only the first eight significant figures of a number.

The program enables the user to raise a N to the power P and receive an answer correct to the last digit. Each digit of the answer is stored in a single dimension array and, to assist programming, is stored in reverse order.

Line 80 calculates the number of digits in the answer and DIMS D to that number. Lines 100 to 170 calculate the number, the variable F being used as a carry. Lines 180 to 240 print-out the final result.

The CHR\$ statement in line 230 increases the speed of the printing as the ROM routine for printing numbers is very slow. The program occupies only 461 bytes but an expanded machine is required because of the memory needed for the variables.

High Powers was submitted by J Stephenson of Bolton, Lancashire. (16K ZX-81).



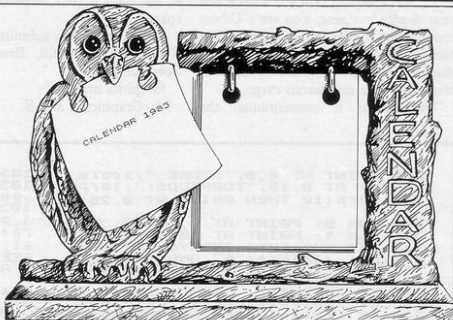
```

20 LET F=0
30 PRINT "ENTER NUMBER"
40 INPUT N
50 PRINT "ENTER POWER"
60 INPUT P
70 FAST
80 LET X=INT (P<LN N/LN 10)+.1
90 DIM D(X)
100 LET D(1)=1
110 FOR A=1 TO P
120 FOR B=1 TO X
130 LET D(B)=D(B)*N+F
140 LET F=0
150 IF D(B)>9 THEN GOSUB 260
160 NEXT B
170 NEXT A
180 CLS
190 SLOW
200 PRINT N;" TO THE POWER ";P;
  " = "
210 PRINT
220 FOR A=1 TO X
230 PRINT CHR$(D(X+1-A)+28);
240 NEXT A
250 STOP
260 LET F=F+1
270 LET D(B)=D(B)-10
280 IF D(B)>10 THEN RETURN
290 GOTO 260
  
```

CALENDAR

IF YOU HAVE a printer and at least a 1K ZX-81, you can make a neat little calendar with this routine from Simon Kelly of South Croydon, Surrey.

As set up at present, the listing produces a calendar for 1983 but it can be changed by altering the year in line 20 and the value of Z in line 25. Z should be made to signify the first day of the year, on the convention that Sunday equals one, Monday is two, and so on.



```

10 LET M$="JANFEBMARAPR MAYJUNJ
  ULAUGSEPCTNOVDEC"
15 LET D$="3128313031303131303
  13031"
20 LET Y=1983
25 LET Z=7
30 LPRINT TAB 9;"CALENDAR ";Y
35 LET Z=Z*4-1
40 FOR A=1 TO 12
45 LET D=VAL D$(A TO 2)
50 LET D=D*(3 TO )
55 LPRINT "*****"
  
```

```

***** "J M A T O 3";" *****"
60 LET M$=M$(4 TO )
65 LPRINT "SUN MON TUE WED
  THU FRI SAT"
70 FOR B=1 TO D
75 LPRINT TAB Z;B;
80 LET Z=Z+4
85 IF Z=31 THEN LET Z=3
90 NEXT B
95 LPRINT
99 NEXT A
  
```

```

10 GO SUB 8000: INK 0: BORDER
0: PAPER 5: LET score=0: LET sux
=15: LET state=0: LET sdc=0: LET
pdc=0: LET ddc=0: LET torp=20:
LET tpy=0: CLS
20 REM Submarine game
30 REM © Andrew D Russell
50 PAUSE 50
70 PRINT AT 10,11;"submarine";
AT 12,14;" "
80 PAUSE 50
100 REM *****
110 REM INSTRUCTIONS
120 CLS
130 PRINT TAB 11;"SUBMARINE"
140 PRINT TAB 11;" "
150 PRINT
160 PRINT "The idea of the game
is to destroy enemy shippi
ng BUT AUDID depth charges
dropped by torpedo boats
these spell instant": INK
2: FLASH 1: PRINT "DEATH":
FLASH 0: INK 1
165 PRINT "left (5) right (8) "
170 PRINT "fire (space bar)": I
NK 1
180 PRINT " ","1000 points"
200 PRINT

```

```

210 PRINT " ","250 points"
220 PRINT
230 PRINT " ","250 points"
240 PRINT
250 PRINT " ","500 points"
260 PRINT
270 PRINT " ","50 points"
280 INK 0: PRINT
290 PRINT " " press any key t
o start"
300 PAUSE 0
310 CLS
320 INK 1
330 FOR a=10 TO 21
340 PRINT AT a,0:" "
410 NEXT a
500 LET shx=25
510 DATA " ","50"," ","250
" ","1000"," ","500"," "
" ","250"
520 FOR a=1 TO (5*AND)+1
530 READ a$,val
540 NEXT a
545 LET step=.25+(INT (AND*6)+
1)/8)
550 RESTORE
560 INK 5: PRINT AT 9,0:" "

```

SUBMARINE

THE SEA is cold and as clammy as a witch's skin. Under its green and creeping skin you slide about your deadly business. You are a U-boat commander. Under the icy waters of the North Atlantic, you shadow assorted shipping and are pursued by torpedo boats and their murderous cargo.

The format is conventional; the

graphics are excellent—see our listing. Power your craft left with 5, right with 8, and launch your torpedoes with the space bar.

Submarine was submitted by A D Russell of Eccleshill, Bradford (16K Spectrum)

Graphics notes:

70—Graphics A and B.

190—Graphics K and L.

210—Graphics C, D and E.

230—Graphics P, Q and R.

250—Graphics M, N and O.

270—Graphics F,G,H,I and J

1030—Graphic U

2510—Graphic S

2520—Graphic T.

```

600 PRINT AT 0,0:"SCORE:":score
: PRINT AT 0,16:"TORPEDOS:":torp
: IF torp<10 THEN PRINT AT 0,26;
600 INK 5: PRINT AT 9,shx+5;" "
705 INK 1: PRINT AT 20,sux;" "
710 LET sux=sux+(INKEY$="8" AND
sux<30)-INKEY$="5" AND sux>0)
715 PRINT OVER 1;AT 20,sux;" "
720 PRINT OVER 0;AT 9,shx;a$
725 IF INKEY$=" " AND state=0 T
HEN LET state=1: LET torp=torp-1
726 IF state=1 THEN GO SUB 1000
727 IF state=0 THEN GO SUB 900
728 IF torp<0 THEN GO TO 3000
729 IF sdc=1 THEN GO SUB 2500
730 IF sdc=0 AND val=1000 AND R
ND<4 THEN GO SUB 2000
740 LET shx=shx-step
745 IF (shx<1 AND torp<1) THEN
GO TO 3000
750 IF shx<1 THEN GO TO 500
750 GO TO 600
900 LET pos t=sux
905 LET tpy=18
910 RETURN
1000 INK 1: PRINT AT tpy+1,pos t
:
1030 PRINT OVER 1;AT tpy,post;" "
1034 IF tpy>10 THEN GO TO 1040

```

```

1035 IF tpy=10 THEN LET state=0
1036 IF tpy=10 THEN PRINT AT tpy
,post;" "
1037 IF tpy=10 AND SCREEN$ (tpy-
1,post)<>" " THEN LET score=score
+val: PRINT OVER 1;AT tpy-1,po
st;" " PAUSE 50: FOR y=1 TO 8:
BEEP .05,10*AND+20: NEXT y: PRIN
T AT tpy-1,0;" "
1040 LET tpy=tpy-.5: BEEP .05,-1
3: RETURN
2000 REM **release depth charge*
2010 LET pdc=shx
2010 LET ddc=shx
2020 LET ddc=10
2030 LET sdc=1
2040 BEEP .1,-20
2050 RETURN
2500 INK 1: PRINT AT ddc-1,pdc;" "
2510 PRINT OVER 1;AT ddc,pdc;" "
2520 IF ddc=20 THEN PRINT OVER 1
,AT ddc,pdc;" " PAUSE 25: BEEP
.25,-20: PRINT AT ddc,pdc;" " L
ET sdc=0
2530 IF ddc=20 AND ABS (pdc-sux)
<5 THEN PRINT AT 20,sux;" " BE
EP .25,-30: PAUSE 25: PRINT AT 2
0,sux;" " GO TO 4000
2540 LET ddc=ddc+1

```

```

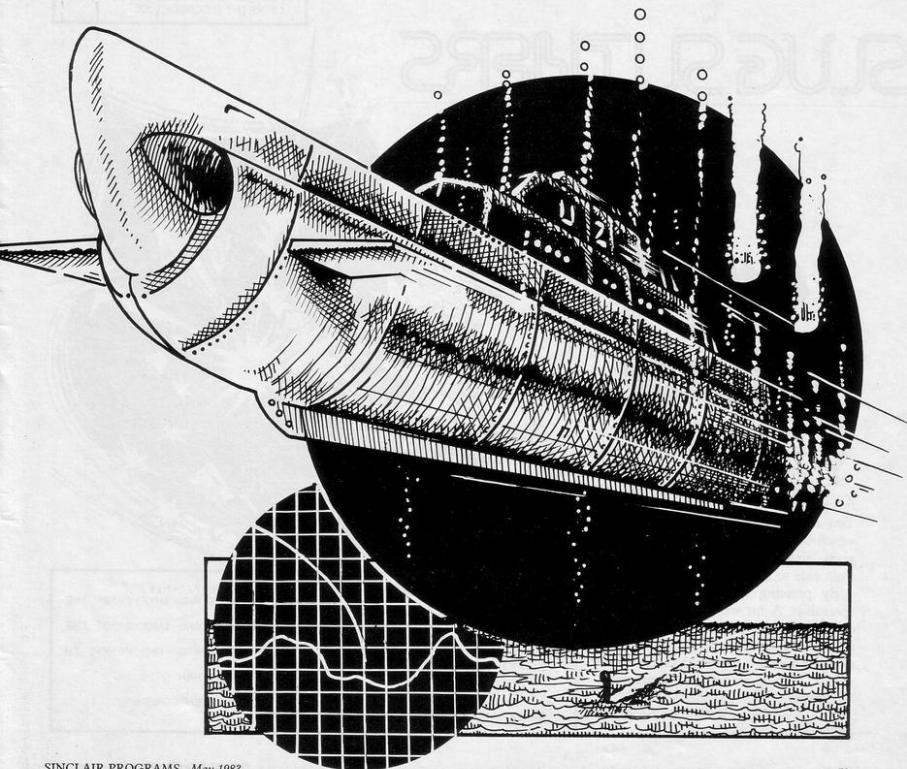
2550 RETURN
3000 CLS
3100 PRINT "GAME OVER"      YOUR
    SCORE IS "":SCORE
3200 GO TO 5000
4000 INK 2: CLS : PRINT "DEPTH C
HARCE GOT YOU"
4010 INK 0: PRINT "YOUR SCORE WA
5000 PRINT "DO YOU WANT TO REPLA
Y (Y or N)"
5010 INPUT a$
5020 IF a$="y" OR a$="Y" THEN RU
N
3030 IF a$="n" OR a$="N" THEN ST
OP
5040 GO TO 5010
5050 RESTORE 9000
5060 FOR a=144 TO 164
5070 FOR b=0 TO 7
5080 READ c
5090 POKE (USR CHR$ a)+b,c
5100 NEXT b
5110 NEXT a
5120 RESTORE
5130 RETURN
9000 DATA 1,3,3,127,255,255,127,
248,0
9010 DATA 0,192,192,248,255,255,
248,0
9020 DATA 0,0,3,3,255,127,63,0

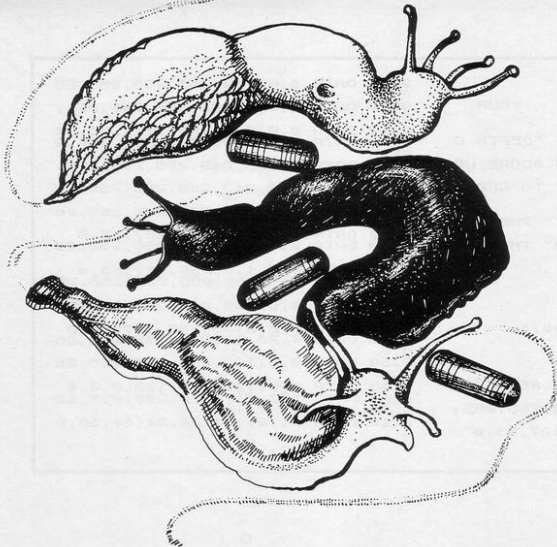
```

```

9030 DATA 8,60,60,253,255,255,25
5,0
9040 DATA 0,0,0,192,255,255,254,
255
9050 DATA 0,0,0,24,255,127,63,31
9070 DATA 0,0,1,15,255,255,255,2
55
9080 DATA 1,255,249,255,255,255,
255
9090 DATA 0,3,243,255,255,255,25
55
9100 DATA 0,0,192,236,255,255,25
4,252
9110 DATA 0,0,0,3,255,127,63,0
9120 DATA 0,0,192,224,255,255,25
4,0
9130 DATA 0,0,1,3,255,127,63,0
9140 DATA 4,30,62,255,255,255,25
4,0
9150 DATA 0,0,192,224,255,255,25
4,0
9160 DATA 0,0,3,55,255,127,63,0
9170 DATA 4,28,30,254,255,255,25
4,0
9180 DATA 0,0,192,230,255,255,25
4,0
9190 DATA 0,0,120,120,120,0,0,0
9200 DATA 137,74,42,0,255,255,12
7,0
9210 DATA 24,24,24,24,24,24,36,6

```





SLUG SLITHERS

ALIEN ATTACK

YET ANOTHER alien ship is circling the earth and, once again, it is you who has the responsibility for saving civilisation as we know it. You have been provided with a craft which bears a startling resemblance to a giant slug, which moves relentlessly from side to side.

By pressing 0 you can fire at the spaceship. A hit will be acknowledged on the screen but the ship remains impervious to attack and the hits serve as warning shots rather than the usual scenes of destruction and mutilation. The game continues indefinitely.

The program was written by Mark McLeod for the 1K ZX-81.



TRANSFORMED into a slug, you slither down your screen, trying to avoid death at the hands of the master gardener. The garden has been littered with slug pellets and the only way to survive is to slither around them, using cursor keys 5 and 8 to move to left and right.

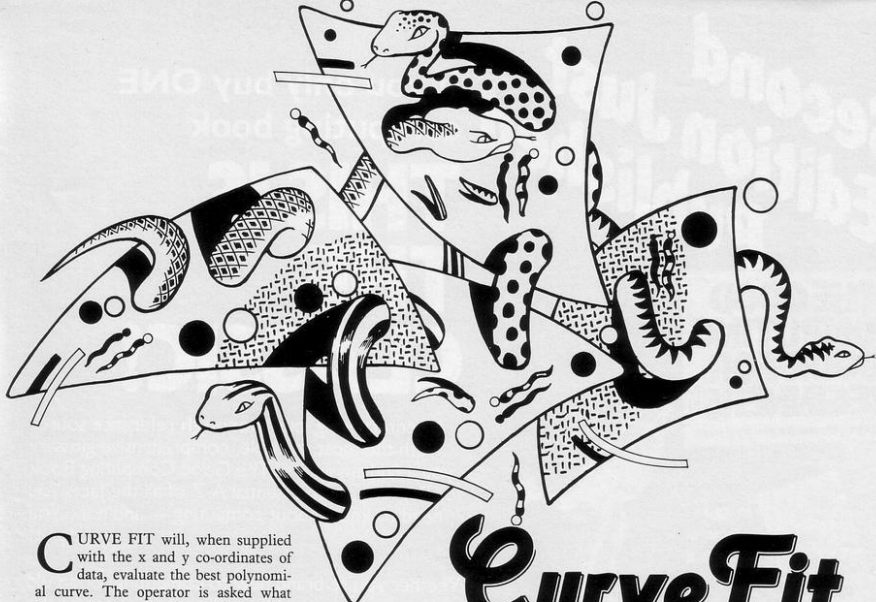
The program was devised by Neil Martin of Callington, Cornwall for the 1K ZX-81. Graphics instructions are given in lower-case letters in brackets.

```

2 LET X=VAL "16"
3 LET E=VAL "5"
4 LET SC=PI/PI
5 LET R=INT (RND*VAL "30")+1
6 SCROLL
7 LET SC=SC+VAL "1"
8 PRINT AT VAL "13",R;"(inver
se space)";AT VAL "11",R+1;"(inv
erse space)"
9 LET X=X+(INKEY$="8")-<INKEY
$="5")
10 PRINT AT E,X;
11 IF PEEK (PEEK 16398+PEEK 16
399*256)=128 THEN GOTO 14
12 PRINT AT E,X;"*"
13 GOTO E
14 PRINT AT VAL "19",PI/PI;"HA
...ZAPPED BY A SLUG PELLET"
15 PRINT "SCORE=",SC
  
```

```

1 LET Y=INT (RND*27)
2 LET Y=0
3 CLS
10 PRINT AT 1,X;"(9t'9d'9x)"
20 PRINT AT 21,Y;"(93'95Pace'9
4)"
21 PRINT AT 21,Y;" "
25 LET Y=Y+1
26 IF INKEY$="0" THEN PRINT AT
2,Y;"*"
27 IF Y=X+1 AND INKEY$="0" THE
N PRINT AT 11,7;"(hit)"
28 IF Y=X+1 AND INKEY$="0" THE
N PAUSE 10
29 IF Y=X+1 AND INKEY$="0" THE
N GOTO 1
33 IF INKEY$="0" AND Y<X+1 TH
EN GOTO 1
34 IF Y=28 THEN GOTO 1
35 GOTO 20
36 SAVE "ALIEN COMBAT"
  
```



Curve Fit

CURVE FIT will, when supplied with the x and y co-ordinates of data, evaluate the best polynomial curve. The operator is asked what degree of polynomial he wants—1 for a straight line, 2 for a parabola, and so on.

Although there are standard results for fitting straight lines and parabolas, we have not previously seen a generalised method—perhaps not surprising when one looks at the algebra involved. The sets of data are set up as a matrix of simultaneous equations and that is then

solved by Gaussian elimination. The matrix is reduced to a triangular one and back-substitution gives all the required values.

If the user wishes, he can try fitting another polynomial, so long as it is of lower order. The only limit on the order

is the capacity of memory but the number of operations increases exponentially with the order and above an order of about 7 becomes impossibly slow.

Curve Fit was written by I C Kemp of Abingdon, Oxfordshire. (16K ZX-81).

```
5 REM PROGRAM TO FIT A CURVE
  USING LEAST-SQUARES. BY I.C.KEMP
10 PRINT "TYPE ORDER OF POLYNOMIAL
  REQS."
```

```
15 INPUT N
16 LET N=N+1
19 DIM Z(N+1)
20 PRINT "TYPE NUMBER OF DATA
  POINT PAIRS"
```

```
25 INPUT ND
30 IF N<ND THEN GOTO 45
35 PRINT "POLYNOMIAL OF THIS ORDER
  CANNOT BE FITTED."
```

```
40 GOTO 10
45 FAST
46 DIM S(2*N+1)
47 DIM T(N+1)
```

```
49 REM SETTING VARIABLES TO 0
50 FOR D=1 TO N+1
51 LET S(D)=0
52 LET T(D)=0
```

```
53 LET S(D+N+1)=0
55 NEXT D
57 LET S(0)=0
59 FOR C=1 TO ND
```

```
61 PRINT "TYPE IN X, THEN Y"
70 INPUT X
71 INPUT Y
```

```
75 REM DATA INPUT/CALCULATION
76 FOR F=1 TO N+1
77 LET W=ABS XXXX
78 IF X<0 AND F/2<INT (F/2) T
```

```
HEN LET W=ABS XXXX F=N+1
79 LET W=ABS XXXX F=N+1
80 IF X<0 AND (F+N-1)/2<INT (
  (F+N-1)/2) THEN LET W=-W
81 LET S(F)=S(F)+W
82 LET T(F)=T(F)+W*Y
```

```
83 LET S(F+N+1)=S(F+N+1)+W*Y
85 NEXT F
87 LET SY0=SY0+Y
90 NEXT C
```

```
92 REM FORMATION OF MATRIX OF
  SIMULTANEOUS EQUATIONS FOR THE
  COEFFICIENTS OF THE POLYNOMIAL
97 DIM A(N,N+1)
```

```
98 LET A(1,1)=ND
99 LET A(1,N+1)=SY0
100 FOR K=1 TO N
```

```
101 FOR J=1 TO N
102 IF K+J=2 THEN GOTO 110
105 LET A(K,J)=S(K+J-2)
110 NEXT J
```

```
111 IF K=1 THEN GOTO 115
112 LET A(K,N+1)=T(K-1)
115 NEXT K
120 GOSUB 716
```

```
121 REM PRINT-OUT OF RESULTS
122 PRINT "SOLUTION POLYNOMIAL
  IS:"
```

```
125 FOR L=1 TO N
126 PRINT " + "Z(L); " XXX"; L-1
127 NEXT L
135 PRINT "DO YOU WISH TO FIT A
  POLYNOMIAL OF LOWER
  ORDER? TYPE 1 TO DO THIS."
```

```
140 INPUT G
141 IF G<1 THEN STOP
145 PRINT "TYPE ORDER REQUIRED"
146 INPUT N
```

```
147 LET N=N+1
150 IF N=ND THEN GOTO 97
152 PRINT "POLYNOMIAL OF THIS ORDER
  CANNOT BE FITTED."
```

```
153 GOTO 145
700 REM GAUSSIAN ELIMINATION
```

```
SUBROUTINE TO SOLVE MATRIX
716 DIM B(N,N+1)
717 DIM C(N,N+1)
800 CLS
```

```
850 FOR L=1 TO N-1
855 GOSUB 978
860 FOR K=L TO N
862 LET C(K,L)=A(K,L)
```

```
865 FOR J=L TO N+1
868 IF C(K,L)=0 THEN GOTO 885
870 LET B(K,J)=A(K,J)/C(K,L)
872 IF K=L THEN GOTO 880
```

```
875 LET A(K,J)=B(K,J)-B(L,J)
880 NEXT J
885 NEXT L
890 NEXT L
```

```
910 LET Z(N)=A(N,N+1)/A(N,N)
920 FOR K=N-1 TO 1 STEP -1
925 FOR J=K+1 TO N
930 LET B(K,N+1)=B(K,N+1)-Z(J)*B(K,J)
```

```
935 NEXT J
940 LET Z(K)=B(K,N+1)
945 NEXT K
950 RETURN
```

```
978 LET MAX=ABS A(L,L)
980 FOR K=L+1 TO N
982 IF ABS A(K,L)>MAX THEN GOTO
  998
```

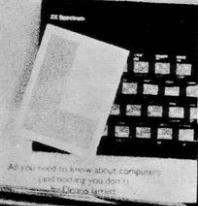
```
983 LET MAX=ABS A(K,L)
985 FOR J=L TO N+1
986 LET Z(J)=A(K,J)
987 LET A(K,J)=A(L,J)
```

```
988 LET A(L,J)=Z(J)
990 NEXT J
998 NEXT K
999 RETURN
```

Second
Edition Just
published

**THE GOOD
COMPUTING
BOOK FOR
BEGINNERS**

PLUS a complete practical glossary of terms



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!

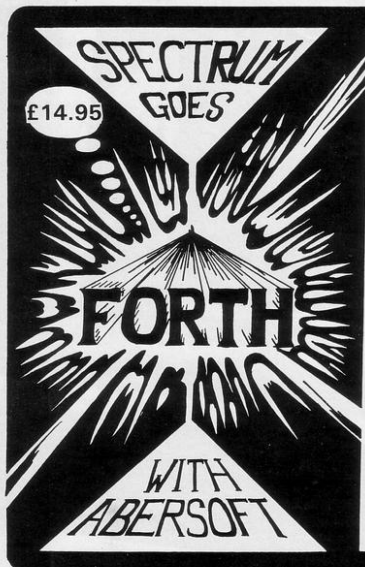
Whether you're brand new to computing, or an old hand keen to stay ahead, you'll score by keeping this classic, top-selling book within reach to use again and again.

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 _____ Address _____
Send to: _____ (please print clearly)
ECC PUBLICATIONS LIMITED
30-31 Islington Green
London N1 8BJ



£14.95

The affordable FORTH



FORTH : A full implementation of this very fast running language. 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. 48K Spectrum only.

14.95



Chess 1.4 : 10 Levels m/c. Graphic screen display. 16K ZX81 only.

8.95



Invaders : Very fast m/c action. Includes mystery ship and increasingly difficult screens. 16K ZX81 only.

4.45



Mazeman : A fast action m/c game that reproduces the spirit of the original. The Spectrum version includes excellent graphics and sound. 16K ZX81 & 16/48K Spectrum.

ZX81

4.45

4.95



Adventure 1 : Based on the original game by Crowther, this game was the start of the Adventure craze. Reviewed Sinclair User. Iss. 2. Features Save game routine as the game can literally take months to complete. 16K ZX81 & 48K Spectrum.

ZX81

8.95

9.95

ABERSOFT

7 MAES AFALLEN, BOW ST, DYFED, SY24 5BA



24-hour Accessphone for Access orders on (0970) 828851

R & R

STAR TREK 48K

Rid the Galaxy of the evil Klingons. Protect your Star Bases from attack. ("Easy to play. Difficult to beat" Sinclair User Dec '82)



ONLY £4.95

16K Spectrum GOLF

Hi-Res Full colour graphics. A game for 1 or 2 players. All the features of a full size course. The family game. (Reviewed Sinclair User Oct '82)



ONLY £3.75

P-E-P

THE PROGRAM ENHANCEMENT PACKAGE FOR THE ZX81 (16K)

A suite of easy to use machine code routines designed to transform your Basic programs.

- DEFINED SCROLL REGION 1 line to whole screen ■ SCROLL up or down.
- FILL SCREEN any character
- CHANGE BACKGROUND
- CHANGE FOREGROUND
- INVERSE VIDEO ■ FLASH SCREEN
- CLEAR SCREEN without changing print position

Supplied on tape with a 6K DEMO PROGRAM and a FULL instruction booklet.

ONLY £5.95

GNASHER 16K

THE ULTIMATE MAZE GAME. Ghosts, Energy Pills, Bonus Fruit, Sound, Colour + much more. Starts easy. Becomes impossible.



ONLY £4.95

Send to: **R & R SOFTWARE (SP)**
34, Bourton Road,
GLOUCESTER GL4 0LE
Tel: GLOS (0452) 502819

48 HOUR DISPATCH
Overseas + 10% please
Large Dealer Discounts

ZX SPECTRUM



Crystal

Innovative ZX Software

Have you the skill and reflexes to control a leviathan space freighter from lift-off to touch-down?

Have you the business head to trade successfully throughout the length and breadth of an entire planet?

Find out by becoming a

MERCHANT OF VENUS

where a complex economic scenario is combined with a superb graphic simulation to produce an entirely new concept in real time adventures.

By studying the current market and wheeling and dealing in Cyborgs, Robodrones and much more, you must plan your business strategy. But ultimately your success depends on your ability as a pilot; from lift-off as you thrust skyward . . . during flight as you control your ship's flight over mountains, cities and oceans . . . to landing where your descent is displayed in incredible graphic detail.

A compelling game of skill and strategy for the 16K ZX-81. **£5.95**

ZX-81 1K GAMES PACK: Without doubt the finest quality collection for the 1K ZX-81: 4 full screen, fast action graphics games, all with on-screen scoring: Invaders, Astravoid, Bomber and Super Slalom, plus a challenging adventure, Dungeon Quest.

All 100% machine-code.

Great value at **£5.95**

COSMIC GUERRILLA: This classic arcade game is now available for the ZX Spectrum. Written in 100% machine code, with fast super-smooth colour graphics and sound. You must defend your laser bases against from incessant attack by those marauding aliens. For 16K and 48K Spectrums.

THE DUNGEON MASTER: Dungeons and Dragons fans . . . let the 48K Spectrum be your D.M. with the first adventure program to enter into the true spirit of D&D. Its unique dungeon creation program allows you to create your own complex scenarios quickly and simply. Comes complete with sample dungeon. Battle your way through a new dimension in fantasy. An infinity of possibilities for only **£5.95**

Open up a whole new world of programming with our professional standard machine code utilities. Send for details (including printer samples).

S.A.E. for our latest catalogue. Please add £0.50p p&p and make Cheques/P.O.s etc. payable to:

CRYSTAL COMPUTING
2 Ashton Way, East Herrington,
SUNDERLAND SR3 3RX

Dealer enquiries welcome. Written any software? Send it to us for evaluation and details of our excellent royalties scheme.



IBM £2,400

How does the world's biggest selling micro compare with the world's biggest computer company's micro? The no-holds-barred test in this month's Which Micro & Software Review reveals some surprises. As a home computer the ZX81 is not only easier to use and program—it actually rivals the IBM on operational speed for some applications.

Which Micro & Software Review's side-by-side tests reveal other surprises too. Would you have thought that the Cambridge Lynx would slay the Welsh Dragon 32? Better read the test.

We also line up the ageing VIC 20 against the upstart Oric I. A real clash!

Our software supplement reviews a stack of new programs—games, educational and business. And our listings are designed to move you off the

FAIR COMPARISON?

"GRRRRR"



ZX81 £49.95

nursery slopes of programming and into areas with a touch of sophistication, using time-savers like letter variables and character statements.

If you want some quick fun, there are five new programs on a free disc with every copy of the April issue. They'd run on ZX81, Spectrum, BBC, Vic 20 and PET. You really can't afford to miss April's Which Micro & Software Review

**WHEN WE TEST A MICRO
IT STAYS TESTED.**



QUICKSILVA

are proud to announce they
are now marketing

PIXEL GAMES

TRADER

A trilogy of 16K programmes that combine to give an epic 49K graphic adventure. As a galactic trader, you deal with some very bizarre customers indeed. Will you live to tell the tale?



SUBSPACE STRIKER

With your deadly Antimat torpedoes, you unleash havoc in the Federation spacelanes and try to dive back to the safety of subspace, fast.
+ **ZOR** — Battle of the robots. Fight for survival in this action-packed strategy game.

STARQUEST

With the help of your on-board computer, you seek a habitable planet amidst the perils of deep space.
+ **ENCOUNTER** — In this adventure, you are snatched off the Earth and the space invaders play YOU!

PIXEL POWER A graphics workshop packed with useful features like Create, Amend, Save, View Set.

HARVESTER A cut-throat strategy game for 2 to 4 players.
BRAINSTORM Can you get our three space explorers across a river of nasty goo without blowing them dry.

SUPPLIED ON CASSETTE

Send order to: QUICKSILVA, DEPT SP,
92 NORTHAM ROAD, SOUTHAMPTON, SO2 0PB

ZX-81 GAMES

Trader	ZX-81 + 16K RAM	£9.95	☐
Subspace Striker + Zor	ZX-81 + 16K RAM	£3.95	☐
Starquest + Encounter	ZX-81 + 16K RAM	£3.95	☐

VIC-20 GAMES

Trader	VIC-20 + 16K RAM	£14.95	☐
Subspace Striker + Zor	VIC-20 + 16K RAM	£7.95	☐
Starquest + Encounter	VIC-20 + 16K RAM	£7.95	☐
Pixel Power	VIC-20 + 16K RAM	£7.95	☐
Harvester + Brainstorm	VIC-20 + 16K RAM	£7.95	☐

Please send me the games as ticked.

Total cheque/P.O. enclosed.....
Cheque payable to QUICKSILVA

Name.....

Address.....

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.



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-made 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 primeval slime... **See** them all on the computer's plan of the tomb... when it will tell 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. SP)
(Incorporating MOVIEDROME VIDEO)

19 Leighton Avenue, Pinner, HA5 3BW.

Is your Spectrum holding back?

Unlock all the secrets of your Spectrum with the most complete Spectrum Software Library available.

Written by the sharpest minds in micro technology today, this comprehensive library of software will allow you to maximise the entire range of your Spectrum's impressive capabilities. If you demand the best from your Spectrum, cut out and mail the coupon today, because once you've unlocked all the secrets of your Spectrum - there'll be no holding you back.

NEW RELEASE: The Complete Spectrum ROM Disassembly

This is the book for the serious programmer who wants to get right to the heart of the Spectrum system; its 16K ROM control program.

Written by Dr. Ian Logan and Dr. Frank O'Hara, each ROM routine is completely disassembled and its function clearly explained. Great care is also taken to ensure the reader understands how all the routines within the ROM interact with each other. The book also explains every aspect of the Spectrum's software operation in detail and makes all functions and entry points available for use in your own programs and routines. £9.95

NEW RELEASE: Spectrum Hardware Manual

An essential aid for every Spectrum user, giving an easy to follow explanation of how this sophisticated micro computer really works, written by Adrian Dickens. Backed up with a complete rundown on each component's function and full circuit diagrams, the book reveals many features of the Spectrum system not mentioned in the Sinclair Manual.

The book also includes practical hardware projects and tips enabling you to take full advantage of the system's hardware potential. £5.95

The Complete SPECTRUM ROM DISASSEMBLY

SPECTRUM Hardware MANUAL

UNDERSTANDING YOUR SPECTRUM

DR. IAN LOGAN

Understanding Your Spectrum
A complete overview of Spectrum software systems explaining both BASIC and machine language programming. £7.95

OVER THE SPECTRUM

PLUS COLOUR PAGES

Edited by Philip Williams

Over the Spectrum
30 exciting programs and games to test you and your Spectrum plus many programming hints and tips too. £6.95

SPECTRUM MACHINE LANGUAGE FOR THE ABSOLUTE BEGINNER

Spectrum Machine Language For The Absolute Beginner
Everything the first time user needs to know about Spectrum Machine language. £5.95

MELBOURNE HOUSE PUBLISHERS

☐ Please send me your free catalogue.
Please send me:

- Books**
- ☐ **SPECTRUM**
 - ☐ Understanding Your Spectrum £7.95
 - ☐ Spectrum Machine Language for The Absolute Beginner £6.95
 - ☐ Over the Spectrum £6.95
 - ☐ The Complete Spectrum ROM Disassembly £9.95
 - ☐ Spectrum Hardware Manual £5.95

All Melbourne House cassette software is unconditionally guaranteed against malfunction. Access orders can be telephoned through on our 24-hour ansafone (011 858 7397).

I enclose my cheque/money order for £ _____

Please debit my Access card No. _____

Name _____

Expiry date _____

Address _____

Postcode _____

Signature _____

SP5

Orders to: 131 Trafalgar Road, Greenwich, London SE10

Correspondence to: Glebe Cottage, Station Road, Cheddington, Leighton Buzzard, BEDS LU7 7NA

Trade enquiries welcome.

ZX81

- ☐ Machine Language Made Simple £8.95
- ☐ for the ZX80 & ZX81 £4.95
- ☐ Not Only 30 Programs £8.95
- ☐ Understanding Your ZX81 ROM £8.95
- ☐ Complete Sinclair Basic Course £17.50
- ☐ Basic Course cassettes £2.50
- ☐ Complete Sinclair ZX81 ROM £9.95
- ☐ Disassembly Part A & B £9.95
- ☐ Ins and Outs of the ZX81 £5.95

Cassettes

16K SPECTRUM

- ☐ Over The Spectrum No. 1 £5.95
- ☐ Over The Spectrum No. 2 £5.95
- ☐ Over The Spectrum No. 3 £5.95
- ☐ Programs from Spectrum Machine Language Book £5.95

48K SPECTRUM

- ☐ Penetrator £6.95
- ☐ The Hobbit £14.95
- ☐ Terror Daktil 4D £6.95

All prices include VAT where applicable

£ _____

Please add 80p for post and pack £ .80

TOTAL £ _____

GREAT ZX81 software too!

MELBOURNE HOUSE PUBLISHERS



SPECTRUM SOFTWARE

TIME-GATE

4D Space/time adventure in fast moving graphics. 48K.

Author: John Hollis

THE CHESS PLAYER

With Speech and personality. 48K.

Author: Martin Wren-Hilton

METEOR STORM

With speech and Hi Res Graphics. 16K or 48K.

Author: John Hollis

SPACE INTRUDERS

With mutants and Hi Res Graphics. 16K or 48K.

Author: John Hollis

EASYPEAK

Add speech or music to your programs. 48K.

Author: John Hollis

MINED-OUT

With 9 levels of minefield. 48K.

Author: Ian Andrew

SOFTWARE FOR THE ZX81 WITH 16K RAM

QS ASTEROIDS

"...very good..."

"...addictive game!"

(C & V.G.)

Author: John Hollis

QS DEFENDA

"...better than any other arcade game I've seen."

(Symo.)

Author: Nick Lambert

QS SCRAMBLE

"...amazing, fantastical!"

(PC W.)

Author: Dave Edwards

QS INVADERS

"...just like the real thing!"

(C & V.G.)

Author: Dave Edwards

MUNCHEES

Features 1 to 4 Ghosts, 3 Munchies, Power pills.

Author: A. Laird

GALAXIANS & CROAKA-CRAWLA

Features two types of swooping Galaxian.

Author: T. Beckwith

CROAKA-CRAWLA

With Frogs, Lornies, Logs, Crocodiles, Turbles, Flies.

Author: John Field

MINED-OUT

With speech and Hi Res Graphics. 16K or 48K.

Author: John Hollis

STARQUEST/ENCOUNTER

With speech and Hi Res Graphics. 16K or 48K.

Author: John Hollis

STOP PRESS

Trader now available for the Spectrum £9.95

STOP PRESS

Trader now available for the Spectrum £9.95

STOP PRESS

Trader now available for the Spectrum £9.95

STOP PRESS

Trader now available for the Spectrum £9.95

STOP PRESS

Trader now available for the Spectrum £9.95

STOP PRESS

Trader now available for the Spectrum £9.95

STOP PRESS

Trader now available for the Spectrum £9.95

STOP PRESS

Trader now available for the Spectrum £9.95

STOP PRESS

Trader now available for the Spectrum £9.95

STOP PRESS

Trader now available for the Spectrum £9.95

STOP PRESS

Trader now available for the Spectrum £9.95

STOP PRESS

Trader now available for the Spectrum £9.95

STOP PRESS

Trader now available for the Spectrum £9.95

SPECTRUM & ZX81 GAMES FROM QUICKSILVA

A WHOLE GALAXY OF ACTION AT YOUR FINGERTIPS

NEW RELEASES FOR THE ZX81 & SPECTRUM

SPECTRUM FRENZY

Arcade action

Features: Full colour hi-res graphics, sound, high score table, hold feature, 5 levels of robots, Evil Orville, the minelayer.

Expanding code, progressive difficulty, attract mode.

Author: David Shea

ASTRO BLASTER

Arcade action

Features: Full attract mode, 5 attack waves, 15 levels of difficulty, rapid fire, meteor storms, changing aliens, plasma bolts, killer bombs, full colour hi-res graphics, full sound.

Author: John Edwards

16K or 48K Spectrum

EDDIE A WORD PROCESSOR

Features:

Menu driven prompts given at all times.

Drastic commands — e.g. Clear Text — are automatically questioned.

Load/save commands... all text justified on screen as well as printer.

Author: R. Baker

48K Spectrum

PIXEL GAMES FOR THE ZX81 WITH 16K RAM

Arcade action

Features: Full attract mode, 5 attack waves, 15 levels of difficulty, rapid fire, meteor storms, changing aliens, plasma bolts, killer bombs, full colour hi-res graphics, full sound.

Author: John Edwards

16K or 48K Spectrum

EDDIE A WORD PROCESSOR

Features:

Menu driven prompts given at all times.

Drastic commands — e.g. Clear Text — are automatically questioned.

Load/save commands... all text justified on screen as well as printer.

Author: R. Baker

48K Spectrum

STOP PRESS

Trader now available for the Spectrum £9.95

STOP PRESS

Trader now available for the Spectrum £9.95

STOP PRESS

Trader now available for the Spectrum £9.95

STOP PRESS

Trader now available for the Spectrum £9.95

STOP PRESS

Trader now available for the Spectrum £9.95

STOP PRESS

Trader now available for the Spectrum £9.95

STOP PRESS

Trader now available for the Spectrum £9.95

STOP PRESS

Trader now available for the Spectrum £9.95

STOP PRESS

Trader now available for the Spectrum £9.95

STOP PRESS

Trader now available for the Spectrum £9.95

STOP PRESS

Trader now available for the Spectrum £9.95

STOP PRESS

Trader now available for the Spectrum £9.95

STOP PRESS

Trader now available for the Spectrum £9.95

STOP PRESS

Trader now available for the Spectrum £9.95

STOP PRESS

Trader now available for the Spectrum £9.95

STOP PRESS

Trader now available for the Spectrum £9.95

STOP PRESS

Trader now available for the Spectrum £9.95

STOP PRESS

Trader now available for the Spectrum £9.95

STOP PRESS

Trader now available for the Spectrum £9.95

STOP PRESS

Trader now available for the Spectrum £9.95

STOP PRESS

Trader now available for the Spectrum £9.95

STOP PRESS

Trader now available for the Spectrum £9.95

STOP PRESS

Trader now available for the Spectrum £9.95

STOP PRESS

Trader now available for the Spectrum £9.95

STOP PRESS

Trader now available for the Spectrum £9.95

STOP PRESS

Trader now available for the Spectrum £9.95

STOP PRESS

Trader now available for the Spectrum £9.95

STOP PRESS

Trader now available for the Spectrum £9.95

STOP PRESS

Trader now available for the Spectrum £9.95

STOP PRESS

Trader now available for the Spectrum £9.95

STOP PRESS

Trader now available for the Spectrum £9.95

STOP PRESS

Trader now available for the Spectrum £9.95

3D BLACK STAR

Arcade action

Features: Fast 3D graphics, fast scoring, four bytes of target.

Eight instrument displays, warp drive, resurging aliens, time limit, 17 levels of progressive difficulty, high score table.

Author: M. Sudworth

ZX81 with 16K RAM

DAMPER & GLOOPER

Arcade action

Features: Fast action, 5 dampers increase to 6 on later phases, 3 lives plus bonus lives, ever increasing speed, high score, seal frame features, spiral clear at end of games, bonus phase worth 5000 pts., high score save and display.

Author: R. Crane

ZX81 with 16K RAM

PIERCE & TRAIL

Arcade action

Features: 20 levels of play "Mind Game" plus shooting rifle speed uses all keys and is measured against the players personal average response. This game is based on historical data.

Author: Marion Stubbs.

ZX81 with 16K RAM

QUICKSILVA

Arcade action

Features: Fast action, 5 dampers increase to 6 on later phases, 3 lives plus bonus lives, ever increasing speed, high score, seal frame features, spiral clear at end of games, bonus phase worth 5000 pts., high score save and display.

Author: R. Crane

ZX81 with 16K RAM

PIERCE & TRAIL

Arcade action

Features: 20 levels of play "Mind Game" plus shooting rifle speed uses all keys and is measured against the players personal average response. This game is based on historical data.

Author: Marion Stubbs.

ZX81 with 16K RAM

QUICKSILVA

Arcade action

Features: Fast action, 5 dampers increase to 6 on later phases, 3 lives plus bonus lives, ever increasing speed, high score, seal frame features, spiral clear at end of games, bonus phase worth 5000 pts., high score save and display.

Author: R. Crane

ZX81 with 16K RAM

PIERCE & TRAIL

Arcade action

Features: 20 levels of play "Mind Game" plus shooting rifle speed uses all keys and is measured against the players personal average response. This game is based on historical data.

Author: Marion Stubbs.

ZX81 with 16K RAM

QUICKSILVA

Arcade action

Features: Fast action, 5 dampers increase to 6 on later phases, 3 lives plus bonus lives, ever increasing speed, high score, seal frame features, spiral clear at end of games, bonus phase worth 5000 pts., high score save and display.

Author: R. Crane

ZX81 with 16K RAM

PIERCE & TRAIL

Arcade action

Features: 20 levels of play "Mind Game" plus shooting rifle speed uses all keys and is measured against the players personal average response. This game is based on historical data.

Author: Marion Stubbs.

ZX81 with 16K RAM

QUICKSILVA

Arcade action

Features: Fast action, 5 dampers increase to 6 on later phases, 3 lives plus bonus lives, ever increasing speed, high score, seal frame features, spiral clear at end of games, bonus phase worth 5000 pts., high score save and display.

Author: R. Crane

ZX81 with 16K RAM

PIERCE & TRAIL

Arcade action

Features: 20 levels of play "Mind Game" plus shooting rifle speed uses all keys and is measured against the players personal average response. This game is based on historical data.

Author: Marion Stubbs.

ZX81 with 16K RAM

QUICKSILVA

Arcade action

Features: Fast action, 5 dampers increase to 6 on later phases, 3 lives plus bonus lives, ever increasing speed, high score, seal frame features, spiral clear at end of games, bonus phase worth 5000 pts., high score save and display.

Author: R. Crane

ZX81 with 16K RAM

PIERCE & TRAIL

Arcade action

Features: 20 levels of play "Mind Game" plus shooting rifle speed uses all keys and is measured against the players personal average response. This game is based on historical data.

Author: Marion Stubbs.

ZX81 with 16K RAM

QUICKSILVA

Arcade action

Features: Fast action, 5 dampers increase to 6 on later phases, 3 lives plus bonus lives, ever increasing speed, high score, seal frame features, spiral clear at end of games, bonus phase worth 5000 pts., high score save and display.

Author: R. Crane

ZX81 with 16K RAM

PIERCE & TRAIL

Arcade action

Features: 20 levels of play "Mind Game" plus shooting rifle speed uses all keys and is measured against the players personal average response. This game is based on historical data.

Author: Marion Stubbs.

ZX81 with 16K RAM

QUICKSILVA

Arcade action

Features: Fast action, 5 dampers increase to 6 on later phases, 3 lives plus bonus lives, ever increasing speed, high score, seal frame features, spiral clear at end of games, bonus phase worth 5000 pts., high score save and display.

Author: R. Crane

ZX81 with 16K RAM

PIERCE & TRAIL

Arcade action

Features: 20 levels of play "Mind Game" plus shooting rifle speed uses all keys and is measured against the players personal average response. This game is based on historical data.

Author: Marion Stubbs.

ZX81 with 16K RAM

QUICKSILVA

Arcade action</