

40 Rock (C)

POPULAR

Computing WEEKLY

FREE GAMES CASSETTES

35p 6-12 October 1983 Vol 2 No 40

This Week

Dragon software

Brian Cadge confronts the Ninja Warrior and goes walkabout with Cuthbert in this latest review of Dragon games. See page 12.

Spectrum radio

Ray Berry presents a selection of radio routines for the 16K Spectrum on page 18.

Commodore 64 data

Gary Foreman explains how to create hundreds of data files for records and addresses. See page 24.

New releases

All the latest software games including *Splat* from Incentive Software, *Computer War* from Thorn EMI and *Door Slammer* from Cathedral Software. See page 49.

★ STAR

Asteroid Dodge on BBC B. See page 10.

GAME ★

News Desk

ZX Interface 2 direct by mail

SINCLAIR Research has announced its Rom cartridge and joystick port adaptor for the Spectrum computer.

The ZX Interface 2 is available now by mail-order from Sinclair — there is no queuing system for orders such as there is for the ZX Microdrive and Interface 1.

Interface 2 is priced at £19.95 while cartridges for it will cost £14.95. The Rom price is more than the original-

ly suggested £10 tag, because the initial numbers manufactured are small.

To begin with, 10 titles will be available on Rom, all of this are currently available on cassette. They are: *Backgammon*, *Chess*, *Hungry Horace*, *Horace and the Spiders*, *Planetoids* and *Space Raiders* from Psion and *Pssst!*, *Jet Pac*, *Cookie* and *Tranz Am* from Ultimate.

Continued on page 5



It's elementary, Dr Watson

MELBOURNE House's next adventure after the successful *Hobbit* program, is to be based on the *Sherlock Holmes* detective stories.

Planned for the beginning of 1984, the new title will be launched simultaneously for Sinclair and Commodore.

You play the part of Holmes, trying to find the identity of a murderer. Having collected your evidence, you must then convince Inspector Lastrade that you are correct. Dr Watson will be your assistant.

The plot is not based on any one novel but, according to Fred Milgrom, Melbourne House's founder, the mood of the game has been kept as close as possible to that of the original Conan Doyle books.

"In the new adventure we hope to take interaction between the characters a stage further than *The Hobbit* — to the point where it will be possible to hold major conversations with them," he says.

Classified

Classified

Classified

Classified

6,000 free tapes to be given away — see page 37

VALHALLA

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MR CHIP SOFTWARE

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VIC 20

GAMES AND UTILITIES

JACKPOT

This is it, the ultimate Fruit Machine for the VIC with nudge, hold and respin 100% machine code. "Overall Jackpot is a beautifully written simulation giving superb graphics, animation and use of colour. In fact, this program makes Commodore's Fruit Machine cartridge look unbelievably cheap and nasty." Home Computing Weekly No. 20 19/7/83 **£5.50**

KWAZY KWAKS

Accuracy and speed are required for this Shooting Gallery, superb use of colour and graphics in this new and challenging game from the author of **Jackpot**. 1100% machine code, joystick or keyboard control **£5.50**

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COMMODORE 64

GAMES AND UTILITIES

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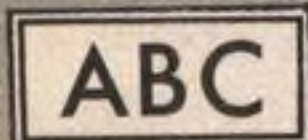
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How to submit articles

Articles which are submitted for publication should not be more than 3,000 words long. The articles, and any accompanying programs, should be original. It is breaking the law of copyright to copy programs out of other magazines and submit them here — so please do not be tempted.

All submissions should be typed and a double space should be left between each line. Please leave wide margins.

Programs should, whenever possible, be computer printed.

We cannot guarantee to return every submitted article or program, so please keep a copy. If you want to have your own program returned you must include a stamped, addressed envelope.

Accuracy

Popular Computing Weekly cannot accept any responsibility for any errors in programs we publish, although we will always try our best to make sure programs work.

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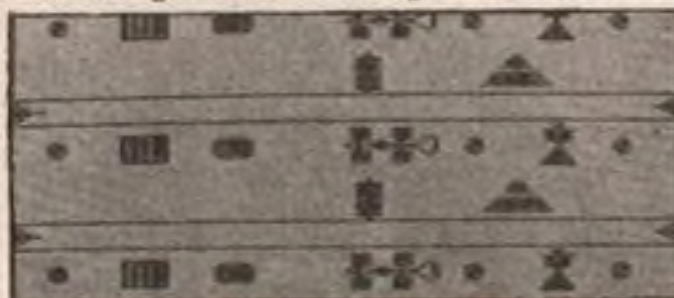
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Editorial

Acorn Computers and Tottenham Hotspur Football Club make an unlikely combination. However, both Acorn and Spurs went public last week, albeit by slightly different routes.

Acorn's decision to join the Unlisted Securities Market is not hard to understand. Like Sinclair, Acorn wanted to raise money to finance future expansion, but without losing control of the company. Placing 10 percent of the shares on the USM will raise several million pounds, but will leave control of the company firmly in the hands of Hermann Hauser and Chris Curry.

With a minimum tender price of 120p per share for the 11,230,172 shares on offer, Acorn is valued at £134.8m — marginally less than the £135.9m figure placed on Sinclair in a private share placement in January.

However, this enthusiasm for micro-computer shares should be tempered with a note of caution. A number of manufacturers have suffered from poor results recently, notably Texas Instruments, NewBrain and Dragon.

The life expectancy of any home micro now being produced is unlikely to be more than two or three years. Consequently, companies such as Sinclair and Acorn are in a vulnerable position. Massive sales for the Spectrum and BBC B this year may not be repeated next year or the year after.

In order to remain successful, both Acorn and Sinclair will have to produce new machines that are competitive with whatever the Japanese or Americans can produce.

Next Thursday

Play Space Invaders for 16K Spectrum by G Cooper in next week's star game.

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Dragon Data shows off 64K at PCW Show

DRAGON Data has shown its new 64K model publicly for the first time at this year's 6th *Personal Computer World Show*.

The machine is intended to be used in conjunction with the OS9 operating system and Dragon's own disc drives, now at last available in some shops.

The Dragon 64 is similar in appearance to the 32K model, except it is grey in colour and is fitted with an RS232 interface as standard. The machine is scheduled to go on sale on November 1 and will be priced at £225.

The machine is capable of

operating in three modes. When switched on it behaves as a 32K machine, all of which is addressable in Basic. The *Exec* command gives Mode 2 — with the Basic relocated above Ram with 41.2K available in Basic (*PClear* gives 48K of Basic user space). Connecting discs and the command *Boot* allows the Basic to be switched out, the OS9 operating system to be loaded from disc and programs from the OS9 system to be run.

OS9 is a multi-tasking system, so more than one machine is capable of being connected together, sharing

use of the disc unit. The single disc unit, recently on sale, is priced at £275.

The OS9 disc operating system is expected to be ready by the end of November, as will a dual drive unit priced at £399. It is possible that the OS9 will be sold with the disc drives as a combined package.

The attraction of the OS9 system is the selection of software already written which will run under it. Among the packages Dragon plan are the *Dynacalc* spreadsheet (£60), *Stylagraph* word processor with spelling checker and *Mail Merge* letter writing program (£60), *RMS* stock handling program (£55) and a compiled Basic (no price yet) — all scheduled for late November.

All of these packages will run on a single disc system. Those with a dual disc system will also be able to run other languages — Pascal (£75) and C (£75). A disc-based editor/assembler/de-bug program is planned for November. A version of Logo is also planned on cartridge scheduled for the end of December.

● Dragon has now appointed its new managing director — to replace Tony Clarke. He is Brian Moore, from GEC.

some problems is well known and to say that they do not affect its subsidiaries would obviously not be true.

"But there is no absolute relation between those problems and the departure of Mike Lunch."

Following Mattel's heavy losses in the US the company announced reduced support for its Aquarius machine in the North American market.



Mike Lunch

In this country sales of the machine have not lived up to expectations and reports from some dealers now indicate that the company might be considering a substantial price reduction for the computer — possibly lopping as much as £20 off its £80 price.

Acorn shares on the market

ACORN formally announced its intention to join the Unlisted Securities Market last week.

Some 11,230,172 ordinary shares are being offered for sale at a minimum tender price of 120p per share, which capitalises Acorn at £143.8m.

Acorn's turnover in the year to 3 July, 1983, totalled £42.3m, while profits before tax amounted to £8.6m.

Oric is top-seller for French

ORIC Products has announced sales figures for its computers in the UK.

So far the company has sold 21,500 Oric 1 machines in the UK.

Seventy percent of Oric's machines are now sold abroad. Of these, 70 percent go to France, where 35,000 machines have been sold since February.

This makes the Oric 1 the top selling French micro — outselling the Spectrum which went on sale in France in August.

● Tansoft has announced a cut in Oric 1 prices. Until Christmas the 16K machine will be priced at £79.95 and come with a £40-off voucher for the Oric MCP 40 printer. The price of the 48K Oric remains unchanged. The offer only applies to mail-order sales through Tansoft.

Second MTX before first

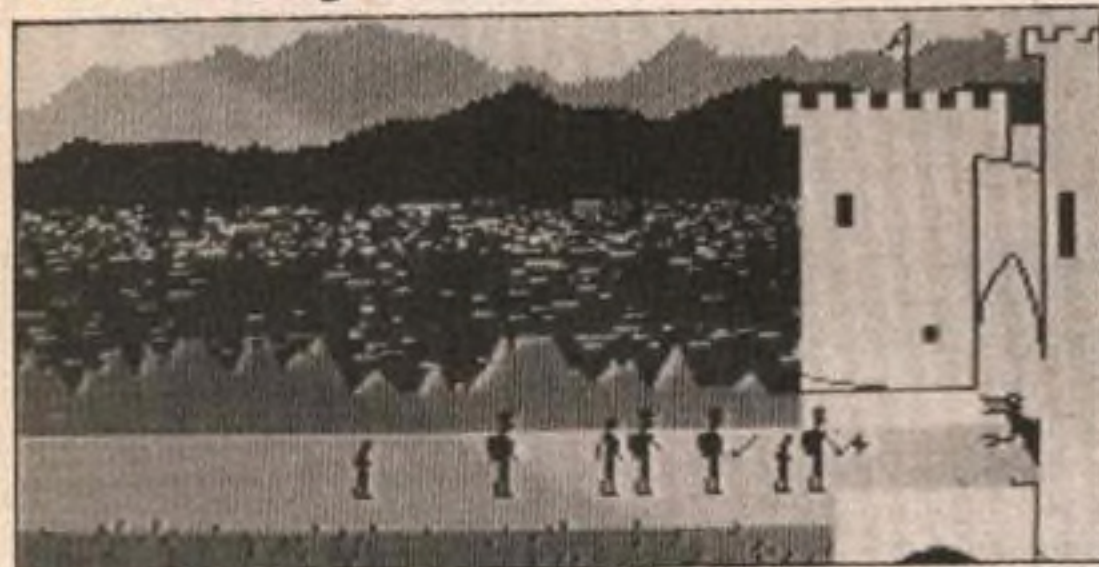
MEMOTECH has announced a second MTX computer, even before the first has gone on sale.

As well as the £275 32K Ram MTX500 machine there is now to be an MTX512 model with 64K Ram, priced at £315.

The first machines — of both models — are now planned to go on sale in late October.

The MTX500 machine was originally planned for sale in September.

Norse myth is revealed



VALHALLA, an animated graphics adventure for the 48K Spectrum, will be available later this month.

Drawing heavily on the ancient Norse myths, Valhalla consists of six separate quests, each of which must be completed in turn before the next can be attempted. In true Hobbit style, you can communicate with the other characters and ask them for help or advice.

Valhalla costs £14.95 from Legend, Freepost, 1 Milton Road, Cambridge CB4 1UY.

Spectrum Interface

Continued from page 1

All Rom cartridges will work with the 16K Spectrum, even if its equivalent cassette version requires the 48K model.

The twin joystick ports on the Interface 2 are standard 9-way D plugs, so most types of joystick should be compatible.

Sinclair has also announced more cassette titles for its range. These are: *Chequered Flag* from Psion, *Zeus Assembler* and *Monitor and Disassembler*, both from Crystal Computing, *Flippit* from Lez Peranto and *Cattel IQ Test* from Victor Serebriakoff.

Mike Lunch leaves Mattel

MATTEL (UK)'s managing director Mike Lunch, is to leave the company.

His decision comes close on the heels of news of big financial losses for the US parent company (see *Popular Computing Weekly*, September 29).

A spokeswoman for Mattel (UK) confirmed that "negotiations were in progress with Mike Lunch concerning his relationship with the company".

Ian Wilson, the company's financial director — acting as managing director following Mike's decision to leave — commented: "The fact that our parent company is having

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Spectrum 48K
Dragon
Com. 64

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Issue 3 Spectrum . . . 1

It has come to our attention that a number of programs available on the market do not work with the issue three Spectrum which has recently been released.

In accordance with our policy of constantly improving our products, we have from time to time made changes to the Spectrum. We have always taken care that such changes neither conflict with published documentation nor alter the normal operation of the Spectrum. However, some software developers have apparently made assumptions about the Spectrum which are

completely unsupported and undocumented by us. They have assumed that the value in the three high order bits, when a byte is read in from the keyboard uses the *B* command, will always be equal to 1.

In the Sinclair ZX Spectrum the bits *D0* - *D4* stand for the five keys in the half row being read. *D6* is mentioned as being the value of the ear socket, while *D5* and *D7* are not mentioned. The correct way to read this byte is to mask it to three unused bits, so that it is certain that their value is either 0 or 1. The value of the complete byte can then be tested safely, as the only variable will be the area relating to the keys.

Issue 3 Spectrum . . . 2

I write with reference to your revelation about the issue three Spectrums (*PCW* 15-21 September) and refute Sinclair Research's claim that "... we are aware of one or two cases where it affects software".

I have been going round the bend trying to work out why several of my programs written on my old Spectrum (which developed a fault) wouldn't run on my new replacement. These programs use the *In* function in order to read more than one key at the same time and I compile them to make them run faster — *Inkey\$* won't compile.

The problem occurs when using the *Beep* command and *In* in the same loop — the accompanying program demonstrates the problem audibly.

Pressing *m* gives a regularly spaced *Beep* as does *n*. Pressing *Space* gives an irregular random *Beep*. Removing the *Beep* statement cures the problem, for instance replacing line 10 with:

```
10 IF IN 32766 = 190 THEN BORDER RND*7: REM SPACE KEY
```

After reading your report, I

```
10 IF IN 32766=190 THEN BEEP
   .1,0: REM SPACE KEY
20 IF INKEY$="m" THEN BEEP
   .1,0
30 IF PEEK 23560=110 THEN
   BEEP .1,0: REM (last k)..
   .KEY "n"
40 GO TO 10
```

sneaked a look inside my Spectrum . . . sure enough, issue three was printed on the circuit board.

Sinclair Research pointed out that some existing software will not work on issue three machines — what about future software?

I don't want an issue three Spectrum, my old one worked fine on my Fidelity tv. I don't suppose it's possible to obtain issue two machines any longer, but I'll do my best to find one.

In conclusion, I consider this is a major limitation of the "new" Spectrum and too high a price to pay for increased tv compatibility. Hold on to your issue twos, they may be valuable.

J S Mellor
87 The Terrace
Torquay
Devon

PS. Fortunately, the best Spectrum game ever still works — *Manic Miner* of course. Damn those telephones.

If it will put your mind at rest, there should be no problems with future software since Sinclair has circulated details of the issue three changes to software houses.

To assume that bits *D5*, *D6* and *D7* should always be high is extremely unwise, as it is not necessarily so in any Spectrum. In issue three Spectrums, however, the effect has become more noticeable as bit *D6* is set to zero when there is no signal coming from the tape recorder.

We must emphasise that in our view it is extremely dangerous programming practice to assume the value of a bit which is essentially unstable and we strongly recommend all software houses that they re-issue masters for any programs which make assumptions of this kind, as soon as possible.

An issue three Spectrum is identifiable as soon as it is connected to a tv, as the image will show up offset to the left of the screen.

Sinclair Research Ltd
23 Motcomb Street
London.SW1X 8LB

A copy of this letter has already been circulated to about 100 software houses and retailers.

Numerous errors

May I, through your letters page, appeal for help from your readers?

I have recently constructed a sound generator for the Spectrum, from an article published in another well-known magazine, *Electronics & Computing*.

I do not seem to be able to make sense of the circuit diagram, or printed circuit board, due to what appear to be numerous errors.

If any of your readers have successfully built a sound generator from this magazine article, or using the AY-3-8912 PSG, would they please contact me urgently?

R A Hanslip
28 Mincent Hill
Watcombe
Torquay
TQ2 8DE

High score charts

You have been getting a lot of letters about people's high scores on games such as *Hungry Horace*, *Planetoids* and *Orbiter*. Why not include high score charts for a few

games?

You could put the high scores near the back with the Top 10. You could include the three aforementioned games and *Manic Miner*, the Ultimate games and perhaps some of the Imagine games. We are sure this would be popular.

Phil Howarth and
Robert Kirkbride
Stockport
Manchester

PS. Our high scores are: *Orbiter* — 756,280, *Hungry Horace* — 240,000 (roughly), *Planetoids* — 120,600 (without cheating), *Manic Miner* — 31,323 (sheet 17).

PPS. I (Phil) most foolishly bought a Beeb first. It broke in two months and is now used for boot-scraping (that is true)!

A hall of fame section would undoubtedly be popular, but there are two drawbacks — one, there is now way of authenticating high scores and two, it is very difficult to decide which games to include and which to leave out.

BBC Syndrome

Having visited a large number of computer shops in my time, I have been able to carry out extensive medical research into associated diseases. Most owners or assistants (many under 16) have the affliction known as 'BBC Syndrome'.

This horrifying brain disease affects these unfortunates in such a way that customers become invisible to their eyes! The assistants' natural instinct to help a customer is totally destroyed by amazing, mind zapping games for the . . . ssh . . . BBC Micro. Unless you are a fellow sufferer, you appear to them as a piece of fluff or just another office plant (strangely enough, another similar disease involves a fad, neh, infatuation for lush, green, tropical plants).

So, come on 'BBC Syndrome' sufferers, give us 'non-beeb' users a break and get some therapy.

Stephen Thornley
87 Station Road
Marple

Stockport SK6 6NY

PS. I'm a frustrated Vic owner and still looking for help!

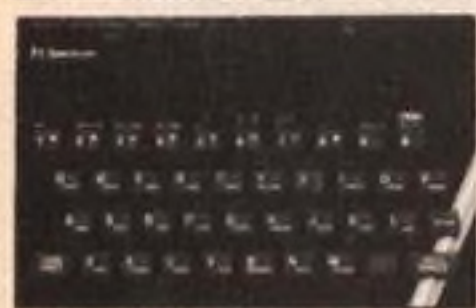
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16/48 will run on 16K and 48K machines. In fact the magazine knows which machine you are using and automatically uses the appropriate addresses.

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 - Dungeons and Green Men - expert help for reluctant prisoners and goblin fodder.
- PLUS LOADS MORE TO LOAD**



THE MONTHLY CASSETTE MAGAZINE FOR THE 16K & 48K ZX SPECTRUM

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The ADVENTURES of MONTY The Mountaineer

De Apibus Semper Dubitandum Est.

"AVALANCHE!"

MONTAGUE MONTAGUE III, DUKE OF BOLTON, HAS ORGANIZED AN EXPEDITION TO CLIMB MOUNT EVEREST. BUT MONTY AND THE TWO OTHER BRITISH CLIMBERS, IAN AND TOM, DID NOT RETURN TO CAMP THE PREVIOUS NIGHT. THE AMERICAN, HANK, TAKES CHARGE OF THE SEARCH PARTY...



"LEE, YOU GO WITH FRED BACK TO BASE CAMP AND GET MORE SUPPLIES. CARL AND I WILL SEARCH FOR THE OTHERS."

"SURE THING, HANK! WE'LL SEE Y'ALL BACK HERE LATER..."

"GUT. DIS MAY VELL BE MY CHANCE TO DISPOSE OF ZIE SCHWEINHUND AMERIKANER!"

NOT FAR AWAY, MONTY, TOM AND IAN ARE TRAPPED AT THE BOTTOM OF A CREVASS.



"DASHED LUCKY REALLY, THAT THIS FISSURE HAS SHELTERED US FROM THE WEATHER. YOU SHARE THE LAST GINGER NUT, CHAPS. I AM SURE THAT AID IS IMMINENT."

"HAVE THE GINGER, TOM, I'LL TAKE THE NUT"

MEANWHILE, AT THE TOP...



"LOOKY HERE WHAT I'VE FOUND, CARL. MONTY'S HAT. THEY MUST BE TRAPPED BELOW."

"AND IN A MINUTE, SCHWEIN, YOU WILL JOIN ZEM IN OBLIVION."

SUDDENLY, THE TWO CLIMBERS HEAR A NOISE ABOVE THEM...

RUMBLE

"GOTT IM HIMMEL!"

"WATCH OUT, AVALANCHE!"

WILL HANK AND CARL SURVIVE THE AVALANCHE? WILL MONTY BE RESCUED? WILL CARL'S EVIL PLANS COME TO FRUITION? WILL THE AARDVARKS REACH THE SUMMIT OF MOUNT PALOMAR BEFORE PETERKIN'S THE FERRET-STRANGLER? DON'T MISS NEXT WEEK'S EXCITING EPISODE!

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"THEY'RE REALLY JOLLY SPIFFING CHAPS!"



Salamander SOFTWARE

QUALITY SOFTWARE FOR THE DRAGON 32, ORIC-1 AND BBC MODEL B MICROCOMPUTERS.

Asteroid Dodge

A new game for BBC B by Phillip Wells

This is a game for the BBC micro, model B, and involves piloting a small shuttlecraft through a maze of asteroids and alien saucers. It is possible to ram the saucers and gain 10 extra points but beware, if you hit the alien on the side, you will instantly explode, for the sides of the aliens are protected by shields. The aster-

oids, naturally, are indestructible.

At the end of a game, your score is printed. It is worked out by the time you lasted in seconds, plus any bonuses for ramming aliens. Full instructions are included in the program.

Notes

170-310 Sets up variables

320-420 Main program
430-490 Checks for character number at location X%,Y% on the screen
500-590 Checks if you have collided with an asteroid or an alien
600-630 Deals with left and right movement of your shuttle
640-820 Deals with crash, prints score and High-score
830-1280 Prints the instructions ■




```

>>LIST
10REM *****
20REM * *
30REM * Asteroid Dodge *
40REM * *
50REM * By *
60REM * *
70REM * Phillip Wells *
80REM * *
90REM * Aged 11 *
100REM * *
110REM * 11/8/1983 *
120REM * *
130REM *****
140
150MODE7
160PROCinstruct
170MODE2
180QB%=0
190H%=0
200ENVELOPE 1,1,3,-5,-4,-5,120,-120,9,120,-126,12,
126,126
210VDU 23,224,&18,&24,&43,&20,&10,&20,&40,&80
220VDU 23,225,&00,&00,&1C,&A2,&41,&02,&04,&04
230VDU 23,226,&80,&80,&80,&40,&24,&1A,&01,&00
240VDU 23,227,&02,&01,&02,&04,&08,&08,&10,&E0
250 VDU 23,228,&22,&5D,&81,&81,&82,&74,&08,&00
260VDU23,231,&00,&00,&10,&38,&28,&FE,&44,&38
270VDU23,8202;0;0;0;
280 TIME=0
290VDU23,230,&18,&18,&24,&3C,&3C,&7E,&FF,&66
300X%=15:Y%=30
310QB%=0
320A%=RND(4)
330IF A%=1 THEN COLOUR 1:F%=RND(18):PRINTTAB(F%,2);
CHR#224;CHR#225:PRINTTAB(F%,3);CHR#226CHR#227
340IF A%=2 THEN COLOUR4:F%=RND(19):PRINTTAB(F%,1);
CHR#228
350IF A%=3 AND RND(2)=1 THEN COLOUR2:PRINTTAB(RND
(19),1);CHR#231
360PRINTTAB(X%,Y%) " "
370PRINTTAB(0,0);VDU11
380COLOUR3
390PROCKEY
400PRINTTAB(X%,Y%);CHR#230
410PROCHECK
420GOTO320
430DEFFNread(X%,Y%)
440LOCAL A%,C%
450A%=135
460VDU31,(X%+19) MOD 19,Y%
470C%=(USR(&FFF4) AND &FFFF) DIV &100)
480IF C%<128 THEN =C%
490=(C% MOD 32)+224
500DEFPROCHECK
510C%=FNread(X%,Y%-1):IF C%=32 THEN ENDPROC
520 IF C%=231 THEN SOUND 1,1,50,10:SOUND2,1,100,10
:SOUND3,1,150,10:QB%=QB%+10:ENDPROC
530IF FNread(X%,Y%-1)=228 THEN PROCCRASH
540IF FNread(X%,Y%-1)=227 THEN PROCCRASH
550PROCKEY
560IF FNread(X%,Y%-1)=226 THEN PROCCRASH
570IF FNread(X%,Y%-1)=225 THEN PROCCRASH
580IF FNread(X%,Y%-1)=224 THEN PROCCRASH
590ENDPROC
600DEFPROCKEY
610IF INKEY(-98) AND X%>1 THEN PRINTTAB(X%,Y%) " "
:X%=X%-1:C%=FNread(X%,Y%):IF C%<>32 THEN PROCCRASH
620IF INKEY(-67) AND X%<18 THEN PRINTTAB(X%,Y%) " "
:X%=X%+1:C%=FNread(X%,Y%):IF C%<>32 THEN PROCCRASH
630ENDPROC

```

```

640DEFPROCCRASH
650FORK%=-15TO0:SOUND0,K%,6,1:NEXT
660A%=X%*64:B%=1020-Y%*32
670FORI=1 TO 50:GCOL0,RND(7):PLOT69,A%+RND(64),
B%-RND(32):NEXT
680CLS
690S%=QB%+TIME DIV 100
700COLOUR132:COLOUR3
710PRINTTAB(0,0);STRING$(19," ")
720PRINTTAB(0,2);STRING$(19," ")
730PRINTTAB(0,1)" ASTEROID DODGE "
740COLOUR120
750 IF S%>H% THEN H%=S%
760COLOUR3:PRINTTAB(5,15)"Score: ";S%
770 PRINTTAB(5,17)"High: ";H%
780COLOUR2:PRINTTAB(1,27)"Press ""S"" to start"
790G$=GET$
800IF G$="S" THEN 810 ELSE 790
810CLS:GOTO280
820ENDPROC
830DEFPROCinstruct
840PRINTTAB(0,0);CHR#129CHR#157CHR#131CHR#141"
Asteroid Dodge"
850PRINTTAB(0,1);CHR#129CHR#157CHR#131CHR#141"
Asteroid Dodge"
860PRINT:PRINT
870D$=CHR#131
880PRINTD$"One day, as you were returning from a"
890PRINTD$"trading mission in your spaceship,"
900PRINTD$"you accidentally got caught in the"
910PRINTD$"gravitational pull of nearby Saturn."
920PRINT:PRINT
930D$=CHR#130
940PRINTD$"You knew that there was no way that"
950PRINTD$"you could stop the crash, and so you"
960PRINTD$"instantly got out in your escape"
970PRINTD$"shuttle. But you had forgotten about"
980PRINTD$"the rings of Saturn, deadly walls of"
990PRINTD$"asteroids. To get to freedom, you had"
1000PRINTD$"to go through the rings."
1010 PRINTTAB(0,22);CHR#129CHR#157CHR#131"
Please Press any key to continue."
1020D$=GET$
1030CLS
1040PRINTTAB(0,0);CHR#129CHR#157CHR#131CHR#141"
Asteroid Dodge"
1050PRINTTAB(0,1);CHR#129CHR#157CHR#131CHR#141"
Asteroid Dodge"
1060PRINT
1070D$=CHR#130
1080PRINTD$"You had also forgotten about the enemy"
1090PRINTD$"saucers. These inhabit the asteroid"
1100PRINTD$"belt, but can be rammed, for 10pts."
1110PRINTD$"The saucers are only vulnerable from"
1120PRINTD$"the front though. Collisions on the"
1130PRINTD$"side will result in instant destruction"
1140PRINTD$"for your ship."
1150PRINT
1160D$=CHR#131
1170PRINTD$"Your score is determined by how long"
1180PRINTD$"you survive Plus any bonuses for"
1190PRINTD$"ramming saucers. Controls are:"
1200PRINT
1210D$=CHR#129
1220PRINTD$"Z [ [ [ Left Right ] ] ] X"
1230PRINT
1240D$=CHR#130
1250PRINTD$" Good Luck !!! You'll need it !!!"
1260 PRINTTAB(0,22);CHR#129CHR#157CHR#131"
Please Press any key to continue."
1270F$=GET$
1280ENDPROC

```


A run for your money

Brian Cadge goes walkabout with Cuthbert in this review of Dragon software

Having survived its financial difficulties (PCW 8-14 September), Dragon Data can now look forward to a brighter future with the launch of several new machines expected soon. The Dragon 32 has not been forgotten though, the long awaited disc drives are finally available and the 64K upgrade is expected shortly. Indeed, the software range for this machine is growing every week, both in size and quality, as this latest look at Dragon goodies shows.

Dragon Data has a growing range of games software for its machine, *Berserk* being one of the recent cartridges. This is a copy of the somewhat dated arcade game of the same name. You have crashed on a hostile planet inhabited by robots and *Evil Orville* (not the green duck, but a grinning ball). Wandering through rooms killing off the robots with your laser gun, avoiding the electrified walls and the robots fire, and keeping well away from the immortal *Orville* are all part of your day here.

You are greeted with a very attractive and colourful title page on turning on. But, the game itself, to my horror, uses only *PMODE 4* graphics — black and white! The graphics were obviously designed for colour resolutions by the arrangement of the dots. The game in play is rather slow for machine code — the robots plod along, occasionally taking a pot shot at you, and it takes the player 10 seconds just to get from one side of the room to the other.

The graphics are quite well animated, though colour would surely have been worth the slight sacrifice in resolution. There is no on-screen scoring either. The method of firing is only really suited to Atari type joysticks, not the ones the Dragon uses — it's also annoying that only one bullet can be on the screen at once. Good use is made of sound effects, but generally this game doesn't really come up to the standard of cartridge material. At a little under £20, this piece of software is rather over priced.

The Programmers Guild is a fairly new name as far as Dragon software is concerned. Its first offering is *Ninja Warrior*. Up to six players can go, one by one, with either joystick or keyboard control. Starting at white belt level, your *Ninja Warrior* (who is displayed as a man in a Kung Fu outfit) runs along kicking rocks out of his way. Get past this level and you go on to the yellow belt, here there are rocks, fire heaps and holes to kick and jump over. In subsequent levels, fireballs are thrown at you and ultimately you must deal with the Ninja masters. It is possible to go through to the black belt level — level 16 — but I've never managed it, even with the bonus men at every 10,000 points.

The graphics are only the equivalent of

Basic's mode one, but good use is made of them. The scrolling background and movement of the man is rather jerky, but being 100 percent machine code it is reasonably fast. The sound effects are also very good, especially the sound of a creaking door when the title page appears. The game uses only one joystick — the left one. I found this maddening, as all other single joystick games use the right socket — remembering to keep swapping from game to game was a real pain.

The advertisements say that "*Ninja Warrior* is a totally awesome experience in arcade action"; very original it is, but it is going over the top to describe it in these terms — the real arcade machines passed this stage years ago.

Three games from Microdeal now. *Storm* was one of the first to be released by this company, and it shows. It is a poor adaptation of that ageing arcade game which I think was called *Surround*. You control a straight line that moves round the edge of a tunnel, firing back at straight lines coming in the other direction. Not very exciting originally and this version for the Dragon is even worse, with its total lack of sound and low resolution graphics. Microdeal have set themselves a very high standard to maintain with their games and this one falls well short of what is expected from them.

The latest release is *Cuthbert goes Walkabout*. *Cuthbert* is a cute little guy whom you control with the joystick. He must turn on the lunar landing light for a state visit, before the invading Moronians get him. The lunar landing lights are actually squares on a 7x5 grid, which light up when *Cuthbert* has walked round all four edges.

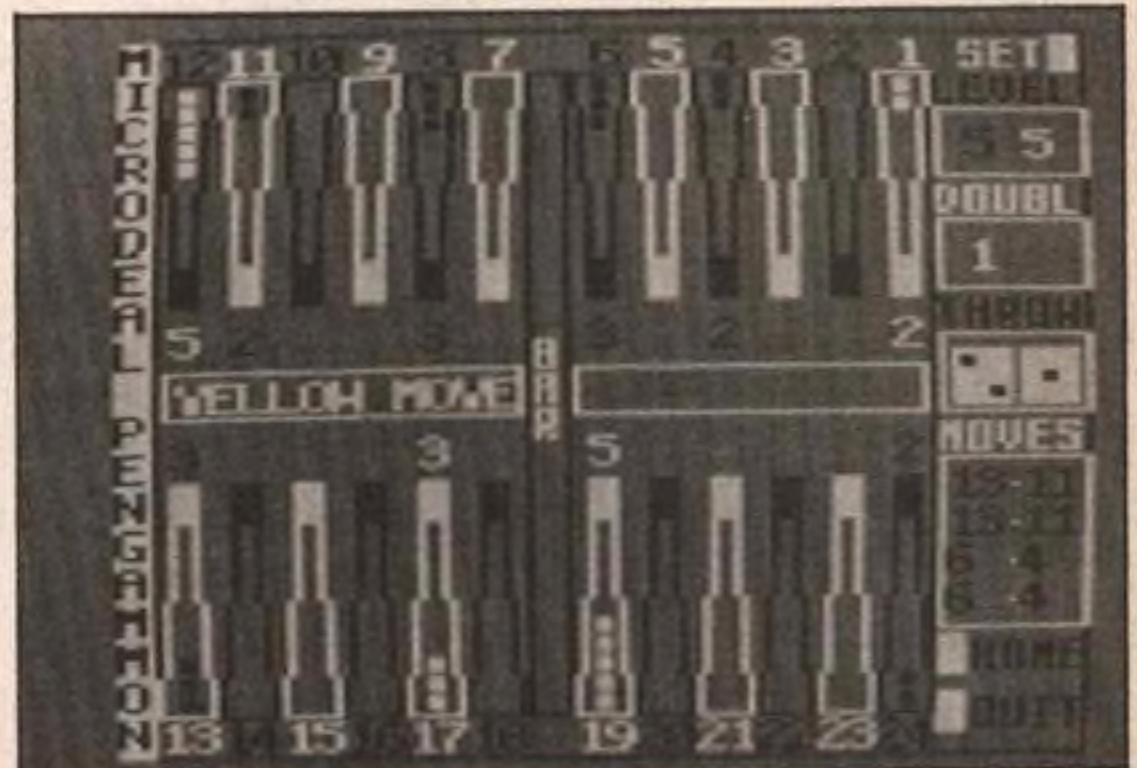
If one of the Moronians touches him, *Cuthbert* and the invader both impressively explode and you lose a life. If you fill in the whole screen, a bonus *Cuthbert* dances on to the screen. Successive screens get harder as more Moronians appear; the colours also change, although you can return to the standard colours at any time (useful for black and white tv's). You can also pause the game and return to it later.

Either joystick or keyboard can be selected to move *Cuthbert* in all four

directions and make him jump *Donkey King* style over the baddies. If you get a good score, you may enter your name in the *Cuthbert* hall of fame, via the joystick in the traditional arcade way. The graphics used are not the highest res available, but clever use is made of them and the game is very fast.

This is certainly one of the best games to come from Microdeal, not quite in the *Donkey King* category, but approaching it. At only £8 you can't really go wrong anyway.

Finally from Microdeal is *Backgammon*, the old board game. The first thing I noticed was that the game takes ages to *Load*. The reason for this turned out to be the method of autorunning the program. *Loading* starts down in the system variables, then has to go through 6K of graphics pages before it starts to *Load* the actual Basic program. This may be a good way to prevent software piracy, but it's not



very clever as far as *Loading* times are concerned.

On to the game itself. The option to use a light pen is included and this works very well with most on the market, including Microdeal's own. Alternatively, normal keyboard input can be selected.

From zero to two players can take part and the level of computer play can also be set from one to 10. The graphics are not bad — a backgammon board, being made up of triangles, is not the easiest thing to display on a computer and this attempt is fair. When the computer is playing above level four it takes an extremely long time over its own move, even with the option of the double speed *Poke*, the program is still very slow.

Dragrunner is the latest game from Cable Software, the people that brought you *Troff*. The program is a mixture of machine code and Basic. The former is used for scrolling and all the sounds. Some quite clear speech synthesis is also included — not on the tape as in *Toff*, but real computer generated speech. The general sound effects are also very good indeed, playing a major part in the game.

The object is to get *Sidney*, who is barely recognisable as a figure of a man,

across the factory floor. To do this, he must negotiate moving conveyor belts loaded with radioactive components. Occasionally, you shoot guards which appear — if you take too long over the whole thing, the laser guns shoot you.

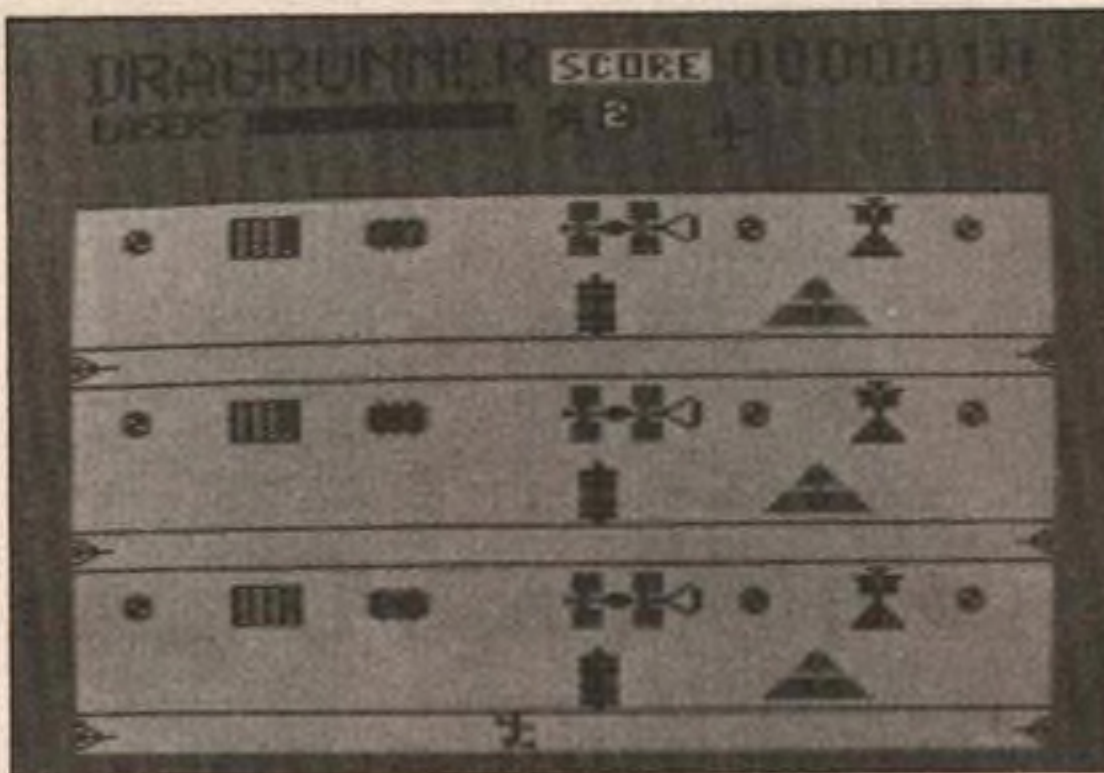
You could describe the game as a space age *Frogger*. The graphics, although well defined, are jerky and rather slow. The program's great redeeming feature is its speech and excellent packaging. But, for sheer playability, the game scores rather badly — this is not a game where you find yourself saying 'Just one more go'. And, at £8.75, it is rather expensive for a game written almost entirely in Basic.

Salamander Software is another manufacturer known for its excellent packaging. *Star Jammer*, the latest game, comes in a full colour, mini-video case with instruction sheet. Those are the good points. Unfortunately, the whole game is in Basic.

If you can imagine a version of Atari's *Star Raiders* without all the trimmings, written in Basic with the background in white instead of black, then you'll get a good idea of this game. Using the joystick to control your sights, enemy ships come towards you which you try and shoot if you're lucky.

Salamander's software is generally very good, but this game, which most users could write themselves, should have been scrapped long before getting on to the market.

Pimania is now available for the Dragon.



Yes, the Piman is here! *Pimania* is, for anyone who's been living under a rock, the infamous adventure game with the real treasure prize of a golden sundial. Apart from the Piman, who keeps popping up to befriend you, or if you annoy him, to turn against you, this is a fairly standard adventure game. That is not to say that it is not good — nice use of graphics and sound and the occasional advertisement for *Pimania* tee shirts make the game amusing at least. The flip side of the cassette contains a ghastly recording by Clair Sinclair (the joke isn't so funny on a game for the Dragon, is it?) which is worth listening to, if you can stand it, as it contains some useful clues.

As with all adventure reviews, you can't really describe the game itself as this

£8. The instructions are in very small print on the inlay card and are long and complicated. If you want a stunning 3D representation of flight, forget it. But if you want a true to life simulation with full instrumentation and a low resolution artificial horizon, then this is for you.

The program is in real time, and the display constantly shows all the instruments and a simple view from the cockpit. There are two runways to choose from — Norwich and Hethal. You control the plane via the joysticks and/or the keyboard. If a crash occurs, the crash code appears with a table showing each code and an explanation.

The program takes some getting used to, it took me a few hours to get up and flying — let alone land the damn thing again. As I said, this is not designed to be a game, but a simulation — you will need a lot of patience and a real interest in flying to get the most out of it.

Finally, to another machine code arcade game — *Dragon Hawk* from Pentagon now marketed by Microdeal.

The program autoruns on *Loading* and offers full instructions. The graphics are full colour in the highest resolution and are very good. Controlling your laser base, you must shoot the eggs on the screen, which scroll past, whilst avoiding the swooping birds which fall down dead and lie in wait twitching below you. All the time, a giant bird is making its way down to kidnap your little man and fly off with him.

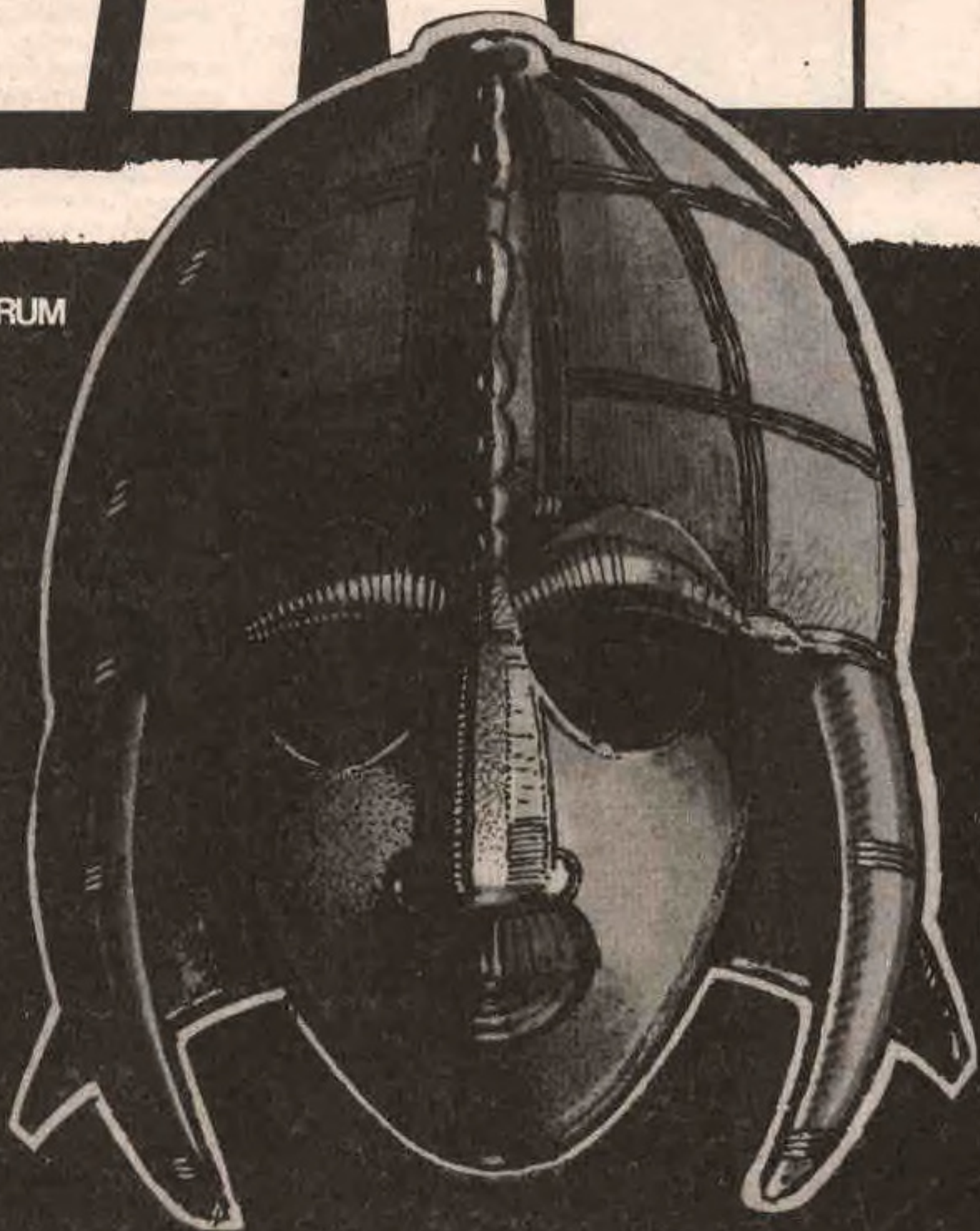
You must shoot down the hawk, avoiding its droppings, and catch the man — that's not as easy as it sounds either. Both the birds and the man are excellently animated and the sound effects are also very good. You get three lives per game and, if you wipe out the whole screen, you go on to an even harder and faster one.

I have commented before on the way some software houses try to produce arcade quality games using Basic. It is nice to see in this review so many machine code, quality games available. It is also good to see some of the smaller companies going into Dragon software, and giving the established firms a run for their money.

Supplier	Game	Price	Value (0-10)
Dragon Data Ltd Kenfig Industrial Estate Port Talbot SA13 2PE	<i>Berserk</i> (cartridge)	£19.95	5
Programmers Guild Ahed House Sandbeds Trading Estate Ossett West Yorkshire WF5 9ND	<i>Ninja Warrior</i>	£8.95	7
Microdeal 41 Truro Road St Austell Cornwall PL25 5JE	<i>Storm</i> <i>Cuthbert</i> <i>Backgammon</i> <i>Dragon Hawk</i>	£8.00 £8.00 £8.00 £8.00	3 8 7 8
PSL Marketing 52 Limbury Road Luton Beds LU3 2PL	<i>Dragrunner</i>	£8.75	6
Salamander Software 27 Ditchling Rise Brighton East Sussex BN1 4QL	<i>Star Jammer</i>	£7.95	2
Automata Ltd 27 Highland Road Portsmouth Hants PO4 9DA	<i>Pimania</i>	£10.00	7
Hewson Consultants 60a St Mary's Street Wallingford Oxfordshire OX10 0EL	<i>Dragonfly</i>	£7.95	7

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Character limits

Bryan Skinner explains how to restrict user input to a limited number of characters

In a previous article (PCW 14-20 July 1983) I described a rather crude method for limiting user input to a given number of characters. This article describes a much-improved version of the routine, though it is rather more specific to the Dragon 32 micro. The improvements are: (a) the use of "backspace", (b) the speed of keyboard response, and (c) the indication on the screen of the input "field".

In many commercial programs the user is prompted to enter data into a prescribed field, eg:

NAME < >

The carets, or angle brackets, indicate the size of the entry that may be made. The cursor may be moved between the markers and pressing "enter" or "return" terminates entry of data into the field, rather like the normal use of *Input*. The advantages of limiting data entry in this way are many — the user cannot upset the screen display and elementary validation of entries is performed automatically.

The flowchart for a routine to achieve this improvement to *Input* is shown in Fig 1. The essential steps are: (a) Collect a character from the keyboard. (b) If the character is a backspace (left arrow, Ascii code 8) and the length of the string of characters collected so far is greater than 0, then print the backspace (ie, "rubout" the previous character) and strip the string of collected characters of the last item. (c) Add the character to the string of characters being collected. (d) If the length of this string exceeds the maximum length allowed, strip the string to the length required.

The other entries in the flowchart serve to perform other necessary tests and checks, such as checking that a key has been pressed, updating the length of the string of collected characters, etc.

The program *per se* has some added niceties: line 1000 defines *Bs\$* as a backspace (*Chr\$(8)*); *Rt\$* as *Enter* or *Return* (*Chr\$(13)*) and nullifies *Wd\$* and *A\$* (*Wd\$* is used to collect characters). Line 1010 is specifically for the Dragon and requires that the dimension *L* has been set up, as described in a previous article, to hold the *Print @* positions for text screen lines 1-16. It also requires *Mx*: the maximum length of the string to be entered. *Ad* is defined as the screen address to be used as the offset used to calculate where to place (by *Poke*) the brackets (to indicate the size of the entry field). *Pos (0)* returns the current column of the cursor on its *Print* line. *Li* is the current print line.

Line 1020 *Pokes* the brackets (*Ascii* codes 126 & 124) to the relevant positions of the screen. I have in fact reversed the commonly used types, but you could use whatever characters strike you as most

appropriate. Line 1090 ensures that the length of the collected string of characters never exceeds the limit set by *Mx*.

The routine "returns" *Wd\$* as the user's input, just like *Input Wd\$*, or more accurately *Line Input Wd\$*, since it will accept commas. Calling the routine requires that we set two variables — *Li* and *Mx*. In the form given, it also requires two spaces after the prompt, but you could alter this and the corresponding calculations in line 1020. For example, we might, at some stage in a program, require the user to enter a three character code. To use the routine, we might code lines such as:

```
500 PRINT @ L(5), "ENTER A 3 CHARACTER CODE
    ";;REM 2 SPACES AT END
510 MX = 3;LI=5;GOSUB 1000
520 PRINT @ L(5),""; IF LEN (WD$)<> 3 THEN 500
```

If we wanted to collect a three-digit number, we would have to use a routine to validate any given string to establish whether or not it contained only numeric

characters. Of course, since we are dealing now with numeric values, we must also allow negatives. The *Ascii* value of the negative sign is 45.

Such a routine is given in Figure 3 and returns two values — *Ef* is set to 1 if the entry in *Wd\$* is not numeric and *V* is set to the value of a valid numeric entry, or 0 if the string is non-numeric.

Users with machines other than the Dragon will have to alter the screen handling lines of 1010 and 1020, or they may elect to drop them altogether, though psychologically speaking users do like to see exactly what limits there are when entering data. I believe that *Chr\$(8)* is generally used for the backspace code, but if you are not sure of your micro's *Crt* codes, you can check this by:

```
10 PRINT "A";
20 FOR D = 1 TO 500:NEXT
30 PRINT CHR$(8)
```

If the letter A is printed, then erased, you're OK, otherwise you'll have to experiment.

Happy Hacking, Terminal Junkies. ■

The routine in Figure 3 can be called after calling the *Input* routine and will return with *Ef* set to 0 if the string is numeric (*V* will be set to the value of entry). If *Ef* is equal to 1, then the string is not a valid decimal integer. You may wish to alter the routine to accept decimal points, but this is somewhat more complex.

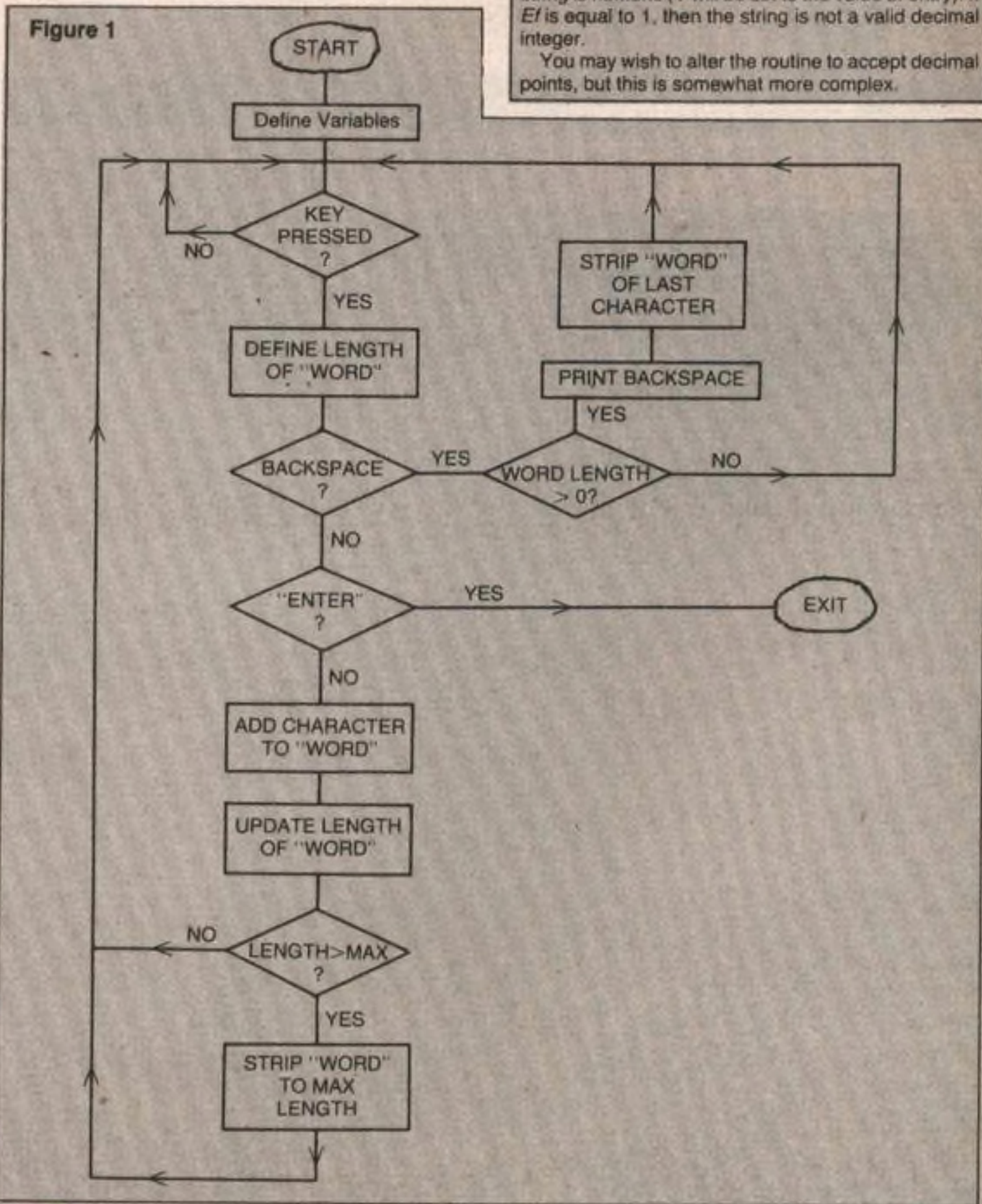


Fig 2. The routine

```

1000 WD$ = "": A$ = WD$: RT$ = CHR$(13): BS$ = CHR$(8)

1010 AD = 1024 + POS(0) + L(LI)

1020 POKE AD-1,126:POKE AD + MX,124

1030 A$ = INKEY$: IF A$ = "" THEN 1030

1040 LD = LEN (WD$)

1050 IF A$ = BS$ AND LD > 0 THEN WD$ = LEFT$(WD$,LD-1):
    PRINT BS$;:GOTO 1030

1060 IF A$ = BS$ AND LD < 1 THEN 1030

1070 IF A$ = RT$ THEN RETURN

1080 WD$ = WD$ + A$:LD = LD + 1

1090 IF LD > MX THEN WD$ = LEFT$(WD$,MX):GOTO 1030

1100 PRINT A$;

1110 GOTO 1030
    
```

FIG. 3 Numeric Validation Routine.

```

1999 EF = 0
2000 FOR T = 1 TO LEN(WD$)

2010 T$ = MID$(WD$,T,1)

2020 A = ASC(T$)

2030 IF (A < 48 OR A > 57) AND
    (A <> 45) THEN EF = 1

2040 IF A = 45 THEN S = 1 : P = T

2050 NEXT

2060 V = ABS (VAL(WD$))

2070 IF S = 1 AND P = 1 THEN V = -V

2080 RETURN
    
```

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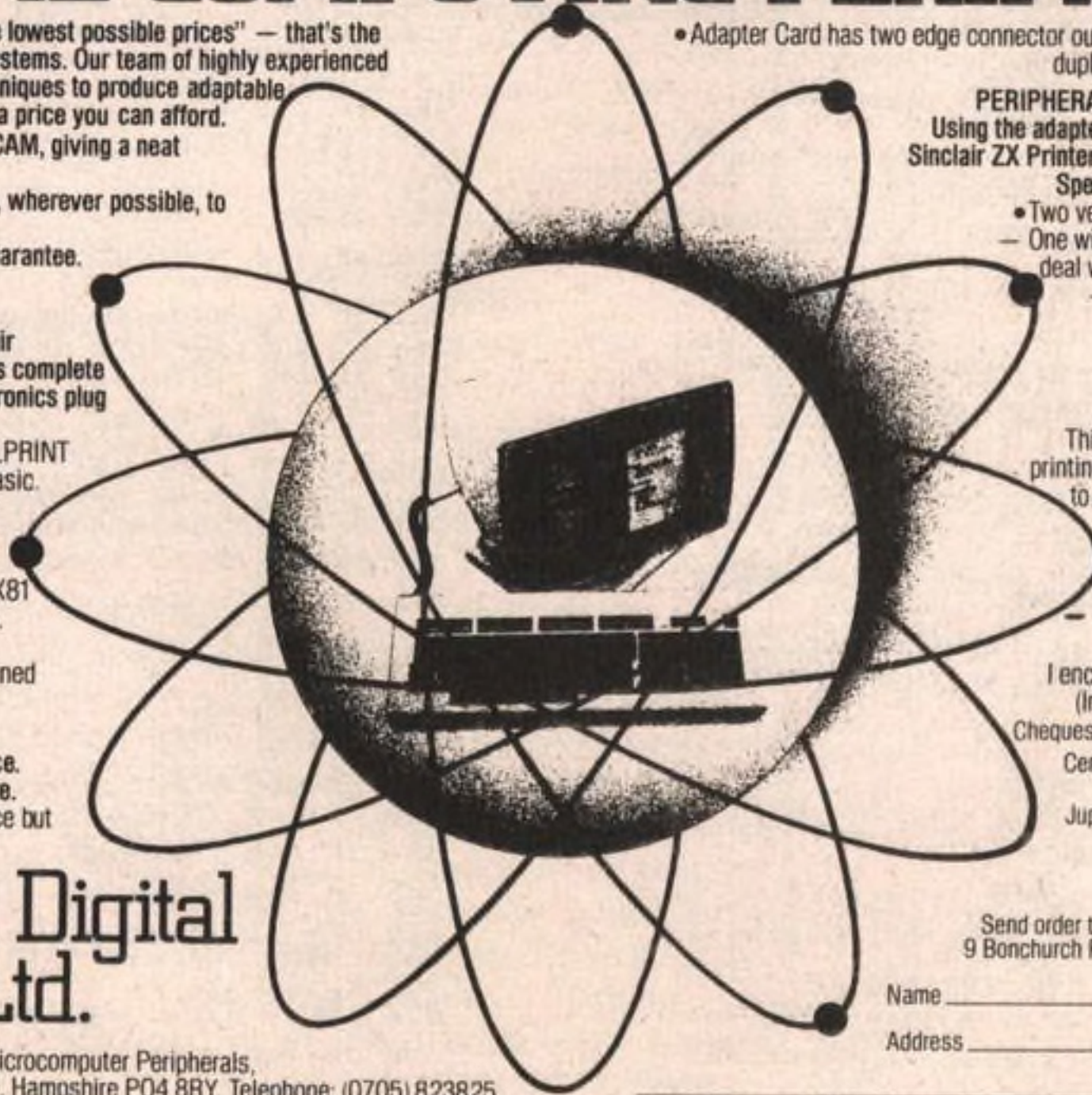
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PCW 1

Along the airwaves

Ray Berry presents a selection of routines for radio users

This program, which contains five different routines for radio users, is designed to be as simple and machine portable as possible. It was written on a Sinclair Spectrum and will run in 16K. It is menu driven and, on selection of the subject required, the program branches to the routine concerned.

Routine one gives the information to design an attenuator used to reduce strong radio or tv signals. A small drawing is made using simple graphics and the user is asked to input the amount the signal should be reduced by — 3db, for example, halves the signal strength. Next, the user is asked for the impedance of the line, which is 75 Ohms for most tv aerials, 50 for most VHF radio applications and 300 for shortwave work. Any other impedance is also catered for.

The second routine will calculate the number of turns that are required when making a coil or inductor. The computer asks for the diameter of the coil, the number of turns per inch and the required inductance. This routine is invaluable for those who build their own equipment.

The third routine is for the computer design of tuned circuits, the heart of any radio. It is the tuned circuit that separates the station required and rejects the others in the chaos of the airwaves. The user is asked to input the known information and the computer works out the unknowns.

Routine four is a menu driven program in its own right. It calculates all the aspects of Ohm's law of physics. All the computer asks is that all elements or inputs are in the same kind of unit. This routine alone should be useful to anyone interested in or

studying physics and shows how a computer can best be used.

The last routine gives the length of elements in what is known as a cubical quad antenna. Often used as a tv aerial, the quad is one of the most effective gain antennas available and is easily made at home with loops of wire. The user inputs the frequency at which the aerial is to be used and the computer does the rest — except actually build it, of course.

Line(s)

- 10 Sets attributes.
- 12 Poke statement to set the keyboard bleep.
- 15-18 Sets up title page and uses PAUSE command to wait for input of any key. CLS is screen clear.
- 20-30 Sets up menu page and accepts input of option required.
- 35-50 Error trapping routine and computed goto command. Those micros having ON...GOTO can use that instead.

This article is the precursor to a regular weekly column about microcomputers and radio. Starting next week, Ray Berry will present a round-up of the radio world in *Microradio*.

```

10 BORDER 7: PAPER 7: INK 0
11 REM ARKABLE RADIO MISCELLAN
NYSBY RAY BERRY GW6JUN
12 POKE 23609,80
15 PRINT AT 10,8;"RADIO ROUTIN
ES";AT 15,6;"BY RAY BERRY GW6JUN"

16 PRINT AT 21,3;"Press any ke
y to continue..."
17 PAUSE 0
18 CLS
20 PRINT "    RADIO ROUTINES BY
GW6JUN"
21 PRINT AT 3,13;"MENU"
22 PRINT : PRINT : PRINT : PRI
NT "1.    'T' Network Attenua
tor"
23 PRINT : PRINT "2.    Coil W
inding Calculations"
24 PRINT : PRINT "3.
L & C Calculations"
25 PRINT : PRINT "4.    Series
& Parallel Elements"
26 PRINT : PRINT "5.    Quad
Aerial Construction"
30 INPUT "Enter Option Require
d ";q
35 IF q<1 OR q>5 THEN GO TO 30
40 LET q=q*100
50 GO TO q
100 CLS : PRINT AT 10,0;"ROUTI
NE TO CALCULATE RESISTORS    IN
'T' NETWORK ATTENUATOR"
101 PRINT AT 20,3;"PRESS ANY KE
Y TO CONTINUE"
102 PAUSE 0
105 CLS : INPUT "Enter source a
nd terminating    resistance in
ohms. ";ro
110 INPUT "Attenuation required
in DB's. ";y: LET x=10+(y/20)
120 LET ra=ro*((x-1)/(x+1)): LE
T ra=INT ((ra+10+.5)/10)
130 PRINT : PRINT "RA=";ra;" Oh
ms.";"Two RA's in series."
140 LET rb=2*ro*(x/(x+2-1)): LE
T rb=INT ((rb+10+.5)/10)
150 PRINT : PRINT "RB=";rb;" Oh
ms.";"RB connects junction of RA
s to ground."
160 PRINT AT 10,2;"██████████";
AT 11,6;"██████████"

170 PRINT AT 12,15;"█";AT 13,15
;"█";AT 14,14;"█";AT 15,14;"█"
;"█";AT 16,14;"█";AT 17,14;"█";AT
18,15;"█";AT 19,15;"█";AT 20,13;
"██████████"

180 PRINT AT 9,7;ra;AT 9,21;ra;
AT 15,17;rb
190 GO TO 1000
200 CLS : PRINT AT 10,1;"ROUTIN
E TO CALCULATE TURNS ON COILS."
201 PRINT AT 20,3;"PRESS ANY KE
Y TO CONTINUE"
202 PAUSE 0
203 CLS : INPUT "Diameter of co
il in inches? ";d: LET r=d/2
205 PRINT AT 1,2;"Coil diameter
=";d
210 INPUT "Inductance in microh
enries? ";l
215 PRINT AT 3,2;"Required indu
ctance =";l;"mh"
220 INPUT "Number of turns per
inch? ";n

```

```

225 PRINT AT 5,2;"Required tpi
=";n
230 LET x=5/(n*r+2): LET b=(50R
(9/(r+l*x+2)+1))
240 LET t=x*(b+1): LET t=INT
((10*t+.5)/10)
250 PRINT AT 10,2;"Total turns
required =";t
260 LET cl=(t/n)+1: LET cl=INT
((10*cl+.5)/10): PRINT AT 12,2;"
Length of coil =";cl;" inches."
270 IF d>(3*cl) THEN PRINT AT 1
7,1;"Coil diameter is greater th
an three times it's length.";"
Try changing parameters."
280 GO TO 1000
300 CLS : PRINT AT 10,1;"L & C
CALCULATIONS"
301 PRINT AT 20,3;"PRESS ANY KE
Y TO CONTINUE"
302 PAUSE 0
305 CLS : PRINT "WHICH CALCULAT
ION?";PRINT
306 PRINT "    1. Tuned Circuit.
";PRINT "    2. Inductive reacta
nce.";PRINT "    3. Capacitive r
eactance.";PRINT : PRINT "    4.
Return to main menu";INPUT a
308 IF a=4 THEN CLS : GO TO 10
310 CLS : PRINT "Input values a
s prompted.";"Input 0 for unknow
ns."
312 PRINT : PRINT
315 INPUT "Frequency in Hertz?";
f
316 IF a=1 THEN GO TO 350
320 INPUT "Reactance in ohms?";
x
321 IF a=2 THEN GO TO 325
322 IF a=3 THEN GO TO 350
323 GO TO 305
325 INPUT "Inductance in Henrys
";l
330 IF f=0 THEN LET f=x/(2*PI*f
)
332 IF l=0 THEN LET l=x/(2*PI*f
)
334 IF x=0 THEN LET x=2*PI*f*l
335 PRINT "Inductance in Henrys
is";l
340 PRINT "Reactance in ohms is
";x
345 PRINT "Frequency in Hertz i
s";f
347 PRINT AT 21,3;"PRESS ANY KE
Y TO CONTINUE"
348 PAUSE 0
349 GO TO 305
350 INPUT "Capacitance in micro
farads?";c
352 LET c=c/1000000
355 IF a=1 THEN GO TO 370
356 IF x=0 THEN LET x=1/(2*PI*f
*c)
357 IF c=0 THEN LET c=1/(2*PI*f
*x)
358 IF f=0 THEN LET f=1/(2*PI*x
*c)
359 LET c=c+1000000
360 PRINT "Capacitance in micro
farads is ";c
365 GO TO 340
370 INPUT "Inductance in Henrys
?";l
375 IF f=0 THEN LET f=1/(2*PI*f
OR (l*c))

```



```

376 IF l=0 THEN LET l=1/(4*PI^2
*f^2*c)
377 IF c=0 THEN LET c=1/(4*PI^2
*f^2*l)
378 LET c=c*1000000
380 PRINT "Capacitance in micro
farads is ";c
385 LET x=0: GO TO 334
400 CLS : PRINT AT 10,0;"RESIST
ORS, INDUCTORS OR CAPACI
TORS IN SERIES OR PARALLEL"
401 PRINT AT 20,3;"PRESS ANY KE
Y TO CONTINUE"
402 PAUSE 0
405 CLS : PRINT "MAKE CERTAIN T
HAT ALL ELEMENTS OF EACH CALCUL
ATION ARE IN THE SAME UNITS, eg
Kilohms, picofaradsetc.."
406 PRINT
410 PRINT : PRINT "WHICH CALCUL
ATION?"
415 PRINT : PRINT " 1. Resist
ors or inductors in series or ca
pacitors in parallel"
416 PRINT : PRINT " 2. Resist
ors or inductors in parallel or
capacitors in series"
417 PRINT : PRINT " 3. Return
to main menu"
420 INPUT "Input option ";o
423 IF o<1 OR o>3 THEN GO TO 405
424 IF o=3 THEN CLS : GO TO 10
425 CLS : INPUT "How many eleme
nts are there? ";n
426 IF n<2 THEN GO TO 425
427 LET n=INT n
428 LET s=0
430 FOR i=1 TO n
432 INPUT "Value ";v
434 PRINT "Element No. ";i;" Val
ue ";v
440 IF o=1 THEN LET s=s+v
445 IF o=2 THEN LET s=s+1/v
455 NEXT i
460 IF o=2 THEN LET s=1/s
465 PRINT : PRINT "Total of all
";n;" elements " "=" ;s
470 PRINT AT 21,3;"PRESS ANY KE
Y TO CONTINUE"
475 PAUSE 0
480 GO TO 405
500 CLS : PRINT AT 10,1;"TWO EL
EMENT QUAD ANTENNA DESIGN"
501 PRINT AT 20,3;"PRESS ANY KE
Y TO CONTINUE"
502 PAUSE 0
503 CLS : INPUT "INPUT CENTRE F

```

```

REGENCY IN MHZ ";f
505 PRINT " QUAD ANTENNA FOR "
;f;"MHZ"
508 PRINT
510 LET e=.985*f: LET g=1.033*f
: LET d=1005/f: LET r=1030/f: LE
T b=118/f
515 LET x=(2*(r+r/64)): GO SUB
580
516 LET s=y: LET x=(s*s+(b*b/4)
): GO SUB 580
517 LET p=y: LET x=((r+r/64)+75
*75/(f*f+4)): GO SUB 580
518 LET t=y: LET x=((r+r/64)+12
5*125/(f*f+4))
519 GO SUB 580
520 LET u=y: LET w=468/f
525 PRINT : PRINT "This 2 eleme
nt quad should have "an SWR of
2:1 or less over the "frequency
range from ";e
526 PRINT "to ";g;"Mhz with 50
to 75 ohms " "feed line."
527 PRINT "A boom length of ";b
; "feet is " "optimum, but can be
varied " "between ";75/f;" and "
125/f;"feet with little effect."
528 PRINT "Total length of wire
in driven "element is ";d;"ft
which is "d/4;"ft on each side."
530 PRINT "Total length of wire
in "reflector is ";r;"ft." "Th
at is ";r/4;"ft each side." "Min
length of spreader measured "fr
om boom is ";s;"ft." "If quad is
boomless then a "spreader of
;p;"ft is needed" "Turning radiu
s depends on boom." "Best height
is a half wave "above ground i
e "w;"ft" "or more."
535 PRINT "Front to back ratio
exceeds "10db from ".97*f;"Mhz
to "about ";1.03*f;"Mhz." "At
";f;"Mhz it is 25db."
540 GO TO 1000
580 IF x>=0 THEN GO TO 583
581 PRINT "No square root for n
egative. "; GO TO 503
583 LET y=x/2: LET z=0
584 LET w=(x/y-y)/2
585 IF w=0 THEN RETURN
586 IF w=z THEN RETURN
587 LET y=y+w: LET z=w
588 GO TO 584
999 REM @ Ray Berry G6BUJN 1983
1000 PRINT AT 21,3;"PRESS ANY KE
Y TO CONTINUE"
1005 PAUSE 0: CLS : RUN 10

```

KEYSOFT PRESENT



*All programs are for the 48K Spectrum

THE DIETICIAN — £6.95
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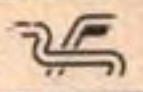
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In a word . . .

Peter Whittaker presents a user friendly word processing program

In my reading of several of the popular computer magazines, I have come across a couple of word processing programs for the Dragon. However, they all seem to have one failing, they have sacrificed user friendliness in favour of a large text storage capacity. I believe that the Dragon has enough memory to accommodate a program that is both friendly, and has enough text memory to meet most people's requirements.

Before Loading the following program, enter *Poke25,6:New* to achieve a *Pclear0*. When the program is run, a menu is presented after the title page. This can be recalled at any time by pressing the shift and up arrow keys.

Functions 3 and 4 are for *Saving* and *Reloading* half finished pieces to and from the cassette recorder. Functions 5 and 6 enter the *Edit* mode.

The cursor is controlled by the four

arrow keys. However, rather than move the cursor over a small page of 512 letters, a machine code routine scrolls a window of text under the cursor. When using the Editor, the desired position is indicated by pressing the enter key. The cursor remembers its position in the text memory for subsequent calls to the Editor.

Function 7 allows the use of characters not directly available from the keyboard. This is useful for sending control codes to the printer. Functions 9 and 10 control the backspace. As the cursor is moved back, it leaves a trail behind it. Letters can be altered by entering them as normal, and when the shift and down arrow keys are pressed the cursor will return to the end of the text displaying the alterations.

Capital letters are obtained by holding down the shift key — I have reversed the usual Dragon practice of highlighting the lowercase letters, as I thought it more

logical to emphasise the capitals.

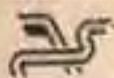
Text is entered by bashing away at the keyboard. No thought need be given to spacing at the end of lines, as the computer does that automatically. If a word is going to be split, the computer holds it over until the next line.

The program can easily be altered to suit the individual's requirements. Once Run, delete lines 4, 5, 7 and 9, as these are no longer needed. Then resave the new program. If a toolkit of programs is to be kept in high memory, these can be protected by altering the value of *TP* in line 0.

Make sure to leave a buffer of about 250 bytes, to prevent the Editor insert routine from overwriting this area. Likewise, if the program is shortened, the value of *ST* in line 0 can be lowered to increase the amount of text memory. If it is brought too low, the computer will run out of stack memory, so be careful. The width of the lefthand margin can be altered by changing *Z\$* in line 0. Setting it to "" will leave no margin.

```

0 CLEAR200,7500:ST=7500:LO=ST:Z$=STRING$(9,
  &HDF):D1=ST:TP=32517
1 DEF FNA(X)=INT(X/256):DEF FNB(X)=X-INT
  (X/256)*256
2 CLS:PRINT@169,"ESSAY PROCESSOR":PRINT@
  455,"by";CHR$(128);"Peter";CHR$(128);"
  whittaker";
3 M1=PEEK(47)*256+PEEK(48)+30:REM*****
  *****
4 FOR A=M1 TO M1+19:READ A#:POKE A,VAL("&H
  "+A#):NEXT
5 DATA BE,01,36,A6,80,81,0D,26,02,B6,C9,BD,
  BC,AB,BC,01,38,25,F0,39
6 M2=PEEK(47)*256+PEEK(48)+31:REM*****
  *****
7 FOR A=M2 TO M2+15:READ A#:POKE A,VAL("&H"
  +A#):NEXTA:DATA BE,01,36,FE,01,38,A6,
  80,A7,C0,BC,01,3A,25,F7,39
8 M3=PEEK(47)*256+PEEK(48)+31:REM*****
  *****
9 FOR A=M3 TO M3+17:READ A#:POKE A,VAL("&H"
  +A#):NEXT A:DATA FE,01,3A,10,BE,01,38,
  A6,C2,A7,A2,11,B3,01,36,2E,F6,39
10 POKE329,0
11 PLAY"03L100T100:AGD8CGFDAEDGFBAC":CLS:
  PRINT@12,"ENTER TEXT":PRINT
12 ' MENU
13 CLS:PRINT@5,"*****menu*****":
  PRINT:PRINT"1...@ DISPLAY TEXT ON SCREEN
  .","2...RT ARROW - TEXT TO PRINTER.,"3.
  ..SHF RT ARROW - TEXT TO TAPE","4...SHF
  _ TAPE TO TEXT"
14 PRINT"5...^ FOR DELETE MODE.,"6...DN
  ARROW FOR INSERT MODE.,"7...CLEAR FOR
  SPECIAL CHARACTERS","8...SHF ^ FOR MENU.
  ","9..._ TO BACKSPACE."
15 PRINT"10...SHF DN ARROW CURSOR TO END"
16 A#=INKEY#:IFA#=""THEN16ELSEIF A#=CHR$(64)
  OR A#=CHR$(94) OR A#=CHR$(10) OR A#
  =CHR$(8) OR A#=CHR$(12) OR A#=CHR$(9) OR
  A#=CHR$(21) OR A#=CHR$(93) THEN-20 ELSE
  GOTO 16
17 'input text
18 A#=INKEY#:IF A#=""THEN 18
19 IF A#=CHR$(95) THEN 13
20 IF A#<>CHR$(64) THEN 24ELSE CLS:FOR A=ST
  TO LOC-1:A#=CHR$(PEEK(A))
21 IF ASC(A#)<123 AND ASC(A#)>96 THEN PRINT
  CHR$(ASC(A#)-32):NEXT A:GOTO18
22 IF ASC(A#)<91 AND ASC(A#)>64 THEN PRINT
  CHR$(ASC(A#)+32):NEXT A:GOTO18
23 PRINTA#:NEXTA:GOTO18
24 IF A#<>CHR$(94) THEN 25 ELSE GOTO 52'^
  delete(lift text out)
25 IF A#<>CHR$(10) THEN 26 ELSE GOTO 61'
  insert text down arrow
26 IF A#<>CHR$(8) THEN 29 ELSE IF PEEK(137)
  <>0 THEN POKE 137,(PEEK(137)-1):LOC=L
  OC-1 ELSE POKE 137,255:POKE136,PEEK(136)
  -1:LOC=LOC-127 IF LK<LOC THEN LK=LOC+1
28 POKE VAL("&H"+HEX$(PEEK(136))+HEX$(PEEK
  (137))),128:GOTO18
29 IF A#<>CHR$(91) THEN30 ELSE FOR B=LOC TO
  LK-1:PRINTCHR$(PEEK(B)):NEXT:LOC=LK
  :GOTO18
30 IF A#<>CHR$(12) THEN 36 ELSE CLS:PRINT"
  ENTER SPECIAL 2 DIGIT CHARACTERS":PRIN
  T:A#="" :PRINT"0 TO ESCAPE","-1 TO BACK
  SPACE":PRINT
31 PRINT@96,"":PRINT@96,"":INPUT A
32 IF A>0 AND A<256 THEN A#=A#+STR$(A)+","
  :PRINT@510-LEN(A#),A#:POKE LOC,A:LO
  C=LOC+1:GOTO31
33 IF A=0 THEN CLS:PRINT@8,"LETTER INPUT
  MODE":PRINT:GOTO18
34 IF A=-1 THEN LOC=LOC-1:A#=LEFT$(A#,LEN(
  A#)-4):PRINT@510-(LEN(A#)+4)," " :A#)
  :GOTO31
35 GOTO31
36 IF PEEK(344)<>223 THEN 44 ELSEPRINT#-2,
  CHR$(13):POKE65495,0:A1=ST-1:L=80:A#=Z
37 A1=A1+1:IF A1=L0 THEN PRINT#-2,A#:PRINT
  #-2,CHR$(13):POKE65494,0:GOSUB13:GOTO18
38 B=PEEK(A1):IF B=14 OR B=15 THEN PRINT#-2,
  A#:PRINT#-2,CHR$(B):A#=Z#:IFB=14 TH
  EN L=40:GOTO37 ELSE L=80:GOTO37
39 IF B=13 THENPRINT#-2,A#:A#=Z#:GOTO37
  ELSE A#=A#+CHR$(B):IF LEN(A#)<L THEN37
40 B#=CHR$(B):IF(B#="" ORB#="" ORB#="" ORB#
  ="")>THENPRINT#-2,A#:A#=Z#:GOTO37
41 B#=CHR$(PEEK(A1+1)):IF(B#="" ORB#="" ORB#
  ="")>THENPRINT#-2,A#:A#=Z#:
  GOTO37
42 FOR A=LEN(A#)TO LEN(A#)-20 STEP-1:B#=
  
```

```

MID$(A$,A,1):IF(B$=" "ORB$="."ORB$=","OR
B$=")")THEN43 ELSE NEXT
43 PRINT#-2,LEFT$(A$,A):A#=Z#+RIGHT$(A$,
LEN(A$)-A):GOTO37
44 IF A$(<>CHR$(93)) THEN 47 ELSE CLS:PRINT
@106,"POSITION TAPE":PRINT@142,"<ENTER>"
:MOTORON:AUDIOON:EXEC41194
45 CLS:PRINT@102,"SET TAPE TO RECORD":PRINT
@142,"<ENTER>":EXEC41194:AUDIOOFF:CSA
VEM"WORDDATA",ST,LOC,ST
46 CLS:PRINT@107,"TAPE SAVED":EXEC41194:CLS
:PRINT@15,"WORD INPUT MODE":GOTO18
47 IF A$(<>CHR$(21)) THEN 48 ELSE CLS:PRINT@3,
"SET TAPE TO PLAY <ENTER>":EXEC41194
:PRINT:PRINT"LOADING":LOADM:LOC=
PEEK(126)*256+PEEK(127)-1:A#=CHR$(64):GOT
O18
48 IF LO<TP THEN 50 ELSE CLS:PRINT@200,"TEXT
MEMORY IS FULL":PRINT@420,"<ENTER>"
FOR MENU"
49 EXEC41194:GOTO13
50 POKE LOC,ASC(A$):LOC=LOC+1:IF ASC(A$)>123
AND ASC(A$)>96 THEN PRINTCHR$(ASC(A
$)-32):GOTO18 ELSE IF ASC(A$)<91 AND
ASC(A$)>64 THEN PRINTCHR$(ASC(A$)+32):
GOTO18 ELSE PRINTA$:GOTO18
51 'delete text
52 D0=D1-240:IF D0<ST THEN D0=ST
53 D2=D1+240:IF D2>LO THEN D2=LO
54 GOSUB69:Y=X:GOSUB69:IFX<Y THEN Z=X:X=Y:
Y=Z
55 POKE310,FNA(X):POKE311,FNB(X):POKE312,
FNA(Y):POKE313,FNB(Y):POKE314,FNA(LO):P
OKE315,FNB(LO)
56 EXEC M2:LOC=LO-X+Y
57 D0=D1-240:IFD0<ST THEN D0=ST
58 D2=D1+240:IFD2>LO THEN D2=LO
59 CLS:PRINT@240+D0-D1,"":EXEC M1:A$=INKEY
$:GOTO18
60 'insert
61 D0=D1-240:IFD0<ST THEN D0=ST
62 D2=D1+240:IF D2>LO THEN D2=LO
63 GOSUB69:POKE310,FNA(X):POKE311,FNB(X)
64 PRINT@240,"":LINEINPUTA$:POKE312,FNA(
LOC+LEN(A$)):POKE313,FNB(LOC+LEN(A$)):P
OKE314,FNA(LO):POKE315,FNB(LO)
65 LO=LO+LEN(A$):EXEC M3
66 FOR A=1 TO LEN(A$):POKEX+A,ASC(MID$(A$,
A,1)):NEXTA:SOUND200,1:SOUND100,1:SOUN
D50,1
67 CLS:PRINT@240+D0-D1,"":EXEC M1:A$=INKEY
$:GOTO18
68 'move cursor
69 X=159
70 POKE310,FNA(D0):POKE311,FNB(D0):POKE 312,
FNA(D2):POKE313,FNB(D2):CLS:PRINT@D0
-D1+240,"":EXEC M1:SF=0
71 IF PEEK(341)=223 THEN SF=1:D1=D1-32:IF
D1<ST THEN D1=ST
72 IF PEEK(342)=223 THEN SF=1:D1=D1+32:IF
D1>LO THEN D1=LO
73 IF PEEK(343)=223 THEN SF=1:D1=D1-1:IF
D1<ST THEN D1=ST
74 IF PEEK(344)=223 THEN SF=1:D1=D1+1:IF
D1>LO THEN D1=LO
75 D0=D1-240:IF D0<ST THEN D0=ST
76 D2=D1+240:IF D2>LO THEN D2=LO
77 IF SF=1 THEN 70
78 IF PEEK(330)=191 THEN SOUND 100,1:SOUND
50,1:X=D1:RETURN
79 X=414-X:POKE1264,X:GOTO71
80 '(C) PETER WHITTAKER 1983

```

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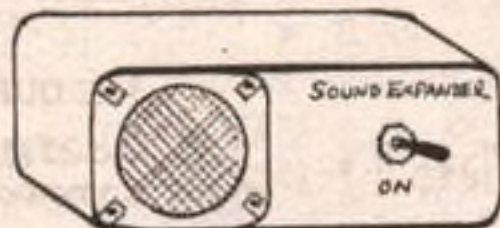
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Filing system

Gary Foreman presents a simple program for the creation of data files

This program, *Data File* for the Commodore 64, allows the user to input information for a file. The program could be used for a name and address book, or as a record of membership to a club.

In the program there is provision for 100 files, but if it becomes necessary this can be changed (lines 20 and 1010). One hundred files takes a long time to write to

tape — to speed things up you could input, say, 25 files at a time, but this would make it harder to look for a particular file.

It is also possible for a search to be carried out. All the user has to do is input an item of information and the computer will give all the file numbers containing that information. Information can be entered in any format, but commas are not allowed. If connected to a printer the program can write specific files to it — this could be used to make address labels, etc.

The program will also work on the Pet and Vic20. On the Pet no changes are

necessary, but on the Vic the screen will have to be readjusted and 3K of additional memory may be required.

Variables

AS — File
QS — Information for input
WS — Menu
FIN — File number

Program notes

10-75 Initialisation of variables
100-250 Title and menu
1000-1950 Create new file
2000-2060 View a file
3000-3100 Write all files to tape
4000-4120 Read all files from tape
5000-5120 Write a file to printer
6000-6080 Correct a file
7000-7150 Search for a file
8000-8030 Ending routine

```

1 REM *****
2 REM *
3 REM * DATA FILE *
4 REM *
5 REM * BY G.FOREMAN *
6 REM *
7 REM *****
8 REM
10 REM * INITIALISE *
20 DIM A$(7,101)
30 Q$(1)="NAME....." Q$(2)="ADDRESS..." Q$(3)="TOWN
....." Q$(4)="COUNTY...."
40 Q$(5)="POSTCODE.." Q$(6)="TEL.NO. .." Q$(7)="DATE
....."
50 P$="####" Q$="XXXXXXXXXXXXXXXXXXXX" R$="XXXXXXXXXXXX"
50 W$(1)="1) START NEW FILE" W$(2)="2) VIEW A FILE"
53 W$(3)="3) WRITE FILE TO TAPE"
55 W$(4)="4) READ FILE FROM TAPE" W$(5)="5) WRITE
FILE TO PRINTER"
70 W$(6)="6) CORRECT FILE" W$(7)="7) SEARCH FOR A
FILE" W$(8)="8) END PROGRAM"
75 FORQ=1TO7 FORQ1=1TO100 A$(Q,Q1)="":NEXTQ1,Q
100 REM * TITLE & MENU *
110 PRINTQ$:"*****"
120 PRINTR$:"* * * * *"
130 PRINTR$:"* DATA FILE *"
140 PRINTR$:"* * * * *"
150 PRINTR$:"*****"
160 PRINTP$:P$:P$:P$:" PRESS ANY KEY"
170 GETKB$:IFKB$="" THEN170
200 PRINTQ$:"TTTTTTTTTT": "* MENU *"
210 PRINT FORW=1TO8
220 PRINTP$:W$(W):NEXT
230 GETKB$:KB=VAL(KB$):IFKB$="" THEN230
235 IFKB<1 OR KB>8 THEN 230
240 ON KB GOSUB 1000,2000,3000,4000,5000,6000,
7000,8000
250 GOTO200
1000 REM * START NEW FILE *
1010 FIN=FIN+1:IFFIN>100 THENPRINTP$:"NO ROOM FOR
FILE" GOTO1950
1020 PRINTLEFT$(Q$,3):R$:"* FILE #",FIN:"*"
1030 FORQ=1TO7:PRINTP$:Q$(Q):NEXTQ
1040 PRINT"TTTTTTTTTTTTTT" FORQ=1TO7
1050 PRINT"###":R$: INPUTA$(Q,FIN)
1060 NEXT
1070 RETURN
1090 FOR T=1TO1000:NEXT:RETURN
1099 END
1000 REM * VIEW A FILE *
1010 INPUT"XXXXXXXXXXWHICH FILE ":WF
1020 PRINTLEFT$(Q$,3):P$:"* FILE #":WF:"*"
1030 FORQ=1TO7:PRINTP$:Q$(Q):A$(Q,WF):NEXT
1040 PRINTP$:P$:"PRESS SPACE TO CONTINUE"
1050 GETKB$:IFKB$="" THEN2050
1060 RETURN
1099 END
2000 REM * WRITE FILE TO TAPE *
2010 PRINTLEFT$(Q$,3):P$:"INSERT DATA TAPE"
2015 PRINTP$:"REWIND DATA TAPE"
2020 PRINTP$:"PRESS SPACE WHEN READY"
2025 PRINTP$:
2030 GETKB$:IFKB$="" THEN3030
2040 OPEN1,1,0,"DATA1"
2050 PRINT#1,FIN
2060 FORQ=1TOFIN
3070 FORQ1=1TO7
3080 PRINT#1,A$(Q1,Q)
3090 NEXTQ1,Q
3100 RETURN
3999 END
4000 REM * READ FILE FROM TAPE *
4010 PRINTLEFT$(Q$,3):P$:"INSERT DATA TAPE"
4020 PRINTP$:"REWIND DATA TAPE"
4030 PRINTP$:"PRESS SPACE WHEN READY"
4040 GETKB$:IFKB$="" THEN4040
4050 PRINTP$:
4060 OPEN1,1,0,"DATA1"
4070 INPUT#1,FIN
4080 FORQ=1TOFIN
4090 FORQ1=1TO7
4100 INPUT#1,A$(Q1,Q)
4110 NEXTQ1,Q
4120 RETURN
4999 END
5000 REM * WRITE FILE TO PRINTER *
5010 OPEN4,4
5020 INPUT"XXXXXXXX FILE NO. ":WF
5030 FORW=1TO2:PRINT#4,"":NEXTW
5040 PRINT#4,CHR$(14);SPC(6);"FILE NO.#":WF
5050 PRINT#4,CHR$(15)
5060 FORW=1TO2:PRINT#4,"":NEXTW
5070 FORQ=1TO7
5080 PRINT#4,SPC(10)Q$(Q);A$(Q,WF)
5090 NEXTQ
5100 FORW=1TO3:PRINT#4,"":NEXTW
5110 CLOSE4,4
5120 RETURN
5999 END
6000 REM * CORRECT FILE *
6010 INPUT"XXXXXXXXWHICH FILE":WF
6020 PRINTLEFT$(Q$,3):R$:"* FILE NO.#":WF:"*"
6030 FORQ=1TO7:PRINTP$:Q$(Q):A$(Q,WF):NEXT
6040 PRINT"TTTTTTTTTTTTTT":
6050 FORQ=1TO7
6060 PRINTP$:LEFT$(R$,9):INPUTA$(Q,WF)
6070 NEXT
6080 RETURN
5999 END
7000 REM * SEARCH FOR A FILE *
7010 PRINT"###" Y=0
7020 FORQ=1TO7:PRINTP$:Q$(Q):NEXT
7030 INPUT"### WHICH DO YOU KNOW":KB$
7035 INPUT"###WHAT IS YOUR INFORMATION":IN$
7040 KB=VAL(KB$):IFKB<1 OR KB>7 THEN 7010
7050 FORSE=1TOFIN
7060 IFA$(KB,SE)=IN$ THEN Y=Y+1:EU(Y)=SE
7070 NEXTSE
7080 PRINT"###THERE ARE "(Y)" FILES CONTAINING"
7085 PRINT"###":IN$
7090 PRINT"###THEIR NUMBERS ARE "
7100 FORSE=1TOY:PRINTEU(SE):NEXT
7105 PRINTCHR$(13)
7110 PRINT"###WHICH DO YOU WISH TO VIEW"
7115 PRINT"###0-RETURN"
7120 INPUTMF
7130 IFA$(0,0)=MF THENRETURN
7140 GOSUB2020
7150 GOTO7080
7999 END
8000 REM * END PROGRAM *
8010 PRINTQ$: INPUT"ARE YOU SURE" :SI$
8020 IFSI$<"Y" THEN RETURN
8030 END

```


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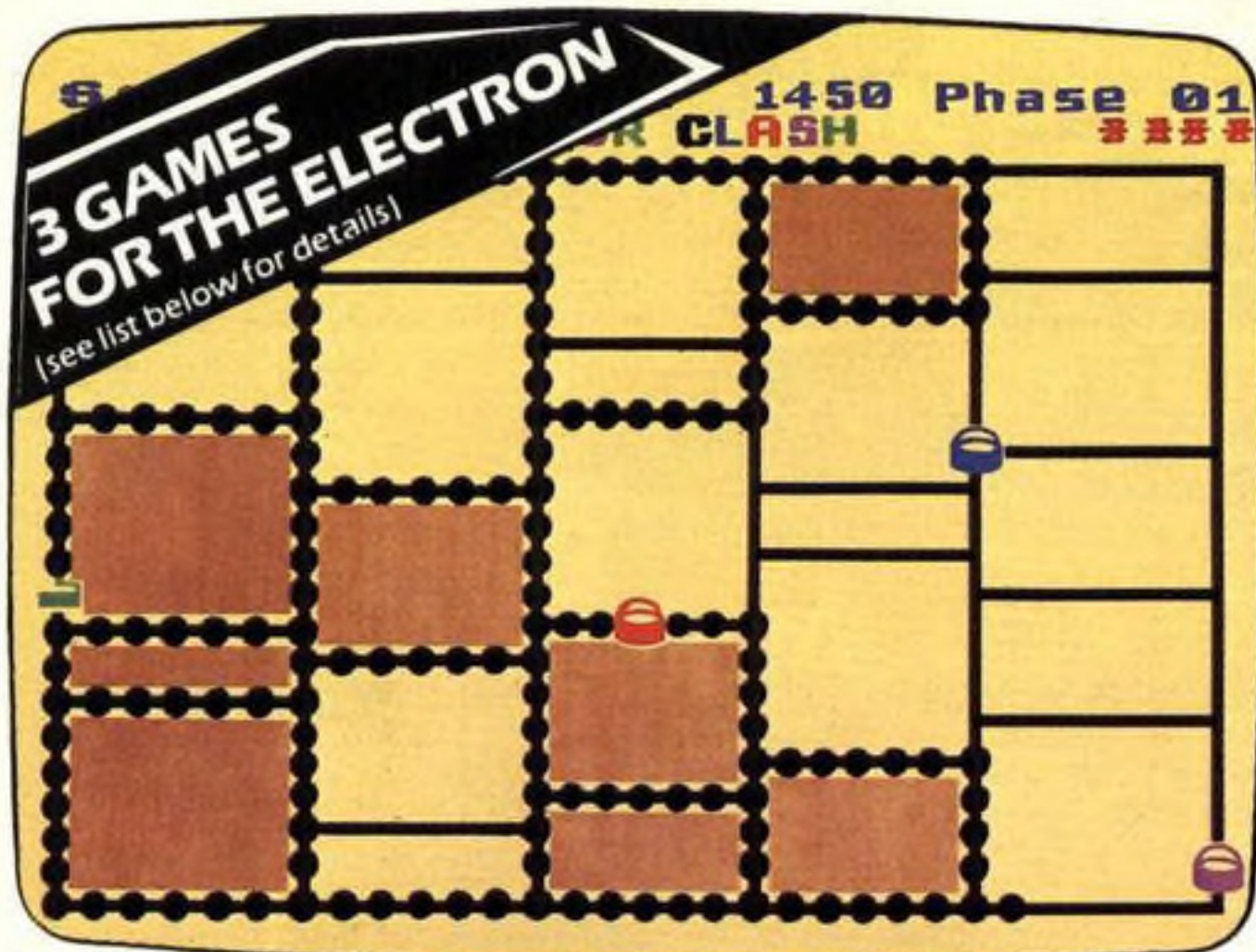
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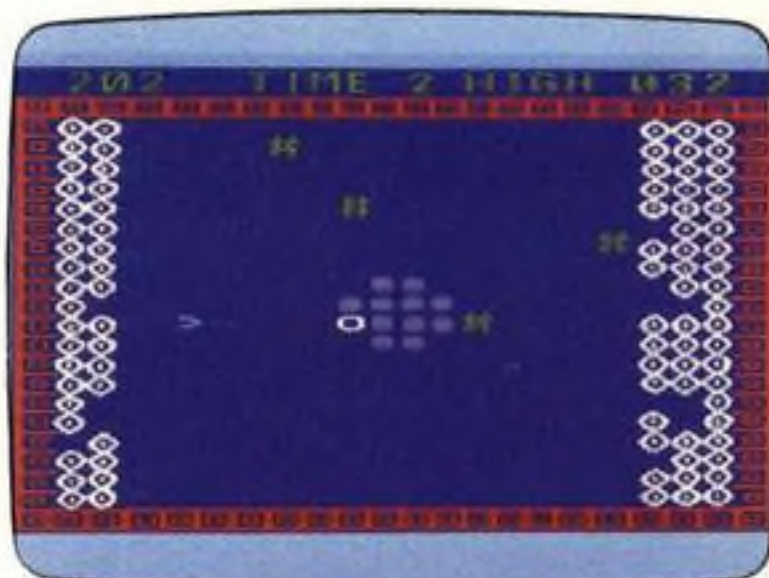
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Flowering art

Michael Batty explains how to introduce randomness into a program in the last of the series

Having developed some reasonably fast techniques to draw, fill and rotate ellipses in the last two weeks, we can now really begin to exercise our imagination through computer art.

We will present a program which takes the regular flower-like designs generated in Program 2 last week, and display these in different sizes, with varying numbers of petals, at random points on the screen.

This is not as easy as it might sound because if you explored various designs using last week's Program 2, you will have found that many values of XX, YY and N, which determine the X and Y axes sizes and the number of petals, do not give designs that look like flowers.

Thus, we require some structure to the way we introduce randomness to enable

us to always generate flower-like pictures.

The program listed here takes Program 2 from last week and strictly controls the way XX, YY and N are chosen. First, flowers based on a small number of broad petals or a large number of narrow petals are fixed in *Procord* or *Procunu* respectively. Then, the dominance of the X or Y axes is established in *Procfor* or *Procbak* and finally, large or small sizes of flowers are chosen using appropriate functions to determine XX and YY.

Line 110 of the program initially establishes a branch to *Procord* or *Procunu* and then branching takes place within these procedures from line 570 to the end. Random values are chosen, but within the overall limits set by these procedures.

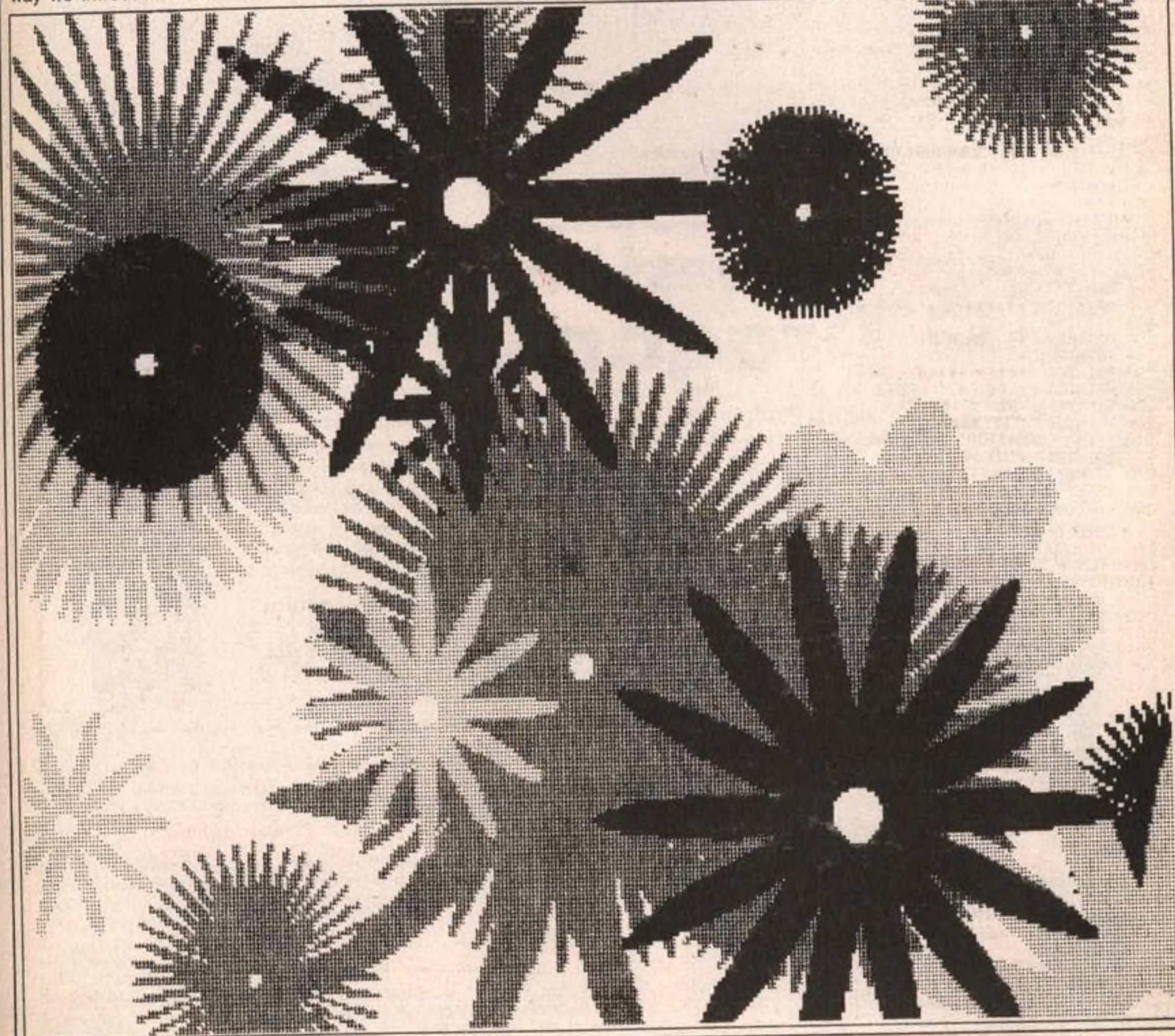
Despite the emphasis we have placed

on speed, the program might appear slow; after 10 minutes, some nice patterns have developed; after 20, the picture is clearly becoming less formal. To get 100 flowers, the program would have to run for 40 minutes or so; to get 1000, about six hours. Computer art always disappoints as nice patterns are suddenly wiped out by new designs which evolve to nice patterns, and so on. Of course, the answer is to stop it, when you like it.

Speed could be improved by only computing 15, rather than 30 co-ordinates of each ellipse, or by using an assembler, but I feel the speed is about right. This illustration took 15 minutes to develop.

Finally, experiment with the program. Change the shapes, the mode, the colours and the operation of the *Gcol* statement. Scroll the screen. If you have a spare colour tv set, you can set the program going and have the art of the future — a forever changing picture in the corner of your room!

continued on page 31



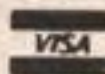



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```

10 REM Let A Thousand Flowers Bloom
20 REM (C)Michael Batty,1983
30 MODE1
40 DIM X(30),Y(30)
50 VDU19,0,5;0;19,1,6;0;
60 VDU19,2,4;0;19,3,2;0;
70 VDU23,1,0;0;0;0;
80 M=0
90 REPEAT
100 M=RND(2)
110 IF M=1 THEN PROCORD ELSE PROCUNU
120 XO=RND(1279);YO=RND(1023)
130 VDU29,XO,YO;
140 PROCELLIPSE(XO,YO,XX,YY,N)
150 UNTIL FALSE
160 END
170 DEFPROCELLIPSE(XO,YO,XX,YY,N)
180 GCOL0,RND(3)
190 PROCSETUP(XX,YY)
200 TH=2*PI/N
210 FOR KX=1 TO N-1
220 PROCTRANSF(TH)
230 NEXT KX
240 IF XX>YY THEN Z=YY ELSE Z=XX
250 Z=Z*1.25;XX=Z;YY=Z
260 VDU29,XO-XX;YO;
270 GCOL0,0
280 PROCSETUP(XX,YY)
290 DEFPROCSETUP(XX,YY)
300 DT=2*PI/30;A=XX/YY
310 C=COS(DT);S=SIN(DT);SX=S/A;SY=S*A
320 XA=XX;YA=0
330 FOR IX=1 TO 30
340 T=XA*C-YA*S
350 YA=YA+C+XA*SX;XA=T
360 X(IX)=XA+XX;Y(IX)=YA
370 NEXT IX
380 PROCFILL
390 ENDPROC
400 DEFPROCTRANSF(TH)
410 C=COS(TH);S=SIN(TH)

```

```

420 FOR IX=1 TO 30
430 T=X(IX)+C-Y(IX)*S
440 Y(IX)=X(IX)*S+Y(IX)+C;X(IX)=T
450 NEXT IX
460 PROCFILL
470 ENDPROC
480 DEFPROCFILL
490 MOVE X(30),Y(30);MOVE X(1),Y(1)
500 PLOT85,X(29),Y(29)
510 FOR IX=2 TO 14
520 PLOT85,X(IX),Y(IX);JX=30-IX
530 PLOT85,X(JX),Y(JX)
540 NEXT IX
550 PLOT85,X(15),Y(15)
560 ENDPROC
570 DEFPROCORD
580 R=4+RND(4)
590 N=7+RND(7)
600 M=RND(2)
610 IF M=1 THEN PROCFOR ELSE PROCBK
620 ENDPROC
630 DEFPROCUNU
640 R=15+RND(10)
650 N=30+RND(30)
660 M=RND(2)
670 IF M=1 THEN PROCFOR ELSE PROCBK
680 ENDPROC
690 DEFPROCFOR
700 M=RND(2)
710 IF M=1 THEN XX=FNSF ELSE XX=FNBF
720 YY=XX/R
730 ENDPROC
740 DEFPROCBK
750 M=RND(2)
760 IF M=1 THEN YY=FNBB ELSE YY=FNBB
770 XX=YY/R
780 ENDPROC
790 DEFFNSF=50+RND(30)
800 DEFFNBF=120+RND(40)
810 DEFFNSB=80+RND(40)
820 DEFFNBB=200+RND(50)

```

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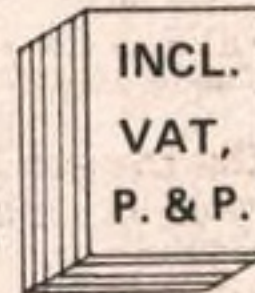


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List

on Spectrum

This program is designed to list all Gotos and Gosubs and the line in which they originate.

The program is useful for debugging and for following programs written by others.

The program is only five lines long and should be merged with an existing pro-

gram. It is started by the direct command *Goto* 9995, the variables used are unlikely to conflict with existing variables.

Program notes

9995- Prints heading: sets the variables
Q Main loop counter.
Q1 To start of program area.
Q2 To end of program area.
Q3 Byte at Location Q.
Q4 Contains first line number.
9996-Q4 Contains line number until a new line is detected (Chr\$ 13). The new line number

9997 Prints line number. Builds goto/gosub destination in Q\$.
9998 Detects new line (CHR\$ 13) and colon (Chr\$ 58) as terminators of goto/gosub destination. Prints destination.
9999 Builds complex destinations in Q\$.

This program also demonstrates how a relatively simple program can be compressed into a small number of lines. The original version was 21 lines long.

The use of the system variables *newppc* and *nsppc* is a novel approach to conditional branching.

```
9995 PRINT TAB 8; "GOTO/GOSUB DUM
P" " " "LINE": LET Q1=PEEK 23635+25
6*PEEK 23636: LET Q2=PEEK 23627+
256*PEEK 23628: LET Q4=PEEK (Q1+
1)+256*PEEK Q1: FOR Q=Q1+4 TO Q2
: LET Q3=PEEK Q
9996 LET Q4=Q4*(Q3<>13)+(PEEK (Q
+2)+256*PEEK (Q+1))*(Q3=13): POK
E 23618,12: POKE 23619,39: POKE
23620,5+3*(Q4>9999): LET Q=Q+4*(
Q3=13)+5*(Q3=14): IF ((Q3=14) OR
(Q3<>236 AND Q3<>237)) THEN NEX
T Q: PRINT "END OF DUMP": STOP
9997 PRINT Q4;: LET Q5=Q+1: LET
Q$=CHR$ (PEEK Q5)
9998 LET Q5=Q5+1: IF PEEK Q5=13
OR PEEK Q5=58 THEN PRINT TAB 6;C
HR$ (236+1*(Q3=237));Q$: LET Q=Q
5-1: NEXT Q
9999 LET Q6=Q5: LET Q5=Q5+5*(PEE
K Q6=14): LET Q$=Q$+(CHR$ (PEEK
Q5) AND PEEK Q6<>14): GO TO 9998
```

List
by M Booth

Character

on Oric

This program is an improvement and

adaptation of the alternative character set mentioned on page 35 of the Oric manual.

In some editions line 20 is incorrect and should read 20 PRINT N;CHR\$(27);"I";CHR\$(N).

However, my program does not have the

scroll which makes it inconvenient to look at as in the manual.

This listing will display each standard character and the alternate associated with it. Line 98 turns off the cursor. To get it back when you have finished Type *Ctrl Q*.

```
10 REM** ALTERNATE CHARACTER SET **
15 CLS' ** BY P. J. AINSCOUGH **
20 PAPER0:HIRES
25 I=31
30 FOR K=0 TO 180 STEP 18:CURSET0,K,0
35 FOR J=1 TO 9
40 I=I+1:IFI>127THEN GOT055
45 CHARI,0,1:CURMOV13,0,0:CHARI,1,1
50 CURMOV13,0,0
55 NEXT J
60 NEXT K
65 CURSET40,191,3
70 FOR L=1 TO 24
75 READM
80 CHARM,0,1
85 CURMOV7,0,3
90 NEXT L
95 DATA65,76,84,69,82,78,65,84,69,32
96 DATA67,72,65,82,65,67,84,69,82,32
97 DATA83,69,84,46
98 PRINTCHR$(17)
99 END
```

Character
by P Ainscough

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```

8092 IFPEEK(BP)=4THENSC=SC+10:GOTO8200
8093 IFPEEK(BP)=8THENSC=SC+5:GOTO8200
8094 IFPEEK(BP)=3THENSC=SC+25:GOTO8200
8096 IFPEEK(BP)=1THENSC=SC+100:GOTO8200
8097 IFPEEK(BP)=0THENSC=SC+1000:GOTO8200
8098 IFPEEK(BP)=13THENSC=SC+10000:GOTO34010
8099 IFPEEK(BP)=11ORPEEK(BP)=15THENSC=SC+10000
:GOTO34010
8100 POKEBP,9:POKEBC,0
8120 GH=5:GOSUB8000:GH=0:POKEBP,32
8130 BP=BP-44:BC=BC-44:IFBP<7702THENRETURN
8140 GOTO8090
8200 POKEBP,8:POKEBC,10:POKE36877,190:FORI=
15TO0STEP-.2
8205 POKE36878,I+144:NEXT:POKE36877,0
8210 POKE36878,8:POKEBP,32:NA=NA-1
8220 PRINT"#####SCORE="SC:RETURN
11000 IFSC=8625THENNA=59:GOTO30
11001 GOTO30
11005 GOTO86
22000 PRINT"#####":POKE36869,240:POKE36869,240
22001 PRINT"#####"
22003 PRINT"##### TIME UP!*"
22005 PRINT"#####"
22006 PRINT"##### YOU SCORED "
22007 PRINT"##### "SC" POINTS IN "
22008 PRINT"##### "RIGHT$(TI$,3)" SECONDS"
22009 PRINT"#####ANOTHER GO (Y/N)?"
22010 GETT$:IFT$=""THEN22010
22011 IFT$="Y"THENSC=0:RUN
22012 IFT$="N"THENPRINT"#####"
30000 END
33000 PRINT"#####":POKE36869,240
33001 PRINT"#####"
33002 PRINT"#####*"
33003 PRINT"##### YOU HAVE*"
33004 PRINT"#####*"
33005 PRINT"##### WIPED*"
33006 PRINT"#####*"
33007 PRINT"##### OUT ALL THE*"
33008 PRINT"#####*"
33009 PRINT"##### ALIENS*"
33010 PRINT"#####"
33011 GOTO22006
33014 FORT=1TO2000:NEXT
33015 PRINT"#####BONUS STAGE#####"
33016 POKE36869,255:GOSUB4050
33017 GOSUB6000
33018 A=0:LA$="#####":CO=10
33019 GOSUB8000
33020 GOSUB34000
33022 IFN=1THENA=A+1:GOSUB34000
33023 GOTO33019
34000 PRINTLA$:TAB(A)"#####KMO#"
34001 IFPEEK(8141)=15THEN35000
34005 N=1:RETURN
34010 POKE36877,190:FORI=15TO0STEP-.2:
POKE36878,I+144:NEXT:POKE36
34011 POKE36878,8
34013 SC=SC+10000
34014 PRINT"#####SCORE="SC
34015 FORT=1TO1000:NEXTT
34016 IFSC>150000THEN33000
34017 IFTI$="000500"THEN22000
34018 GOTO33015
35000 POKE36869,240:PRINT"#####"
35001 PRINT"#####*"
35002 PRINT"#####THEY'VE LANDED*"
35003 PRINT"#####*"
35004 PRINT"#####"
35005 GOTO22006

```

Cosmic Cascade
by Mark Manus

Patterns

on Dragon 32

This program was devised when I was playing around with Sine and Cosine. Some pretty fantastic patterns can be obtained by adjusting four variables (A, B, C, D).

Variables

A and B are the elliptical variables. C and D are what I call the 'funny variables'. Funny because these are the variables

that change the whole pattern. The size of M gives the resolution of the drawing. To adjust the variables you just *Edit* the numbers in line 20.

Examples

These are a few examples which I found nice:

A	B	C	D
50	70	400	1200
80	80	600	400
40	80	400	400
40	40	1	1.1
40	40	1	1.2

Program notes

Lines	Description
10	Sets up High resolution
20-30	Sets up the variables
40-50	Works out the position to plot
60	Draws a line from the old co-ordinates to the new ones
70	Increases the increment

To speed up the drawing *Poke* 65495,0, but if you want to save it you must remember to *Poke* 65494,0 to get out of the fast mode. The program will keep drawing the pattern until you stop it. Some Dragons do not accept this *Poke*.

```

10 PMODE 4,1:PCLS 0
20 A=80:B=80:C=50:D=50
30 M=.01
40 X=A*SIN(M*C):Y=B*COS(M*D)
50 X=X+100:Y=Y+100
60 LINE(X,Y)-(X1,Y1),PSET:X1=X:Y1=Y
70 M=M+.1
80 IF I=0 THEN PCLS 0:I=1:SCREEN 1,1
90 GOTO 40

```

Patterns
by J Twigger

Maths

on Spectrum

The idea is to save your friend from falling off a cliff. The program is aimed at children between 7 and 13. If your answer is correct, he moves away from the edge of the cliff by one character space. If your answer is incorrect, he moves two character spaces towards the edge of the cliff.

You have 10 questions in all, but it will

only print your number of correct answers out of 10 if you save him. If your answer is incorrect it will tell you the correct answer.

Program notes

10-60 Asks which section you require
 70-130 Selects chosen section
 500-517 Asks which grade required
 520-635 Finds the numbers for the questions you wanted
 640-645 Finds correct answers
 650-660 Prints questions and asks for answer
 672-682 Responds to answer

687-688 Clears screen
 690-692 Prints score out of 10 only if mate saved and produces display if mate saved
 1510-3000 Multiplication zone (same as above)
 3110-4990 Division zone (same as above)
 5000-5500 Draws cliff and puts man on it
 6000-7000 Moves man in a direction which is determined by whether you get the question correct
 9000-9800 Sets up graphics
 9900-9950 Moves man down cliff if insufficient answers correct
 9960-9980 Checks if your mate has hit the bottom
 9982-9999 Produces screen display if mate falls off cliff

```

1 LET q=6: LET w=13
5 GO TO 9000
10 CLS : PRINT AT 0,0;"Welcome
to Michaels maths lesson"
20 PLOT 0,165: DRAW 255,0
30 PRINT AT 4,4;"Which section
do you want?"
40 PRINT AT 7,7;"1 Addition"
" 2 Subtraction"
50 PRINT AT 11,7;"3 Division"
" 4 Multiplication"
60 INPUT "Input number you req
uire ";s
70 IF s>4 OR s<1 THEN GO TO 60
100 IF s=4 THEN GO TO 1500
110 IF s=1 THEN GO TO 500
120 IF s=2 THEN GO TO 515
130 IF s=3 THEN GO TO 3100
500 CLS : IF s=1 THEN PRINT FLA
SH 1;AT 2,10;"Addition": PRINT A
T 5,1;"How difficult do you want
them?"
510 IF s=1 THEN PRINT AT 8,9;"1
Easy"
" 2 Quite easy
" 3 Quite hard"
" 4 Hard"
515 IF s=2 THEN CLS : IF s=2 TH
EN PRINT FLASH 1;AT 2,10;"Subtra
ction": PRINT AT 5,1;"How diffic
ult do you want them?"
517 IF s=2 THEN PRINT AT 8,9;"1
Easy"
" 2 Quite easy
" 3 Quite hard"
" 4 Hard"
520 INPUT "Input level you requ
ire ";level
525 IF level>4 OR level<1 THEN
GO TO 520
600 GO SUB 5000
605 LET l=0
609 LET f=0
612 IF level=3 THEN LET y=INT (
RND*135)+65
615 IF level=3 THEN LET x=INT (
RND*135)+65
617 IF level=4 THEN LET y=INT (
RND*799)+200
619 IF level=4 THEN LET x=INT (
RND*799)+200
620 IF level=1 THEN LET x=INT (
RND*15)
625 IF level=1 THEN LET y=INT (
RND*15)
630 IF level=2 THEN LET y=INT (
RND*50)+15
635 IF level=2 THEN LET x=INT (
RND*50)+15
640 LET k=VAL "x+y"
645 LET j=VAL "x-y"
650 IF s=1 THEN PRINT AT 13,2;x
;" + ";y;" =
"
655 IF s=2 THEN PRINT AT 13,2;x
;" - ";y;" =
"
660 INPUT "Input your answer ";
a
670 PRINT AT 13,15;a;" "
672 IF s=2 AND a=j THEN PRINT I
NK 2;AT 13,20;"✓"
675 IF s=1 AND a=k THEN PRINT I
NK 2;AT 13,20;"✓"
676 IF s=2 AND a=j THEN LET l=l
+1
677 IF s=1 AND a=k THEN LET l=l
+1
678 IF s=2 AND a<>j THEN PRINT
INK 2;AT 13,20;"X"
680 IF s=1 AND a<>k THEN PRINT
INK 2;AT 13,20;"X"
681 IF s=1 AND a<>k THEN PRINT
AT 15,2;"Wrong it was ";k
682 IF s=2 AND a<>j THEN PRINT
AT 15,2;"Wrong it was ";j
683 GO SUB 6000
685 PAUSE 125
687 PRINT AT 15,2;"

```

```

688 PRINT AT 13,15;" "
690 IF f=9 THEN PRINT AT 13,1;"
You got ";l;" out of 10"
692 IF f=9 AND w<23 THEN PRINT
AT 3,2;"You have saved him";AT q
,w;"X"
694 IF f=9 THEN PAUSE 1000: IF
f=9 THEN RUN
695 LET f=f+1: GO TO 610
1500 CLS
1510 PRINT FLASH 1;AT 2,6;"Multi
plication": PRINT AT 5,1;"How di
fficult do you want them?"
1520 PRINT AT 8,9;"1 Easy"
" 2 Quite easy"
" 3 Quite hard"
" 4 Ha
rd"
1530 INPUT "Input level you requ
ire ";diff
1535 IF diff<1 OR diff>4 THEN GO
TO 1530
1537 GO SUB 5000
1540 LET l=0: LET f=0
1545 LET y=INT (RND*12)
1550 IF diff=1 THEN LET x=INT (R
ND*5)
1560 IF diff=2 THEN LET x=INT (R
ND*5)+5
1570 IF diff=3 THEN LET x=INT (R
ND*5)+10
1580 IF diff=4 THEN LET x=INT (R
ND*5)+15
1590 LET z=VAL "y*x"
1650 PRINT AT 13,2;x;" * ";y;" =
"
1660 INPUT "Input your answer ";
a
1665 PRINT AT 13,15;a
1670 IF a=z THEN PRINT INK 2;AT
13,20;"✓"
1680 IF a=z THEN LET l=l+1
1690 IF a<>z THEN PRINT INK 2;AT
13,20;"X"
1700 IF a<>z THEN PRINT AT 15,2;
"Wrong it was ";z
1705 PRINT AT q,w;" "
1710 IF a=z THEN LET w=w-1
1720 IF a<>z THEN LET w=w+2
1730 IF w>22 THEN GO TO 9900
1740 PRINT AT q,w;"X"
1745 PAUSE 125
1750 PRINT AT 15,2;"
"
1760 PRINT AT 13,15;" "
1770 IF f=9 THEN PRINT AT 13,1;"
You got ";l;" out of 10"
1780 IF f=9 AND w<23 THEN PRINT
AT 3,2;"You have saved him";AT q
,w;"X"
1790 IF f=9 THEN PAUSE 1000: IF
f=9 THEN RUN
1800 LET f=f+1
3000 GO TO 1545
3100 CLS
3110 PRINT FLASH 1;AT 2,10;"Divi
sion": PRINT AT 5,1;"How difficu
lt do you want them?";AT 8,9;"1
Easy"
" 2 Quite easy"
" 3 Quite hard"
" 4 Hard"
3120 INPUT "Input level you requ
ire ";diff
3130 IF diff<1 OR diff>4 THEN GO
TO 3120
3140 GO SUB 5000
3150 LET l=0: LET f=0
3180 IF diff=2 THEN LET x=INT (R
ND*5)+5
3190 IF diff=2 THEN LET y=INT (R
ND*8)+5
3200 IF diff=3 THEN LET y=INT (R
ND*5)+12
3210 IF diff=3 THEN LET x=INT (R
ND*15)+15
3220 IF diff=4 THEN LET x=INT (R

```



```

ND*20)+10
3230 IF diff=4 THEN LET y=INT (R
ND*15)+25
3240 IF diff=1 THEN LET y=INT (R
ND*4)+1
3250 IF diff=1 THEN LET x=INT (R
ND*11)+1
3300 LET p=VAL "x=y"
3310 LET i=VAL "p/y"
3320 LET z=VAL "p/i"
3400 PRINT AT 13,2;p;" / ";i;" =
"
3410 INPUT "Input your answer ";
a
3415 PRINT AT 13,15;a
3420 IF a=z THEN PRINT INK 2;AT
13,20;"✓"
3430 IF a=z THEN LET l=l+1
3440 IF a<>z THEN PRINT INK 2;AT
13,20;"X"
3450 IF a<>z THEN PRINT AT 15,2;
"Wrong it was ";z
3451 PRINT AT q,w;" "
3453 IF a=z THEN LET w=w-1
3455 IF a<>z THEN LET w=w+2
3458 IF w>22 THEN GO TO 9900
3460 PRINT AT q,w;"Å"
3470 PAUSE 125
3480 PRINT AT 15,2;"
"
3490 PRIN AT 13,15;" "
3500 IF l=9 THEN PRINT AT 13,1;"
You got ";l;" out of 10"
3510 IF f=9 AND w<23 THEN PRINT
AT 3,2;"You have saved him";AT q
,w;"*
"
3520 IF f=9 THEN PAUSE 1000: IF
f=9 THEN RUN
3550 LET f=f+1
4990 GO TO 3160
5000 CLS : PLOT 10,119
5010 DRAW 172,0: DRAW 0,-100
5020 PLOT 182,33: DRAW 70,0
5030 PRINT AT 6,13;"Å"
5500 RETURN
6000 PRIN) HI q,w,
6005 IF s=1 AND a<>k THEN LET w=
w+2
6007 IF s=2 AND a<>j THEN LET w=
w+2

```

```

6010 IF s=1 AND a=k THEN LET w=w
-1
6020 IF s=2 AND a=j THEN LET w=w
-1
6030 IF w>22 THEN GO TO 9900
6050 PRINT AT q,w;"Å"
7000 RETURN
9000 FOR f=0 TO 7: READ z: POKE
USR "a"+f,z: NEXT f
9010 FOR f=0 TO 7: READ z: POKE
USR "b"+f,z: NEXT f
9020 FOR f=0 TO 7: READ z: POKE
USR "c"+f,z: NEXT f
9030 FOR f=0 TO 7: READ z: POKE
USR "d"+f,z: NEXT f
9040 FOR f=0 TO 7: READ z: POKE
USR "e"+f,z: NEXT f
9500 DATA 0,1,3,7,142,220,248,48
+64
9510 DATA 195,231,126,60,60,126,
231,195
9520 DATA 56,56,16,56,84,56,68,6
8
9530 DATA 0,0,0,0,128,187,255,25
5
9540 DATA 56,186,84,56,16,56,68,
68
9800 GO TO 10
9900 LET q=q+1
9925 PRINT AT q,w;"Å"
9927 BEEP .1,10
9930 PRINT AT q,w;" "
9950 IF q=17 THEN PRINT AT 3,1;"
You have not saved him!";AT 16,2
3;"SPLAT";AT q,w;"w"
9960 IF q=17 THEN GO SUB 9982
9975 IF q=17 THEN PAUSE 1000: IF
q=17 THEN RUN
9980 GO TO 9900
9982 FOR f=0 TO 20
9983 PLOT 193,35
9985 DRAW INK 1;INT (RND*40)-20,
INT (RND*40)-20
9990 BEEP .01,f
9995 NEXT f
9999 RETURN

```

Maths
by Michael Kay

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Sunshine is giving away 6,000 software tapes — for free. All you have to do is cut out and fill in this coupon, together with the coupons in the last three issues, plus next week's. As soon as you have collected five coupons, post them to:

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- 3) There is a limit of 1,000 tapes per game
- 4) No correspondence will be entered into
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Character

on Dragon 32

These two programs try out and then demonstrate new character shapes for games.

In program 1 you try out shapes. A useful source of new characters for use in games are listings from other computers,

particularly Vic and Spectrum. Look in the program notes to see where the user defined graphics are created and enter them into the program in groups of eight.

If you like the characters press the L key for a list of the characters' numbers. Use these numbers in program 2 in line 60. Don't forget to *Dim* the amount of space you need at the beginning.

Program notes

10	Set mode (mode 4 best)
20-30	<i>Dim</i> shape
40-60	Enter numbers and error trap
70-100	<i>Poke</i> character on hi-res screen
110-120	<i>Get</i> and <i>Put</i> character
130-160	User prompts
5	Set mode
10-40	Read <i>Data</i> and <i>Poke</i> character
50	<i>Get</i> character
60	<i>Data</i>

```

5 REM*** PROGRAM 1 ***
10 PMODE 4,1:PCLS:CLS
20 DIM SHAPE(7,7)
30 PRINT TAB(6);"CHARACTER CREATOR"
40 FORI=1TO8
50 PRINT"NO.":I;:INPUT A(I)
55 IF A(I)<0 OR A(I)>255 THEN PRINT"INVALID INPUT":GOTO 50
60 NEXT
70 SCREEN1,1
80 FORI=1 TO8
90 POKE 1536+32*I,A(I)
100 NEXT
110 GET(0,0)-(8,8),SHAPE,G
120 PUT(100,100)-(108,108),SHAPE,PSET
130 A#=INKEY#:IF A#="" THEN 130
140 IF A#<>"L" THEN CLS:GOTO 30
150 FORI=1TO8:PRINT I;A(I):NEXT
160 GOTO 130
145 CLS

3 REM *** PROGRAM 2 ***
5 PMODE4,1:PCLS
10 FORI=1TO8
20 READ A
30 POKE 1536+I*32,A
40 NEXT I
50 GET(0,0)-(8,8),SHAPE,G
60 DATA 255,129,129,129,129,129,129,255
70 REM** THIS GIVES A BOX **
    
```

Character
by S Dundon

Score Counter

on ZX81

This is a useful machine code subroutine which could be used in many programs.

At the beginning of your program enter the loading part of the listing (including a

at line 1). Then run the program so that the machine code can be loaded into the *Rem* statement.

Once the program has been run you can delete the loader program but not the *Rem* statement.

When in the program itself the screen display is shown. A number of zeros (any

Directly before the zeros, a black square, *CHR\$ 128* is needed.

When in the program you need to increment the score, simply use *Rand Usr 16514*.

If the score gets full; ie, more than 9999 the counter is automatically reset. This is why the black square needs to be put



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Russian roulette

A host of Spectrum adventures have been released lately, and I really must take time to look at some of the programs. Before starting this week's perusal, however, a bit of a grovel!

After our running commentary of *Zodiac* for the Oric 1, from Tansoft, Mr Fitzgerald of A & F Software has written to take me to task for some of the things that I said. He was right in pointing out that I contradicted myself by saying, first of all, that Tansoft's was "as far as I know, the only adventure for the Oric so far available", and then going on to say that the *Zodiac* under discussion was not the A & F version!

I stand corrected, A & F — there are of course, other adventures available for this machine. I should have said that Tansoft's *Zodiac* is the only one that anyone has so far written to me about (and there has been quite a lot of mail concerning this one).

Back to the latest adventures for the Spectrum... the first tape is not actually new. In fact the programs found on the tape have been around for a long time, but I think it might be as well to get them aired. Mikrogen probably best known, at the moment, for *Mad Martha*, also have these two adventures in their lists — *Mines of Saturn*, and *Return To Earth*. The scenarios are linked and obviously have a space theme, concerning your adventures on Saturn, on to which you have crashed.

In the first program, your task is to find good old Dilithium crystals to refuel your stranded ship (Starfleet Command could probably help you there). If you're successful in this, you then go on to the next program, in which you explore a sinister, deserted space station in order to tell Earth of your predicament.

The plot sounds like a good one around which to build an adventure, but unfortunately, Saturn Developments, who wrote both the present programs and *Mad Martha*, have not done the theme justice. *Mines of Saturn* refused to load for me, but I imagine it is much the same as the other program. There is a dire warning against capital letters at the start ("They will NOT be accepted" — they were), and then you are told of your initial position, which is the wrecked control room, with four corridors leading off. No directions are given, but we

can assume that they lead off at the cardinal points of the compass.

The program is written in Basic, and the response times are rather slow, so a lot of finger-tapping is done while waiting for the program to think! More damning, to my mind, is the way in which the player is suddenly told: "Poisonous spiders sting you — you are dead". If this happens, the program just stops, and dumps you back into Basic; no warning of any kind is given that this is going to happen. That is not adventuring, it's Russian Roulette!

Apart from this, the program is just plain boring — for £5.95, better save your money for *Mad Martha 2!* If you enjoyed the first part of this crazy adventure, you will be sure to love the follow-up (*Hungry Horace* certainly seems to have started a trend).

The scenario of this part of poor old Henry's life has him off to the beaches of Spain with his wife and son for a spot of the nightlife in Torremolinos. The mix is the same as before, a few high-resolution graphics, a few doors to choose from, and several arcade-type games sprinkled amongst the puzzles. I haven't had time to get far into the adventure, but you will know if you want to see more of Martha and Henry.

From Computer Rentals comes *Rescue*, by D C B Baker. There are no instructions on the cassette, apart from how to Load the thing, but the first part of the program is a massive instruction manual, which will have your brain reeling from trying to digest all the details. Many programs now use this as a way of saving memory (with 48K to play with — remember when 16K seemed more than enough?). There's nothing wrong with this, but the present program does not give a condensed *Help* page in the main program, which would certainly have been a bonus. So, write everything down before going on to the game itself.

This turns out to be rather good — not strictly an adventure, but more of a strategy game. Your task is the age-old one, to rescue the princess from her prison in the castle, blah, yawn — why not an adventure to imprison the princess, much more appealing! Anyway, to rescue her, the player moves around a network of five concentric rings, exploring the locations dotted around them, and picking up objects which will be of use in the later parts of the game. This is where your cribbed instructions will come in handy — if you've forgotten to write them down, you will forget what you need at various points.

Eventually, if you have collected the right things, you will be able to cross over to the castle: (you'll have to find the location yourself by playing a silly little guessing game with the computer).

Win the game and you can enter the castle. This has 12 rooms, on four levels, and the princess in one of them. Then you must retrace your steps back to the starting point. Don't worry about getting lost —

in the initial stages, you will have found a map, and you may call up the layout of the playing grid whenever you like (although a few points are lost for doing so). You may also find a radio, a gun, torch, rope, ladder, knife and so on. By the way, two patrols do their best to kill you.

I recommend this game as a welcome and well-written diversion from the usual adventure.

Workforce is a software house that has quite a large catalogue of varying programs, the more successful of which are, to my mind, the utility titles. They have sent along for review two new adventure titles, *Pirate Island* and *Devil's Revenge*. This last title is one of those programs in which the player has to work his way around a network of interconnecting lines, all the time being set problems in order to progress. The idea first surfaced with *Nightmare Park*, from Macronics. This one is rather similar.

At every other step, on average, the player is plunged into what the author would probably claim is an arcade game — if successfully completed, the player may carry on to the next one, and so work his way toward the end of the network.

Actually, I am only guessing at what happens at the end of all this. Terminal boredom set in after about five minutes — the games are all (at least, all of the half-dozen or so I kept awake for), in Basic, and of the most useless sub-Interface *Scrolling* type.

The other program is a text adventure. *Pirate Island* is written by G G Wilson, who sets a nice atmosphere right from the start, by saying "Thank you" when you "Press any key to start". The adventure follows the well-trodden path of "You are in a clearing. Exits North and South. You see nothing. What next?". The responses are quick, although many of the usual words don't seem to be recognised. After typing in your choice of direction, the screen fills with colourful hash marks, which then clear to show the next location.

If several commands are typed in quickly, the program soon gets confused, and the answers flash by too fast for the player to read. All the old favourites are here, such as the bag of gold, the rusty torch and so on. But the C cursor is definitely not accepted; you will be sharply told off for your impertinence!

If you are an avid collector of the traditional text adventure, this one should fill a few evenings with its puzzles.

Next week, I shall look at more Spectrum adventures. ■

This series of articles is designed for novice and experienced Adventurers alike. Each week Tony Bridge will be looking at different Adventures and advising you on some of the problems and pitfalls you can expect to encounter. So, if you have an Adventure you want reviewed, or if you are stuck in an Adventure and cannot progress any further, write to: Tony Bridge, Adventure Corner, *Popular Computing Weekly*, 12-13 Little Newport Street, London WC2R 3LD.

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COMPUTER SCEPTIC

T Marsh of Roding Ride, Wolverhampton, writes:

Q A friend of mine has a small business. He is having problems with the SSP — statutory sick pay. He is sceptical about computers and, in a rash moment, I said that my computer could do his SSP. Unfortunately, he took me up on it. I thought I had seen a program for SSP on the Spectrum, but now I'm not so sure. Is there one?

A Yes. Hilderbray, who do a range of business software for the Spectrum, have one. Hilderbray can be found at: 8/10 Parkway, London NW10 7AA. Let us hope that this leads to one less computer sceptic.

VALID GUARANTEE

Steve Palmer of Denham Green Close, Denham Green, Uxbridge, Middlesex, writes:

Q I am writing this letter about the telesound Spectrum sound booster. The advertisement in *Popular Computing Weekly* says that 'three easy snap-on connections eliminate soldering'. What I would like to know is whether you have to take the Spectrum apart to fix the device? If so, I would like to know if my guarantee would be invalidated?

If this is the case, could you let me know of another sound booster that does not invalidate my guarantee? Also, could you let me know if there is a compiler available for the Spectrum?

A As soon as you take the top off your Spectrum you invalidate the guarantee. The advantage of the tele-

sound booster is that there is no sign that anything has been done to the computer. The three clips are very easily removed, and all you then have to do is re-screw the top. If you still want another sound amplifier, then there is the Fuller sound box. This is more expensive, but gives you more for your money in that it also acts as a port.

I covered compilers recently. No compiler will compile absolutely everything, but both Softek and PSS make reasonable ones.

Fuller is based at the ZX Centre, Sweeting Street, Liverpool, Softek at 12/13 Henrietta Street, London WC2, and PSS at 452 Stoney Stanton Road, Coventry CV6 5DG.

OPERATING SYSTEM

Francois Hardy of Bothwells, Bracknell, Berkshire, writes:

Q I have a BBC B with the old 0.1 operating system, which I would like to change for a 1.2. I am sure that I have seen somewhere that this should be exchanged free of charge, though I was quoted £11.50.

The thing is, I bought my computer second-hand, so do I have to pay? Also, someone I know who has a 0.1 OS paid to get it changed. Who is right?

My computer gets very hot at the back. I have had little trouble, but it is a bit worrying. Is it all right?

A I have also seen the same information, though I have no knowledge of anyone else being successful. The 0.1 OS does not meet the published specification. Therefore Acorn are technically in breach of contract by selling goods that are below the published standard. This far I am sure your local trading standards officer will back you up. In law, the fact that the 1.2 exceeds the published standard is not an issue.

In your case, however, I am not sure that it will apply, because at the point of sale you bought the machine as it stood and that therefore is in effect the published standard. It might be worth talking to your local trading standards officer, in case there is a way round this, though I do not

hold out much hope.

I do not know the precise cause of the overheating. It sounds as if the system is being overloaded, or that a component is faulty. On the whole, the BBC power supplies have a good name.

SECRET PASSWORD

Edward Dubois of Kellock Crescent, Old Monkland, Coatbridge, writes:

Q I recently took the plunge and bought a 16K ZX81 and have spent endless hours learning how to use it. A friend also has the same, but I could not Run any of his many copied programs because he had a password in them which was "AT AT 6000". As I know his password, I could then use them.

He has now gone to Australia and left me all his software, which I can of course use, but I am intrigued as to how he did it. And, though he promised to tell me before he went, he did not. I would like to do something similar. Can you tell me how to write the codeword program in Basic so that I can use it in my own programs, or at least tell me what he did?

A I think I can tell you what he did, but not how to do the same in Basic. There is probably a machine code routine in a Rem statement that reads the keyboard, as soon as the program is Loaded. You do not say if the programs auto run, but I presume they do.

This routine would scan the keyboard for the correct code, and continue to do so until it was put in, then it would return to Basic and carry on with the normal execution of the program. Presuming that the Rem statement is at the start of the program, you would want to finish the program with three lines like:

```
SAVE "p"           Where p is the
                   name of the program title
```

```
RAND USR 16514 This takes you to
```

the first byte of the program (assuming that the Rem statement holding the Machine Code is at the start of the program)

GOTO n or RUN This starts the program running after it has been Loaded, and the keyboard scan has been done

Goto n, where *n* is the first line number of the program proper, is used in preference to Run, because you might have to protect data, which Run would wipe out.

AMERICAN OVERLOAD

Phillip Allmendinger of Millgrove Road, Stonewood, Aberdeen, Scotland, writes:

Q My father is going to Dallas in a few weeks, so I have asked him to get me a Commodore 64 there. But, he says that it will not work on our electricity, or on our TV system. Is he right?

Also, would he have to pay anything at customs for bringing it into the country?

A Your father is right, it would not work over here. The American electricity supply is 110 volts, while ours is 240. The computer would be overloaded if you plugged it in, and very likely catch fire! You would need a special transformer to guard against this.

Also, the American television system is different to ours. They have 525 lines, running at 60Hz, ours is 625 lines at 50Hz. This would throw out all the timings, because the American system would try and scan the screen 10 times more per second than our system can handle. It would then try and put the results into a smaller format (525 lines).

By the time you have got a special transformer, and brought back an American television set as well, you will find it much cheaper to buy your computer over here.

Is there anything about your computer you don't understand, and which everyone else seems to take for granted? Whatever your problem Peek it to Ian Beardsmore and every week he will Poke back as many answers as he can. The address is Peek & Poke, PCW, 12-13 Little Newport Street, London WC2R 3LD.

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SPECTRUM software cassettes for sale, inc The Hobbit, Arcadia and many other big names, approximately 20 cassettes worth £135. Any offers? Tel: 01-574 4122.

SPECTRUM 48K + £150 software + £150 of books, bargain at £175 the lot. Owner buying BBC. Tel: 0223 66722.

SPECTRUM 48K, 2 months old, still in box + leads + over £100 software, Manic Minor Kong + program + magazines + manuals, with lots of software £200 ono. Tel: Exeter 75839 (Jones).

SPECTRUM 48K, books, software inc The Hobbit, £90. Tel: Abertillery (0495) 214977.

SPECTRUM 48K, still under guarantee, ZX printer + large collection of software, £140 ono. Tel: Luton 54931.

SPECTRUM 48K, with around £500 of software, mainly games, including well over 70 cassettes, sell £250 ono. Tel: 574 4122.

SPECTRUM GAMES to swap or sell, over 90 titles, including The Hobbit, Penetrator, Manicminer, Trantam, Combat Zone, ZZoom, ZipZap, Cookie, Vetpac. Tel: 449 8385, private sale.

ZX SPECTRUM 48K, F.D. amplifier, lots of software, £85, must collect. Tel: Alan on 01-300 2455, after 6 pm.

SPECTRUM GAMES for sale, all half price. Ring for details: 328 2075, after 5 pm. Ask for Mike.

SPECTRUM 48K, 1-month-old, tapes + magazines, £190 ono. Tel: 051-733 0090, after 6 pm.

SPECTRUM 48K, 3-months-old + tape deck, over £100 software, 2 sets of manuals, 3 programming books + a sound amplifier worth £300, sell for £200. Tel: Alan 021-475 8508, after 5 pm.

SPECTRUM 48K + tape recorder + all leads + magazines and books, £150. Tel: St Albans 69022.

SPECTRUM 48K, + Kempston stick, Sony recorder, + ZX printer, + 12 latest games (including Hobbit), + books, as new, £205 ono. Tel: Kirkpatrick, Durham (055665) 340.

ZX PRINTER + Roadrunner game, only £40. (Ask for A. Kamalish between 5-7 pm). Tel: 861 0340.

ZX81s for sale

SWAP ZX PRINTER + spare power pack + three magazines for any Spectrum keyboard, except Fuller keyboard, ask for Kenlash. Tel: 861 0340 5pm and 8 pm.

FULLER KEYBOARD for Spectrum or ZX81, joystick, £20. Tel: Ian on Livingston (0506) 34497 (6 pm).

48K SPECTRUM. More than 11 months guaranteed + tapes and magazines, worth £240, offers £190 or swap for Electron or 64. Tel: 051-733 0090. N.B. cannot collect.

SPECTRUM + **32K**, fitted + sound amplifier, worth £330, offer £200. Tel: 885 1786.

SPECTRUM SOFTWARE. Lots of original software to sell at 75% of price and some software required at 50% of price. Send lists to S. Winter, 28 Criss Grove, Chalfont St Peter, Gerrards Cross, Bucks.

SINCLAIR, 16K, Ram pack for ZX81, £15. Tel: Bournemouth (0202) 429429.

ZX81, 16K, 3 cassettes, offers, worth £30. Tel: 021-358 4732.

ZDC 81, 16K, plus £16-worth of software, selling for only £20, all good condition. Tel: Stevenage 356613 after 7 pm.

ZX81, 16K, Ram, software included, Volcanic Dungeon, Star Trek, Star Fighter, Catacombs etc, plus Peek, Poke, Byte, 8 Ram, books, £40 the lot. Tel: Rugeley 6677.

ZX81, 16K + guarantee, leads, manuals, games, £60. Tel: 021-328 0463.

ZX81 16K with keyboard plus seven tapes, eight months old, £60 ono. Tel: Haywards Heath 416259.

ZX81 16K. Manual, still under guarantee. Leads, games, still in good condition. Football Merger, Mazorgs, Space Invaders, £50. Tel: 021-328 0463 anytime after 4 pm.

ZX81 16K, with 15 software cassettes, leads and manuals, boxed, still under guarantee, £45 ono. Tel: 0419/425630.

ZX81 with Memotech 16KR plus £30 software plus opcode wall chart, £50. Tel: 0602 200385.

ZX81 16K. Condition as good as new with lots of the best software, useful books and magazines, software includes Monster Maze, 3D Defender, Mozogs, etc., £10 ono. Tel: Neil Denham 832678, after 5 pm.

Commodores for sale

VIC20 plus C2N plus 16K Ram pack, four cartridges, 3K Ram pack, £150 software, two books, bargain at £180. Tel: Codsall 2186 (after 4 pm).

VIC20, cassette recorder, 8K expansion, 3K super expander, Gorf cartridge + £30 of software, joysticks + books/magazines, £160. Tel: Sunbury on Thames 86185.

VIC20 C2N cassette unit, 16K Ram joystick, £100 software, cost £280, sell for £200. Tel: 02302 3619.

VIC20 £80 cassette unit, £25 16K Ram pack £35, 3K Ram £15, Adventure cartridge £10, software + books at half price. Tel: 027582 2477 (after 5 pm).

SWAP VIC20 adventure cartridge, Voodoo Castle for any other adventure cartridge or sell for £13. Tel: Chorley (02572) 74632.

VIC20 16K cartridge, C2N cassette, Jelly Monsters cartridge, Programmers Reference Guide and Vic computing magazines, nine tapes, dust covers, £200 Washington 4171510.

SWAP VIC20 with cassette deck, cartridge, eight cassettes and book for Colecovision Console and cartridge. Tel: Clitheroe 26648.

VIC20 + cassette deck + 16K cartridge + Adventure cartridge + joystick + dust covers + Intro Basic, Part 1 and other books, £140. Tel: West Drayton 44486.

VIC SUPER EXPANDER, £20, four cartridges at £15 each, one cartridge + joystick at £20. Tel: Yeovil (0935) 823537.

VIC20 + cassette unit, £90 ono. Tel: 01-363 9764.

VIC20 + C2N cassette, 32K memory expansion + Intro to Basic Part 1 + books/programs/games, £125. Tel: Ongar (Essex) 363947.

VIC20 + cassette unit + super expander + machine code monitor + Vic Revealed + joystick + magazines/£50 of software, excellent condition, boxed as new, ideal for beginners, £150. Tel: (0283) 224169.

VIC20 + super expander + C2N cassette deck, + joystick + Backgammon, Grid Runner, Skramble, worth £230, accept £120 ono. Tel: Epsom 29810.

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VIC20 Voodoo Castle Cartridge, will swap for Omega Race, also Alien for Cosmic Jailbreak of road race. Tel: 0222 861235.

VIC20 STARTERS PACK, brand new, 6 days old, sell for £140 or swap for 48K Spectrum. Tel: 553 3571.

VIC20 plus 16K memory, 3K super expander, motherboard, 5 cartridge games including Choplifter, 2 manuals, £120. Tel: 01-340 6623 (after 6 pm).

SWAP YOUR 64 FOR MY 64. I have a CBM 1701 monitor but AV socket is incompatible with mine. Will give £65 software. Tel: 01-748 8178 any time.

VIC20 CASSETTE DECK. Telephone with offers: 061-499 2001 after 4.30 pm.

Acorns for sale

BBC SOFTWARE, Killer Gorilla, Chess, Startrek, Planetoids, Snapper, Polaris, Monsters, Arcadians, Frogger, Sphinx, Castle Riddles. Swap for any interesting BBC programs. Phone Dave, Ilfracombe 66032 evenings.

SWAP YOUR BBC MODEL B for a complete darkroom for colour and black and white photography, worth well over £500. Please contact Biggin Hill 75047.

BBC MODEL A. Brand new duplicate price £299, will sell for £250. Tel: Reading 580417.

ONLY £49 ONO. Expanded Acorn Atom. Bargain. Tel: 0532 742450 after 6 pm.

ACORN ATOM, 12K Ram, all leads and power supply, £70. Tel: 3114054 evenings only.

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BBC MODEL B. Excellent condition, £150 of latest quality software, bargain as £300. Tel: Staines 54228.

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ACORNSOFT'S Planetoid, Monsters, Doctor Soft Flight Simulation, Superior Software's Fruit Machine. All originals, swap for similar quality software. Tel: 090484 (York) 271.

BBC B, April 1983 (1.2 Mos), boxed, all leads, approximately £50 worth of tapes + loads of magazines, all for £375 ono. Tel: 01-669 0622.

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DRAGON 32, still under guarantee, perfect condition, two cartridges, software and joystick, cost over £250, will take best offer over £180. Tel: 01-942 5026 after 6 pm.

DRAGON 32 + joysticks + over £100 worth of software including Dasm Assembler cartridge + two books, £210 ono. Tel: 574 9504.

DRAGON 32, excellent condition + £60 worth software, £150. Tel: Rustington (09062) 72845.

DRAGON FANS interested in starting Dragon Club in Ware area. Tel: Ware 68264.

DRAGON 32 + cassette, only three months old, nine months guarantee + two games + book (games) etc, £180 ono. Tel: 854 2324 (after 6 pm).

DRAGON 32, boxed, five months guarantee, over £70 software, including Donkey King, Shuttle, Katerpillar etc, joysticks, dustcover, books and magazines etc, offers over £170. Tel: Co Durham (0388) 814717.

DRAGON MACE EDITOR/ASSEMBLER PACKAGE + assembly language programming and the 6809 (Leventhal), £35 or swap for sound extension module. Tel: 0482 634263.

DRAGON 32 SOFTWARE. D.A.C.C. Flight Simulator, Drone, Quark MRC, Fruit, Tyrant of Athens, Stockmarket, Submarine Command. All original condition, £5 each. Tel: Richard Hill 01-953 9101 after 6 pm.

UNUSED DRAGON 32, tape recorder, joystick, machine book, 30 program book, cassettes, Donkey King, Shuttle, Planet Invasion, Black Sanctum, Defense and others, worth over £290, will accept £225. Tel: Littlewick Green 2518.

DRAGON MOUNTAIN, Nightflight (Salamander), £8 both or swap for other Dragon software. Tel: 061-682 5024 after 7 pm.

DRAGON 32, joystick plus £240 software, books, magazines, listings, boxed, titles include Shuttle, King, Bonka, Android, 35 in all. Buyer collects, only £225. Tel: Russell Southend 0702 73740 evenings.

DRAGON software for sale or swap. Black Spectrum, Ultimate adventure 4, Startrek, all three for £10 or will sell separately. Contact 0324 81 2061 after 6 pm.

DRAGON 32 + joysticks + dust cover + £120 worth of top name software including King, Gridrunner, Android, Champions, Pimania + six books, £170, no offers. Tel: 0342 27072.

DRAGON OWNERS, Ring of Darkness, £8 + Space Trek, £4, both original cassettes, £10 for both. Tel: 061 789 4770 (after 5 pm).

DRAGON 32 boxed fully working plus brand new joysticks and cables and small amount software, £150 ono. Bracknell (0344) 29613.

FOR SALE, Dragon 32 software, Cosmic Zap, Galactic Ambush, Talking Android Attack, £6 each. Missile Command, £5. All original Arcade games. Phone Robert on (0444) 413687, evenings.

DRAGON 32 and joystick. £140 ono. Tel: 01-555 9903.

DRAGON 32 + joysticks + £60 worth of software, books + magazines, swap for BBC or £160. Tel: Fleetwood 79249.

DRAGON 32, six months old + compatible recorder + software worth £300+, joysticks + high res cartridge, swap for Atari 800 48K with Basic + recorder or BBC Micro. Tel: 061-652 1012 (after 5.30 pm).

DRAGON 32, good condition, over £100 of software, two joysticks, cassette recorder, books + magazines, light pen, £220. Tel: 01-794 7079.

Ataris for sale

ATARI 400 SOFTWARE. Adventures 4, 5, 8, 9, 12, £8 each. Defender, £16. Bajabuggies, £12. Ghost Hunter, £8. Airstrike, £10. Applepanic, £13. Preppie, £11. Shamus, £13. Astrochase, £13. Centipede, £13. Star Raiders, £14, + others. Tel: Sunbury 82189 evenings.

ATARI 400 16K, 410 program, recorder, Basic, £150 software including Donkey Kong, joysticks, manuals, £250, swap for 48K Spectrum + software or Commodore 64 + software or recorder, also Philips G7000 TV game + five cartridges. Tel: Hesketh Bank (077 473) 4952.

ATARI 400 DEFENDER CARTRIDGE, swap for Star Raiders cartridge or claim Jumpers + £5. Tel: Northwood 22559.

ATARI + Pitfall, Combat, Space Invaders, joystick, Missile Command, six months old, paid £180, except £100 or 48K Spectrum. Tel: 01-267 0826.

TWO MONTH OLD ATARI 800 48K, plus manuals + joystick, £285. Tel: 01-560 7749.

ATARI VCS with controls + 10 good games including Pacman, Space Invaders, International Soccer, Missile Command, worth £250, will accept £125. Tel: 734 2687 daytime, 586 2145 after 4 pm.

ATARI 800 16K + tape recorder, £90 software + books, £230. Tel: 01-736 3889.

ATARI 400, + manuals, Basic language, cassette unit, two joysticks, £195. Tel: Birmingham 458 1553.

ATARI computer software, Necromancer, 32K, £18, seasibility experiment 16K (text adv), £800. Tel: Dave, Nottingham 0602 580015.

ATARI 800, new complete with 410 data recorder and three games, Mines, Zarrox, Preppie and some books, £260. Gravesend 64608.

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ATARI 400/800, original software, assembler/editor Rom, graphic, generator + graphic master discs, Microsoft Basic, etc, mint condition, offers to: Tel: 0702 201637.

ATARI 400 16K + joysticks + software + Basic + cassette recorder, swap for 48K Oric + £20. Tel: 01-989 8138.

ATARI 400, Basic, recorder, joystick, game cartridge, cassettes, four books, 10+ magazines ("Analog", "Computer!", "Page 6"), worth £280, sell for £160, or swap + £150 for BBC "B" 1.2. O. S. Leeds (0532) 74494.

ATARI 400 48K, 4 1.0 tape recorder + 8 10 disk drive + lots of software, including Zaxxon, Shamus etc + joysticks, whole lot £400 ono, or will sell separately. Tel: 01,571 2870 after 4 pm.

ATARI 400 16K, program recorder, Basic cartridge, program kit, energy Czar cassette, £140. Tel: 01-743 3748 evenings.

ATARI VCS CARTRIDGES for sale, Asteroids, Pac-man, Yars Revenge, Star Raiders, Defender, Space Invaders, £15 each. Stampede, Street Racer, £10 each. Phone Buckley (0244) 542420 between 5 pm and 9 pm.

DRAGON 32 plus two joysticks, plus software, eg Salamander Dragon, Trek, Microdeal, Space War and Cable Software, Drone, Datatank for £160. Phone Penkridge (Staffordshire) 3057.

DRAGON 32 cassette recorder, joystick, software, books and magazines, excellent condition, six months old, £140. Tel: (602) 607 822.

Tandys for sale

TANDY, MODEL ONE, 48K, expansion interface + disc drive, manuals + some software, £350. Tel: 061-748 0705.

TANDY TRS 80, 16K, model 1, level 11, Quick printer, various manuals + books, £150+ software, two games, offers around £200. Tel: 0892 20988 (office).

VIDEO GENIE, eg 3005, integral cassette, lower case mod. and expanded to 48K + double density controller for disc drive, manuals, books + software, £250 ono. Tel: Ashbourne 70645.

TRS 80, pocket computer + cassette interface, 12 months old, £40 ono. Tel: Aldershot 317844.

TANDY TRS 80, model 1, level 1, 16K with VDU, cassette recorder, software + manuals, bargain at £130 ono. Tel: Harlow 0279 412242.

For sale

SWAP EARLY WARNING CASSETTE for the BBC for any Spectrum game. Tel: 0245 84583.

INTELLIVISION GAMES computer, £55 plus several games half price. Tel: 0706 225577.

TEXAS T199/4A 16K, eight months old, cassette leads, two manuals plus program book, space invader module and 10 tapes. Hardly used. £110 ono. Tel: Stephanie 0273 731869.

VIDEO GENIE, 16K, including cassette + counter, complete with handbooks, leads, printer interface + upper/lower case chip, £100. Tel: 01-892 1687.

32K COLOUR TV plus two games, £125 ono. Tel: 0532 742052 after 6 pm.

SWAP GRANDSTAND SCRAMBLE for any two 16K ZX81 games by Artic or Quicksilva. Tel: (061) 439 6198, Manchester.

SWAP ATARI 400 defender cartridge for Gorf, Dig-Dug, Miner-20-49er, Quix or Zaxxon. Tel: Northwood 22559 after 6 pm (private sale).

LEVEL 1 SOFTWARE plus manual. Offers. Tel: 021 7421446 before 10 am or after 6 pm.

32K PET + Pick Chip including invoice control, stock control, customer file, multi-column data base + 50 games, excellent condition, £300. Tel: 01-992 8249.

TEXAS T199/4A, as new, with joysticks, cassette interface lead, Beginners Basic tutor tape, one games module. Less than three months old with nine months guarantee, £120. Tel: Jim, Bournemouth 518828.

SPECTRUM software, originals, worth £518, sell for £195. Tel: 0245 84583 (private sale).

SENSORY NO. 9 for sale, mint condition, cost £165, sell for £125. Tel: 0302 721456 (after 6 pm only).

JUPITER ACE COMPUTER + leads, manual, software, £60. Tel: 0254 76228.

FOR SALE, Mattel Intellivision, excellent condition, plus seven cartridges, £170. W. J. Martin, 6 Cage End Close, Hatfield, Ponoak Oak, Essex.

VIC20, 8K stack storeboard, cassette unit, joystick, Vikit 3-hi resolution, software includes Matrix, Crazy Kong, Spiders, Startreck etc, £160. 01-300 3110.

DRAGON 32 + joysticks + software + books + cassette player (worth over £400), £265. Tel: 0949 20418.

FOR SALE, Atari VCS with 30 cartridges, £400. Tel: Simon, 01-500 3532 from 4 pm to 8 pm.

ATARI 800 (48K), disc drive, cassette, sticks, software, six months warranty left, genuine sale, £450 ono. Nottingham 275925.

SWAP TECHTRONIX, Solartron, Oscilloscopes for BBC, MX80K or Spectrum. Tel: 0753 883031.

Wanted

WANTED: ZX81, 1K Ram, leads, power supply and manual, £15-£20. Write to: C. Serafim, Hormobitoo 179, Pireas GR-185 44, Greece.

WANTED: TI-99/4A original cassette software. Also for sale, Spectrum software. Tel: Hornchurch 57487.

VIC20 CASSETTE UNIT WANTED, also Vic Cartridges wanted. Tel: Saddleworth 2518 (Oldham).

WANTED: CBM 1541 DISK DRIVE (as new condition + manual etc.) for my MZ-80K (integral cassette + monitor) + software. All good condition or sell £250 ono. Tel: Cardiff (0222) 732955.

SPECTRUM SOFTWARE: I will buy certain original software titles for 50 per cent price. Also software to sell at 75 per cent price. Send list of programs for sale/wanted to: S. Winter, 28 Criss Grove, Chalfont St Peter, Bucks.

WANTED BBC MICRO MODEL B in working order. Tel: Durham (0385) 67254 (evenings/weekend).

WANTED VIC20 cassette software (only latest). Also Audiographics cartridges. Tek: 01-574 4122.

48K COMPUTER + SOFTWARE (Spectrum preferred). Reasonable price. Tel: 01-828 5004.

WANTED, PAIR OF VIC20 or Atari paddles, swap for lots of good Vic20 software. Tel: 0384-57360 (ask for Charles).

WANTED BOOK BYTE and Another Vic in the Wall. Tel: Kidsgrove (Stoke-on-Trent) 3716 2640.

WANTED JUPITER ACE with manual. Tel: Bradford (0274) 728984 (office hours).

WANTED 1541 DISK DRIVE, will give 7-slot micro expansion unit + 11 cartridges and £100 worth of games. Tel: 01-387 8751 (evenings only).

WANTED ATARI 800. Will pay up to £200 or Dragon 32 will pay up to £130. Tel: Ingrebourne 76431.

WANTED: 8K AND 16K RAM PACKS for Vic20, also ZX printer with interface. Tel: 01-387 8751.

WANTED. 48K Spectrum plus software plus preferably printer in exchange for 48K Lynx, with £20 worth software. Tel: Steve 0799 22207 after 6 pm.

VIC SOFTWARE to swap for Vic20 joystick and Chopper game. Tel: Darlington 463191.

WANTED 48K SPECTRUM. Swap for Vic20, 16K Ram pack, cassette player plus over £100-worth of software, joysticks and more, or sell for £175. Tel: 397 7976.

WANTED BBC MODEL B in good condition or upgraded Model A with or without software. Tel: 01-590 8301.

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<p>INTERCEPTOR: Frogger, Crazy Kong, Spriteman, Panic, Scramble, Star Trek. RRP £7.00 Our Price £6.00</p> <p>LLAMASOFT: Gridrunner. RRP £5.00 Our Price £4.80</p> <p>Laser Zone, Matrix, Mutant Camels. RRP £7.50 Our Price £6.50</p> <p>NEW Hover Bover. RRP £7.50 Our Price £6.50</p>	<p>ULTIMATE: Jet Pack, Pssst, Cookie, Trans Am. RRP £5.50 Our Price £5.00</p> <p>IMAGINE: Arcadia, Jumping Jack, Ah Diddums, ZZoom 48K, Zip-Zap 48K, Schizoids. RRP £5.50 Our Price £4.95</p> <p>QUICKSILVA: Super Offer, Trader. RRP £9.95 Our Price £8.95</p> <p>SAXON: Smugglers Cove, Thelmas Lair, Aquaplane. RRP £6.95 Our Price £6.25</p>
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NEW RELEASES

STARSHIP



Starfighter sounds like a cross between *Star Trek* and *Time Gate*. You must pilot your intergalactic starship through the nine sectors of the galaxy, destroying the aliens who have infiltrated starfleet's bases.

The game features scanners which will locate the enemy forces, whereupon they can be obliterated by your photons and phasers.

Interstellar travel is accomplished via star gates which you must locate and pass through. Naturally, the aliens are not likely to take all this lying down — they defend themselves with mines which they scatter around your ship.

Aside from simply blowing up aliens, you will have to refuel from time to time and replenish your energy, which is drained in battle.

Program *Starfighter*
Price £6.95
Micro Oric 48K
Supplier Martech
9 Billingham Road
Eastbourne
E Sussex BN20 8LY

GALAXY

Workforce is one of those companies that has not deserted the ZX81, despite offering programs for the Spectrum.

Although Spectrum programs often look cheap compared with, for example, BBC programs, conversely, ZX81 programs are beginning to look equally good value in comparison with the Spectrum.

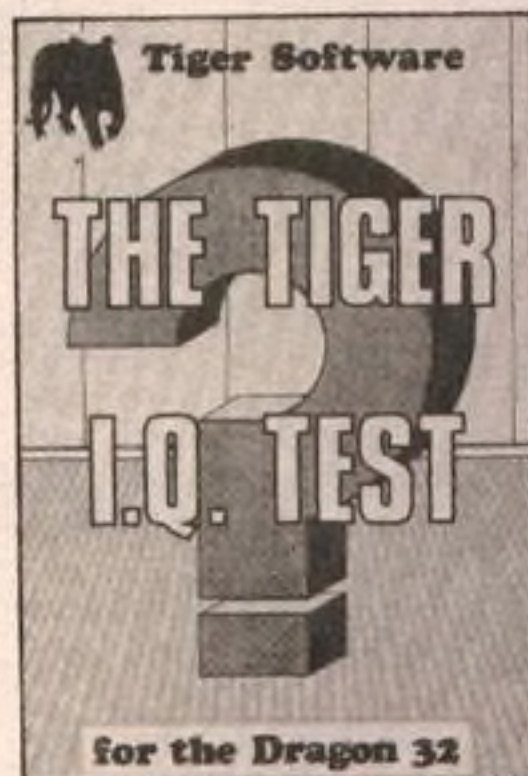
For £4.50, Workforce is offering two machine code

games on one tape. *3D Space Battle* comes with *Moonlander*. The latter needs no introduction except to say that this version features two stages of resolution and smooth graphics.

3D Space Battle displays the galaxy before you. Moving in any of eight directions, you must fight and dodge approaching aliens.

Program *3D Space Battle/Moonlander*
Price £4.50
Micro ZX81 (16K)
Supplier Workforce
140 Wilsden Avenue
Luton
Beds

IQ PROBLEMS



One of the many tasks computers are good at is setting and marking tests. They are horribly thorough and incorruptible and never give you the benefit of the doubt.

The *Tiger IQ Test* produces a high resolution display and uses up the entire memory of the 32K Dragon.

The tests are included in the cassette — both are mixtures of various kinds of IQ problems testing language, and other skills.

Program *The Tiger IQ Test*
Price £7.95
Micro Dragon 32
Supplier Tiger Software
63 Devonshire Street
Monkwearmouth
Sunderland
Tyne and Wear

IN ORBIT

Microdeal has made a tentative step away from its exclusively Dragon based range

with two new releases for the BBC B — *Air Traffic Controller* and *Shuttle*.

Shuttle takes the concept of a flight simulation program one stage further, as you use your instruments to pilot your shuttle into orbit. Once up, the next task is to find and recover a satellite and come back down again.

The BBC program is based on the Dragon version but with improved graphics — release date is October 1.

Program *Shuttle*
Price £8
Micro BBC B
Supplier Microdeal
41 Truro Road
St Austell
Cornwall
PL25 5JE

HEADS

The *I Ching* or *Book of Changes* is a means of predicting the future and/or revealing insights about the world based on whether three coins come up heads or tails.

Clever mathematical type people realised that the *I Ching* used an elaborate binary system and Carl Jung, among others thought that, for whatever reasons, it seemed to work. Now you can throw the *I Ching* on your Dragon 32.

Although it is simple enough to mimic the random fall of coins on a computer, this program actually includes text as well. Since the original book is over 600 pages long, I suspect this is going to be a highly condensed version.

Program *I Ching*
Price £6.95
Micro Dragon 32
Supplier Virgin Games
61-63 Portobello Road
London W11 3DD

RANDOM

One of the most original ideas I've seen for a while is *Splat* — an arcade-style game for the 48K Spectrum.

You must move around a maze eating fruits and grass, surviving long enough to get to the next level. Wait a minute... there's something wrong here, that doesn't sound very original.

Oh yes! I forgot to mention the whole maze is moving ran-

domly and your task is to avoid getting smashed against the four outer walls or else... well, *Splat*.

The program is written by Ian Andrew and Ian Morgan — the former wrote the popular *Mined Out* for Quicksilver.

There is supposedly an exit from the maze at level seven, but the makers are fairly confident no one is going to get that far — not for a while anyway. There is a prize of £500 for the highest score.

Program *Splat*
Price £5.50
Micro Spectrum 48K
Supplier Incentive Software
54 London Street
Reading RG1 4SQ

TOWER GHOST



Door Slammer is a fiendish puzzle for the ZX81. As the nightwatchman of an ancient tower, you must close all the doors.

To close a door you must pass through it — the problem is, if you do not plan it exactly right, you may find yourself locked in the tower with nothing but the tower ghost for company.

On the same tape, as a sort of free gift, comes a utility called *Flash* which will enable you to invert and flash the screen — you are actually encouraged to list it and use it in your own programs.

Program *Door Slammer/Flash*
Price £4.95
Micro ZX81 (16K)
Supplier Cathedral Software
The Lodge
Brandon Lane
Brandon
Co Durham
DH7 8SJ

NEW RELEASES

LIGHT BIKE



ArCADE action for ORIC 1

Light Cycle will need no introduction to anyone who saw *Tron*. Personal Software Services originally issued the program on the Spectrum but have now converted it to the Oric.

The aim of the game is to guide your light bike around the screen without crashing into the sides, the computer's own bike(s), or the wall that is gradually created as you power across the screen. Since the computer is trying to trap you, this is often very difficult.

Program *Light Cycle*
Price £6.95
Micro Oric 1
Supplier PSS 452
 452 Stoney
 Stanton Road
 Coventry

RESOURCES

The big problem with putting your Spectrum to serious uses has always been access time to the program — you can hardly have a quick check of your bank balance if the program takes seven minutes to *Load*.

With luck though, it could all change with the Microdrive *Loading* vast chunks of program and data in second — provided, of course, that Sinclair can get their quality control act together.

Still, it looks like serious packages could soon come into their own and astute companies will make sure that their programs can easily be customised for *Loading* and *Saving* with the Microdrive.

Bank Account System by K Gouldstone allows you to keep track of your dwindling resources, labelling all transactions and setting up standing orders.

Other options allow part of

the records to be displayed for reference and alterations to be made.

Program *Bank Account System*
Price £4.00
Micro Spectrum 48K
Supplier K Gouldstone
 45 Burleigh Avenue
 Wallington
 Surrey SM6 7JG

STAR GAZER

More and more people are looking for serious uses for their micros, having got bored with playing games.

One direction is the "home office" with the micro being a word processor, filing system, calculator, etc.

But, I think I see another strand. Many hobbies could benefit from the introduction of computers, even at an amateur level — one of the most obvious, since it requires relatively little additional equipment, is astronomy.

Bridge Software may therefore be on to a winner with *The Night Sky*. This program turns your micro into a mini planetarium — 700 stars are featured with five magnitudes and 50 constellations.

You input the month, date and time, and the various parts of the sky are displayed on the screen. You can learn to recognise the major features of the constellations and chart their progress across the sky.

Program *The Night Sky*
Price £8.90
Micro Spectrum 16/48K
Supplier Bridge Software
 36 Fernwood
 Marple Bridge
 Stockport
 Cheshire SK6 5BE

UNICORN

Keys of the Wizard is the latest adventure game from Microdeal. Although text only, it looks more sophisticated than most of its competitors.

The program has a vocabulary of 30 verbs with nine monsters and nine different kinds of weapons. Your task is to find 32 treasures scattered about the adventure and deposit them in the mysterious Sanctuary.

To aid you in your quest, you may be visited from time to time by a unicorn who can

sometimes be persuaded to give you a clue. The monsters, though nasty, can be defeated.

Three levels of play are available depending, amongst other things, on how many hours you are planning to devote to it. Should you start to crack with the strain, or be called for tea, you can save the game on tape.

Program *Keys of the Wizard*
Price £8.00
Micro Dragon 32
Supplier Microdeal
 41 Truro Road
 St Austell
 Cornwall PL25

JAMMED



Dodg'em is a new arcade style game for the BBC B (or expanded A). As you might expect, you have to control your stock car as it hurtles round a track.

The computer controls up to three robot cars, which will try to push you off the track by jamming your path.

There are 15 levels of play so that even if you are a driving incompetent (like me), you might manage to survive.

Program *Dodg'em*
Price £5.95
Micro BBC B (expanded A)
Supplier Microgame Simulations
 73 The Broadway
 Grantchester
 Cambridge
 CB3 9NQ



New Releases is designed to let people know what software is coming on to the market. If you have a new game or utility which you are about to release send a copy and accompanying details to: New Releases, Popular Computing Weekly, 12-13 Little Newport Street, London WC2R 3LD.

Ziggurat



Mental exercises

As the whole world knows, logic is very important. And to be educated in a manner which encourages one to be logical is of great benefit.

In 1894 Lewis Carroll wrote a letter to Mary Brown in which he said of logic: "... I believe it's one of the best mental exercises that the young could have; and it doesn't need special powers like mathematics."

This is very true, and many of the new initiatives in teaching (such as the use of Logo) aim to help to improve the learner's logical skills.

On reading *Teaching and Learning With Computers* by Tim O'Shea and John Self (Harvester Press, 1983), I was very taken with their attempt to give a logical structure to their basic argument. They argue that artificial intelligence is very important in examining the place of computers in education.

One reason I was so interested, apart from the use of logic, was that I remain unconvinced of the usefulness of much work in artificial intelligence. O'Shea and Self start with four propositions, of which the first two are that computers will be widely used in education, and that most present programs are unsatisfactory.

There is not much we can deduce from those two. There is no common ground to the two propositions. The first uses "computers", "used in education", and "the future" as its key concepts. The second, "programs", "unsatisfactory", and "now".

The two propositions have nothing to say to each other, they talk of different things and of different times. We need to add extra information to the discussion, such as: computers will use supplied programs; and the future will be very like the present, or, the future will not be like the present (take your choice).

As most present programs are unsatisfactory,

will future programs also be unsatisfactory? Will the way computers are used in education change in the future? Questions such as these have to be answered.

O'Shea and Self offer a third proposition that the main reason for programs being unsatisfactory is that they lack knowledge of various kinds.

One can say little about this, other than that it is not true.

Most of the problems with present programs (do they mean educational programs alone?) are due to poor program writing and lack of imagination in their conception. Both these problems might be remedied if writers were more intelligent about their craft.

Even if the proposition is true, what can one conclude? Most present programs are unsatisfactory because they lack knowledge of various kinds? What has this to do with the future?

And so to the last proposition that artificial intelligence (AI) is concerned with making explicit the kind of knowledge that is lacking in program design.

Where does that get us? Most present programs are unsatisfactory because they lack knowledge of certain kinds, and AI is concerned with making explicit the kinds of knowledge needed for programs?

There is really nothing else we can say — unless we add many other propositions, such as a guess that workers in AI want to sell their expertise.

Anyway, from the four propositions O'Shea and Self conclude that the designers of computer systems to be used in education should take account of the subject of artificial intelligence, and the users of such systems may expect them soon to provide facilities considerably more sophisticated than those available today.

Am I alone in wondering from where the premises for that conclusion came? I cannot see how the conclusion can be logically deduced from the propositions.

That the argument of self-justification has been dressed in logical garb does not add any kudos in my eyes. In fact, as the rules of logical argument have so clearly been flaunted, one wonders about the rest of the book.

Given the above sequence of non-reasoning, a certain piquance is added to their later assertion that "... the emphasis in artificial intelligence on symbolic processing acknowledges that each of us thinks and lives within our own individual representation."

'Nuff said.

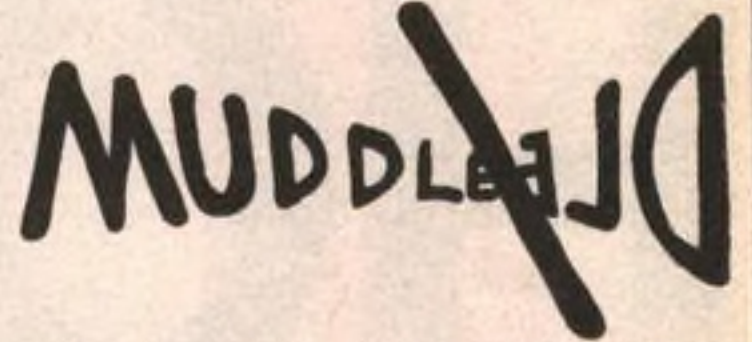
Boris Allan

Puzzle

Fishing for twins

Puzzle No 76

The village of Muddlecombe can boast no less than five sets of twins. At a recent fishing competition, in which these twins took part, Lynne, Bertram, Charles, Donald, Eric, Julie, Gus, Liz, Isambard and Jill caught, respectively 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10 fish.



Now, the Robinson twins caught seventeen fish between them, the Smiths caught sixteen, the Taylors caught nine, the Unwins caught seven, and the Venn-Wilkinson's caught six.

Can you match the twins, and give their surnames?

Solution to Puzzle No 71

We want to find three pairs of numbers such that the sum of the squares of the two numbers in each pair is the same value. If we arrange the six numbers (call them A to F) in numerical order, A being the highest and F the lowest then we can see that A must be paired with F, B with E and C with D (C and D may be equal).

In the program, C and D are assessed. The value of C is decremented to give B and its 'complement', E, is found by subtracting B² from C² + D² and finding the square root of this number. If this is an integer the program proceeds in a similar way to find A and F.

```
10 LET D = 4 20 FOR C = 3 TO D 30 LET X = C*C+D*D 40 FOR B = 2 TO C - 1 50 LET E = VAL STR$(SQR(X - B*B)) 60 IF E - INT E <> 0 THEN GOTO 130 70 FOR A = 1 TO B - 1 80 LET F = VAL STR$(SQR(X - A*A)) 90 IF F - INT F <> 0 THEN GOTO 120 100 PRINT A,B,C,D,E,F 110 STOP 120 NEXT A 130 NEXT B 140 NEXT C 150 LET D = D + 1 160 GOTO 20
```

This gives the answer:

$$325 = 18^2 + 1^2 = 17^2 + 6^2 = 15^2 + 10^2.$$

Winner of Puzzle No 71

The winner is: Ray Rushton, Richmond Street, Keighley, West Yorkshire, who receives £10.

Top 10

Spectrum

- 1 (1) Jet Pac (Ultimate)
- 2 (3) Scrabble (Psion)*
- 3 (4) The Hobbit (Melbourne House)*
- 4 (6) Flight Simulation (Psion)*
- 5 (2) Tranz Am (Ultimate)
- 6 (5) Horace and the Spiders (Psion/Melbourne House)
- 7 (8) 3d Tanx (DK Tronics)
- 8 (7) Ah Diddums (Imagine)
- 9 (10) Cookie (Ultimate)
- 10 (—) Horace Goes Skiing (Psion/Melbourne House)

*Requires 48K.

(Figures compiled by WH Smith and Son, London)

Atari

- 1 (8) Miner 2049er (Big Five)*
- 2 (—) Hellcat Ace (Microprose)†
- 3 (—) Mountain King (CBS)*
- 4 (—) Orc Attack (Thorn EMI)*
- 5 (1) Ultima II (Sierra On-line)‡
- 6 (2) Paris In Danger (Avalon Hill)‡
- 7 (—) Pooyan (Datasoft)†§
- 8 (—) Combat Leader (SSI)‡¶
- 9 (9) Arcade Machine (Broderbund)‡
- 10 (—) Deadline (Infocom)§

†Cartridge. ‡32K cassette. ¶48K cassette. §32K disc. †48K disc.

(Figures compiled by Calisto Computers, Birmingham 021-632 6458)

Top 10

BBC*

- 1 (2) White Knight (BBC Soft)
- 2 (—) 3D Bomb Alley (Software Invasion)
- 3 (5) Starship Command (Acomsoft)
- 4 (—) Record Keeper (BBC Soft)
- 5 (4) Alien Swirl (Program Power)
- 6 (10) Great Britain Limited (Simon W Hessel)
- 7 (—) Super Golf (Squirrel Software)
- 8 (—) Swarm (Computer Concepts)
- 9 (1) Hopper (Acomsoft)
- 10 (—) Demon Demonstrator (Program Power)

(Figures compiled by Micro Management, Ipswich, 0473 59181)

Books

- 1 (1) Structured Programming with BBC Basic, Atherton (Horwood)
- 2 (6) Commodore 64 Programmer's Reference Guide, Commodore (Commodore)
- 3 (—) Advanced Graphics on the ZX Spectrum, Angel and Jones (Macmillan)
- 4 (4) Complete Spectrum Rom Disassembly, Logan and O'Hara (Melbourne House)
- 5 (5) The BBC Micro Book, Basic Sound and Graphics, McGregor and Watt (Addison-Wesley)
- 6 (—) Assembly Language Programming for the BBC Micro, Birnbaum (Macmillan)
- 7 (—) Forth on the BBC Microcomputer, de Grandis-Harrison (Acomsoft)
- 8 (10) 36 Challenging Games for the BBC Micro, Hartnell (Interface)
- 9 (—) Programming the 6502, Zaks (Sybex)
- 10 (9) Commodore 64 Machine-code Master, Lawrence and England (Sunshine)

(Figures compiled by Watford Technical Books, Watford 0923 23324) (Last week's position in brackets)

Top 10

ZX81*

- 1 (1) Flight Simulator (Psion)
- 2 (2) Football Manager (Addictive Games)
- 3 (3) Space Raiders (Psion)
- 4 (8) Ship of Doom (Artic)
- 5 (4) QS Scramble (Quicksilva)
- 6 (9) Asteroids (Quicksilva)
- 7 (—) Chess (Artic)
- 8 (10) Espionage Island (Quicksilva)
- 9 (7) Defender (Quicksilva)
- 10 (—) Invaders (Quicksilva)

*All run in 16K.

(Figures compiled by Boots & Co, London)

Top 10

Dragon

- 1 (2) Frogger (Microdeal)
- 2 (1) The King (Microdeal)
- 3 (—) Shuttle (Microdeal)
- 4 (3) Talking Android Attack (Microdeal)
- 5 (5) Space War (Microdeal)
- 6 (6) Ring of Darkness (Wintersoft)
- 7 (4) Night Flight (Salamander)
- 8 (—) Grid Runner (Salamander)
- 9 (9) Morocco Grand Prix (Microdeal)
- 10 (7) Dragon Trek (Wintersoft)

(Figures compiled by Boots & Co, London)

Vic20

- 1 (1) Arcadia (Imagine)
- 2 (4) Grid Runner (Liamasoft)
- 3 (2) Wacky Waiters (Imagine)
- 4 (3) Sky Hawk (Quicksilva)
- 5 (10) Panic (Bug-Byte)
- 6 (—) Matrix (Liamasoft)
- 7 (5) Catcha Snatcha (Imagine)
- 8 (8) Cosmic Crunch (Commodore)*
- 9 (9) Frantic (Imagine)
- 10 (—) Asteroids (Bug-Byte)

*Cartridge. (Figures compiled by Boots & Co, London)

GROUCH HO OUT NEXT W EEK

MY NAME IS UNCLE GROUCHO YOU WIN A FAT CIGAR is the annual Automata big - prize computer entertainment. Many thanks to all Pimaniacs for being so patient and making it all worth while. "GROUCHO": for 48K ZX Spectrum @ £10 Free Heavy Metal single on its backside by Lady Clair Sinclive and the PiMen. Release date October 12th 1983. Competition closes June 1st 1984. Winner will be announced on this page July 4th 1984. GET READY PIMANIACS

