

FORMAT

TAKING THE SPECTRUM & SAM TO THEIR LIMIT



I See You Cleaned
Your Screen Harry.

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34, Bourton Road, Gloucester, GL4 0LE, England.

Telephone: 01452-412572 Email: Formatpub@aol.com



Last month's issue nearly didn't appear because of major printing press problems at the printers. In the end it was a case of printing **FORMAT** with a black and white front cover or waiting while their colour press underwent extensive surgery. It was typical of our recent run of luck that it was the first issue of a new volume. However, our big thanks to Tony and his men for getting what they could printed so you all had something to read. Their job is not an easy one (I know, I've done it before) but they do well for us.

I'm sorry the technical hotline has been out of action for most of the last month. I've been missing from the office due to personal illness—a virus which caused swelling of the cartilage joining my ribs together, this made breathing difficult and talking even worse (*Oh I can just hear the comments on that one*). While I am still suffering a bit, and some of the drugs are leaving me very tired, I am back to the grind-stone now so you should be able to contact me if you need help. Remember that the best time to call is in the evenings, between 7:30 and 10pm.

There are a couple of major changes coming up in the very near future, several of which will help consolidate **FORMAT's** position at the top of the Spectrum and SAM scene. Of course I will give readers full details as soon as I can (some talks are nearly finished) but in the meantime don't listen to any rumours.

Now that 1999 is here we really want to see more members introduced. I've given you all the details of the promotion before so I will not waste space here, but to help you I have included a subscription form in this issue - please use it to help us grow - it is you that will benefit in the end.

Right, that is all for this month.
Until next month.

Bob Brenchley, Editor.

Writing for **FORMAT**

Yes, I know I keep nagging you to write something for **FORMAT**, but it is for your own good you know.

FORMAT is very special because it is written by enthusiasts. No 'paid hacks' who will get their money even if they produce unintelligible or boring drivel. Everything is written by enthusiasts for enthusiasts and that is what has made **FORMAT** so successful that we are fast approaching our ELEVENTH birthday. Just think of all the other magazines that have come and gone in that time.

But we can't afford to rest on our laurels. If we want to be successful in our second decade then we need new writers all the time. And YOU can be one of them. Oh yes you can, there is something that each and every one of you can do.

We need your contributions. Letters, items for Short Spot, questions for the Help Page, articles - both large and small, reviews, news.....

There are so many ways in which each of you can help us to keep **FORMAT** going well into the new millennium - but we do need your help and we need it NOW!

You don't have to be a brilliant writer to contribute, you just need something to say - and every one of you out there has something to say. It is our job to edit your contribution into shape for **FORMAT** - and that is a job we love to do. So come on, get writing, even the smallest items is better than nothing.

Please, do your bit to help, you can't expect others to contribute if you don't. Honest, it doesn't hurt, and you will have the pleasure of seeing your work in print - extra copies of **FORMAT** to pass on to relatives will be available at discount prices ☺.

Now remember, ring us if you need help or ideas, that is what we are here for. Now get writing.

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Spectrum Sales List - December 1998

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SHORT SPOT

YOUR HINTS, TIPS AND PROGRAMMING IDEAS

As usual, I'm in a rush. "What's new?" you ask. New Year, Old Rush. Answer - 'Nuffin. I've decided I'm always going to be in a rush. It's part of my nature. I'm an Intrinsic Rusher. So there. As I'm away tomorrow, I've rushed round and found some bits to start **SHORT SPOT** with. The rest's in a pile of correspondence lurking under the sidebar. I'll sort that out on Thursday - quick, 'cos Bob wants it all complete by the afternoon. Wish me luck....

So let's start by rushing off with some more SAMbitz by Roy Gardner of St. Columb, Cornwall; you remember, we featured some of his stuff a little while ago. None of these, as Roy says, amounts to very much, but they are all useful snippets from his toolkit to help you when you are writing a program - a library of paragraphs to help you complete the whole essay easily, quickly and with originality, like. Enough of this nonsense - let's start with three snippets to alter the character display. The first is '42 chars'. This snippet allows you 42 characters a line when you're in screen MODE 1 - which is useful if you've a lot of text to get into a small space, but don't want to use MODE 3. (I sympathize with this, because with my overtaxed eyesight. I find MODE 3 difficult to see). I've checked through the listings, and as far as I can see, they don't need you to load any fancy fonts, so here we go - get typing.

```
99 CLEAR : SAVE OVER "42char"
```

Edited By:- John Wase.

```
LINE 100: STOP
100 CLS : CSIZE 8,8
105 LET a$=" Roy Gardner's 42
char print routine.
110 LET a$=a$+"This routine is
printing at 42 characters
per line, 24 lines(over 1
000 chars). Use a smaller f
ont for clarity, and alter
GRAB, PUT,i&j for differe
nt size fonts. See
routine at LINE 260 for s
maller font and more line
s. See REM at Line 145"
111 REM Put in your own text,
starting each line as line
110
144 LET j=0,i=LEN a$: FOR f=1
TO is LET j=j+1: IF j=42 T
HEN LET a$=a$( TO f)+"*"+a
$(f+1 TO ),j=-1,i=i+1
145 NEXT f: REM Line 144 split
s your text into 42-char
chunks- just type in your
lines, run, & correct for
split words as necessary.
No need for letter count.
Lines shorter than 42 may
need spaces added.
146 LET i=173,j=0: FOR f=1 TO
LEN a$: LET j=j+1: IF a$(f
)="*" THEN LET i=i-7,j=0:
GOTO 148
147 PRINT AT 21,31;a$(f): GRAB
p$,250,7,7,8: PUT -6+(6*j
),i,p$
148 NEXT f: STOP
```

All right so far? Got it working O.K.? Now let's look at the next program. This is split into two halves - first a 42

character generator, then a 64 character generator. The overall approach is much the same, but the program uses a pre-defined font to achieve 64 characters in MODE 4. See if you can fathom out how it's all put together.

```

261 REM 42-64 char print by
      Roy Gardner
262 LOAD "42-64"CODE 16384
264 PALETTE 1,16: PALETTE 10,9
      : PALETTE 8,88: PAPER 8:B
      ORDER 0: CLS
266 LET d$="Roy's own little 4
      2 character routine. 29
      (31) lines =1218(1302) c
      hars,(#0).*Need Font (42-6
      4) at 16384 (64= 64 chars,
      29lines)"
268 LET d$=d$+"*A quick brown
      fox jumps over the lazy do
      G.Difficult? -easy!*ABCDE
      F
      GHIJKLMNOPQRSTUVWXYZ*12345
      67890"
270 DPOKE SVAR 566,16128: LET
      i=173,j=0: FOR f=1 TO LEN
      d$: LET j=j+1
271 IF j=42 THEN LET d$=d$( TO
      f)+"*" +d$(f+1 TO ),j=-1,
      f
      =f+1: REM Adds * if line
      >42
272 LET a= 1: IF CODE d$(f)<97
      THEN LET a= 10
274 IF d$(f)="*" THEN LET
      i=i-
      6,j=0: GOTO 279
276 PRINT #0; AT 0,31; PEN a;
      PAPER 0;d$(f)
278 GRAB p$,250,-2,7,6: PUT OV
      ER 2; -4+(6*j),i,p$
279 NEXT f: DPOKE SVAR 566,206
      24
280 REM 64 char
281 LET d$="This is the 64 cha
      racter version. It gives 6
      4 chars per line, 29 line
      s (=1856 characters)*Could
      do O.K. for small print i
      n programs where MODE 3 is
      not practical. See LINES

```

```

280-299 "
290 DPOKE SVAR 566,16896: LET
      i=100,j=0: FOR f=1 TO LEN
      d$: LET j=j+1
291 IF j=63 THEN LET d$=d$( TO
      f)+"*" +d$(f+1 TO ),j=-1,f
      =f+1: REM Adds * if line
      >64
292 LET a= 1: IF CODE d$(f)<97
      THEN LET a= 10
294 IF d$(f)="*" THEN LET i=i-
      6,j=0: GOTO 299
296 PRINT #0; AT 0,31; PEN a;
      PAPER 0;d$(f)
298 GRAB p$,251,-2,4,6: PUT OV
      ER 2; -3+(4*j),i,p$
299 NEXT f: DPOKE SVAR 566,206
      24: STOP
300 CLEAR : SAVE OVER "42 64"
      LINE 260

```

All right; that's great. Now, I'm going to try and pick out, from a number of bits and pieces, some more routines which also will affect in various ways the characters on the screen.

One of the useful things we can do to draw attention to a particular word or phrase is to 'roll' the letters. Of course, Roy has a little routine in his toolkit to do just that...

```

150 DATA "F",0,"O",10,"R",20,"
      M",30,"A",40,"T",50
151 CLS : REM Letter roll by
      Roy Gardner
152 LET a=0: FOR h=1 TO 26: LE
      T a$=CHR$(64+h):lttr:NEX
      T h: REM alphabet
153 FOR e=1 TO 6: READ a$,a: 1
      ttr: NEXT e: STOP : REM an
      y text
154 DEF PROC lttr
155 PEN 7: FOR f=8 TO 2 STEP -
      1: PLOT (64+a)+f,62: DRAW
      0,-7: PAUSE 2: NEXT f
156 PRINT #0; AT 1,30; PAPER 0
      ; PEN 8;a$: PEN 8: PLOT 72
      +a,62: DRAW 0,-7

```

```

157 FOR f=1 TO 8: FOR g=8 TO 1
    6: IF POINT(238+f,-g)=8 TH
    EN PLOT PEN 7; 72+a,72-g
158 NEXT g: SCROLL 1,1,66+a,62
    ,8,8: NEXT f: PEN 7
159 END PROC
160 CLEAR : SAVE OVER "letroll1
    " LINE 150

```

All right so far? Already thought of a little program you're writing that would benefit from this? You have? Good. Because here are a couple more letter-roll routines - same sort of idea, but different routines and different effects. Maybe one of them might suit your routine better than the first you have already tried. So here they are.

```

231 REM 2 Letterroll progs
    by Roy Gardner
232 CLS : PLOT 64,64: DRAW 10,
    0: DRAW 0,-11: DRAW -10,0:
    DRAW 0,10: REM 'Unveils'
    letter
233 FOR h=1 TO 26: LET a$=CHR$(
    (64+h):ltr: NEXT h
235 DEF PROC ltr
236 PEN 7: FOR f=8 TO 2 STEP -
    1: PLOT 64+f,62: DRAW 0,-7
    : NEXT f
237 PRINT #0; AT 1,30; PAPER 0
    ; PEN 8;a$
238 PEN 8: FOR f=8 TO 1 STEP -
    1: FOR g=8 TO 16
239 PLOT 64+f,62: DRAW 0,-7
240 IF POINT(240+f,-g)=8 THEN
    PLOT PEN 7; 65+f,72-g
241 NEXT g: NEXT f: PEN 7
242 END PROC
243 REM This 'rolls' letter on
244 FOR f=10 TO 60 STEP 10: PL
    OT 64+f,64: DRAW 0,-11: NE
    XT f: DRAW -60,0: DRAW 0,1
    1: DRAW 60,0
245 LET a=0: FOR h=1 TO 26: LE
    T a$=CHR$(64+h):ltr: NEX
    T h: REM alphabet
246 RESTORE 256: FOR a=1 TO 6:

```

```

    READ a,a$:ltr: NEXT e: S
    TOP : REM text
247 DEF PROC ltrr
248 REM PEN 0: FOR f=8 TO 2 ST
    EP -1: PLOT (64+a)+f,62: D
    RAW 0,-7: PAUSE 2: NEXT f:
    pen7:rem use this line and
    change PEN and PAUSE for
    different effects
249 PRINT #0; AT 1,30; PAPER 0
    PEN 8;a$
250 PEN 8: PLOT 72+a,62: DRAW
    0,-7
251 FOR f=1 TO 8: FOR g=8 TO 1
    6
252 IF POINT(238+f,-g)=8 THEN
    PLOT PEN 7; 72+a,72-g
253 NEXT g: SCROLL 1,1,66+a,62
    ,8,8
254 NEXT f: PEN 7
255 END PROC
256 DATA 0,"F",10,"O",20,"R",3
    0,"M",40,"A",50,"T",60
260 CLEAR : SAVE OVER "2letrol
    s" LINE 230

```

Howzat! Well, if you've typed them correctly, you should have had roly-poly displays. That's fine, but of course, there are other things you can do when you are putting letters on the screen. For instance, you can gradually fade the letters onto the screen, using POINT and PLOT. As the letters are going to come up pixel at a time, it will obviously work best with a large font. Try it

```

526 REM This prints gradually
    -best with large font RG
528 CLS : FOR i=1 TO 26: LET a
    $=CHR$(64+i):ltr: PAUSE 2
    0: PRINT AT 12,0,, : NEXT i
    : STOP
530 DEF PROC ltr
532 PRINT #0; AT 1,30; PAPER 0
    PEN 8;a$
534 FOR h=4 TO 1 STEP -1: LET
    j=4: FOR f=5 TO 8 STEP h :
    FOR g=9 TO 17 STEP h

```

```

536 IF POINT(238+f,-g)=8 THEN
    PLOT PEN 7; 72+f,75-g
538 IF POINT(238+j,-g)=8 THEN
    PLOT PEN 7; 72+j,75-g
540 NEXT g: LET j=j-1: NEXT f
542 NEXT h
544 END PROC
550 CLEAR : SAVE OVER "grad" L
    INE 520

```

All right; the hard bit's over now. You can relax, and I'll end Roy's bit with a short game-thing.

It is, of course, the inevitable word-search, to keep you amused. Yes we've all seen these before, but they're Fun, aren't they. And those relatively new to using a SAM or Spectrum and needing an introduction to programming (and that includes my new prospective step-daughter) still find such relatively simple programs fun to type in *and* instructive. So, for those long winter evenings, here's word-search. Have fun!

```

99 CLS : REM WORD SEARCH RJG
100 LET pr=4,pr2=0: ON ERROR G
    OTO 119
105 PRINT ''' Need help? (
    y/n)": GET a: IF a=34 THEN
    hlp
110 INPUT AT 0,0;"Word to sear
    ch? (max 32 letters)"; LIN
    E i$: LET c$="0",wd=0,mt=0
    ,copi$="*",y=500
111 IF LEN i$>32 THEN INPUT :
    LET m$="Too Long- max 32 c
    hars":no: GOTO 110
112 clr: LET pr=4,pr2=0:pris
114 PRINT AT 1,12;" WORD SEAR
    CH "
118 LET m=LEN i$,plr=1,pl=0,p2
    =0,b$="",x=0
119 PRINT AT pr,pr2,
120 INPUT "Word? "; LINE w$: I
    F w$="0" THEN GOTO 200
122 PRINT AT pr,pr2;w$
124 IF LEN w$<3 THEN LET m$="T

```

```

oo SHORT!":no: GOTO 120
126 IF w$=i$ THEN LET m$="Come
    off it!! -Same word!":no:
    GOTO 120
128 find: IF a THEN GOTO 120
    135 LET mtco=0
140 LET u$=i$: FOR f=1 TO LEN
    w$: FOR g=1 TO m
145 IF w$(f)=u$(g) THEN LET u$
    (g)=" ",mtco=mtco+1: GOTO
    154
150 NEXT g: LET m$=w$(f)+" not
    found": PRINT PAPER 6; AT
    pr,f-1+(VAL c$*2);w$(f):n
    o: PRINT AT pr,(VAL c$*2),
    : GOTO 120
154 IF mtco>LEN i$ THEN LET m$
    ="Too LONG!":no: GOTO 120
155 NEXT f: LET mt=mt+mtco
160 IF plr THEN LET pl=pl+mtco
    ,plr=0: GOTO 162
161 LET p2=p2+mtco,plr=1
162 LET pr=pr+1: IF pr+wd=34 T
    HEN INPUT : PRINT #0; AT 0
    ,0;"Well Done! Max ";pr-4+
    wd;" words! Score c
    oming up...": LET copi$=co
    pi$+"815"+w$: PAUSE 50: GO
    TO 200
163 IF pr=19 THEN LET pr=4,pr2
    =16,wd=15,a$="15",c$="0":
    GOTO 166
164 LET a$=STR$(pr-4): IF pr<
    14 THEN LET a$="0"+a$
165 LET c$="0": IF wd=15 THEN
    LET c$="8"
167 LET copi$=copi$+c$+a$+w$
169 GOTO 120
170 DEF PROC find
172 LET s$=w$: IF w$(LEN w$)="
    s" THEN LET w$=s$( TO LEN
    s$-1)
179 LET x=INSTR(copi$,"!")
180 LET a=INSTR(copi$,w$): IF
    NOT a THEN GOTO 188
181 IF copi$(a-1)>"9" THEN LET
    a=0: GOTO 188
182 IF copi$(a+LEN w$)="s" THE
    N GOTO 184

```



```

183 IF copi$(a+LEN w$)>"9" THE
    N LET a=0: GOTO 188
184 LET m$="Word used": LET b=
    VAL copi$(a-2 TO a-1),c=VA
    L copi$(a-3)
186 PRINT AT b+3,c*2; PAPER 6;
    w$:no: PRINT AT b+3,c*2;w$
187 IF x THEN PRINT AT pr,pr2,
188 LET w$=s$
189 END PROC
190 DEF PROC clr
192 CSIZE 8,8: FOR f=3 TO 21:
    PRINT AT f,0,,: NEXT f: CS
    IZE 8,9
194 END PROC
195 DEF PROC no
196 INPUT : PRINT #0; AT 0,0;m
    $: PAUSE 60
197 IF NOT x THEN PRINT AT pr,
    pr2,
198 PAUSE 25
199 END PROC
202 IF x THEN LET pr=pr+30
204 INPUT : PRINT #0; AT 0,0;p
    r-4+wd;" words; Plr1-";p1
    ;"; Plr2-";p2,"New, More w
    ords, End ": GET b$: IF b$
    ="n" THEN clr: PRINT AT 2,
    0,,,,: GOTO 100
205 IF b$="m" THEN LET copi$=c
    opi$+"!",y=LEN copi$,pr=4,
    pr2=0,wd=0: PRINT AT 1,12;
    "2":clr:pris: GOTO 120
209 STOP
210 DEF PROC pris
212 CSIZE 8,12: PRINT AT 2,0;i
    $,,: CSIZE 8,9
214 END PROC
1000 DEF PROC hip
1015 CLS : PRINT ""WordSearch 1
    ists the words you find &
    keeps score, find words
    using letters in any order
    (min length 3),If 2 Playe
    rs, then goalternately. Re
    peat by plural isnot accep
    ted."
1020 PRINT ""Enter 0 when you h
    ave done, and prompts appe

```

```

ar. New= new start,Repeat
=reset word, More=continue
"
1040 PRINT #0; AT 0,0;"Input is
    expected in lower-case.
    Any key...": PAUSE : CLS
1045 END PROC

```

And that's all this month from Roy, so many thanks, Roy. I've still got lots of bits from him, so *let us know if you like/hate them*. Perleaze! Thanks, folks.

The next item I want to deal with is a note of real gratitude. This is to several of you who are regular contributors, and particularly this month, Roy Burford and Miles Kinloch. As you know, I've kept on saying that my personal affairs couldn't get any worse, and they promptly did. The principal problem arising from this was that my paperwork, always chaotic, was reduced to total shambles, aided and abetted by still more total shambles arising from the way in which **FORMAT** is put together. As an example, I was typing part of this yesterday in Coventry, and, fearing the worst, got Bob to fax the bits he'd cut from last month's **SHORT SPOT** to my home. When I got back, I found two bits on the mat under the Fax. So I've cut out a piece I had already typed in and substituted a piece from last month. Now, I'd carefully marked Roy's original letter with the bits I'd already sent to Bob (I'm not always good at this), so here we have a recipe for chaos - what happens when a disc contains several files and I've published some and not others, and then bits get cut anyway? Well chaos takes over. Fortunately, as I said, several contributors (notably Roy and Miles this month) have noticed this and sent again bits omitted and subsequently overlooked. Bless you all.

So let's now please all friends of the

Spectrum with some bits and pieces from Miles Kinloch of Edinburgh, which I have omitted / overlooked / forgotten / mis-filed earlier.

Ironically, the first item's about that interrupt-driven clock sent by Roy Burford. Miles has discovered several reasons for its failure to work properly with the PLUS D and in 128K mode, all of them to do with the effects of ROM paging.

The first of these problems concerns the method of setting up the interrupts. Instead of a conventional 256-byte vector table in RAM, the programmer took a short cut and used two ROM locations (relying on the data bus value being 255, which, incidentally, causes problems in itself with certain peripherals, such as the Kempston Mouse). As a result, if an interrupt occurred when the Spectrum 48K ROM was paged out (such as in the 128 Editor, when the shadow 128 ROM may be present, or during a PLUS D command, when the PLUS D ROM would be in place), these locations would no longer represent the interrupt routine. It would therefore try to call it at the wrong address, with obviously unpredictable consequences.

The second problem was a call to ROM address 703 for the purpose of reading the keyboard, instead of the normal RST 56 method used by BASIC. Again, if the 48K ROM, which contains the intended routine, wasn't present, chaos resulted.

The clock's interrupt routine was designed to bypass the normal RST 56 routine - this was because it took over the latter's function of updating the FRAMES system variables (23672/3/4). In 128 BASIC, however, RST 56 performs an additional task - it swaps Basic and 128 Editor ROMs on every interrupt,

which is essential for the running of that mode. Without this interrupt-driven RST 56 call, 128 BASIC will not work.

The third problem involved the Spectrum character set. This is present only in the 48K ROM, but if that is paged out, spurious bit-patterns will be printed instead of the normal characters.

To get round these various difficulties, Miles has written parts of the routine. To begin with, a full 256-byte vector table is now set up in RAM, so that the interrupts cannot be thrown off course by ROM paging. Secondly, the routine now records hours, minutes and seconds through addresses **33330, 33331 and 33332**, instead of the FRAMES system variables as before. This allows the troublesome call to address 703 to be dispensed with, and lets a normal RST 56 call be substituted. (FRAMES can no longer be used because RST 56 updates these addresses itself, and this would have interfered with the routine's own manipulation of them.)

Finally, Miles has arranged for the Spectrum ROM characters to be copied to RAM, so that the clock characters will always print correctly, regardless of the ROM paging status.

And after all of this, one still has certain constraints to be aware of. For instance, the accuracy of an interrupt-driven clock depends in the final analysis on the accuracy of the computer's clock speed, rather than the programming methods used. The same routine may run at different speeds on different machines - the timing of the interrupts is what it depends on, and these are generated by the computer hardware. Many thanks for sorting that one out, Miles. On the next page is his amended program.

```

1 REM Input magazine. pp896
  Watching the interrupts.
2 REM Revised on ZX Spectrum
  + 128K by B.C.R.Burford 12
  0398.
3 REM Adapted for 128K and +
  Dcompatibility by Miles Ki
  nloch.
4 REM Memory 32277 to 34183
  is used (including char s
  et and interrupt vector ta
  ble).
5 REM POKE 33332, hour. 33331
  , minute. 33330, second befo
  re, but preferably after R
  UN.
6 REM RANDOMIZE USR 32340 to
  turn off.
10 CLEAR 32276: LET total=0
20 FOR n=32277 TO 32554: READ
  a: POKE n,a: LET total=to
  tal+a: NEXT n
30 IF total<>27570 THEN PRINT
  "Error in data.": STOP
40 RANDOMIZE USR 32277: STOP
50 DATA 33,0,61,17,43,127,213
  ,1,0,3,237,176,225,37,34,5
  4,92,243,33,0,0,34,50,130,
  34,51,130,33,0,131,17,1,13
  1,1,0,1,54,133,237,176,62,
  195,50,133,133,33,92,126,3
  4,134,133,62,131,237,71,23
  7,94,251,201,0,64,0,0
60 DATA 62,62,237,71,237,86,2
  01,0,229,213,197,245,58,91
  ,126,60,50,91,126,254
70 DATA 50,32,50,175,50,91,12
  6,58,50,130,60,50,50,130,2
  54,60,32,35,175,50
80 DATA 50,130,58,51,130,60,5
  0,51,130,254,60,32,20,175,
  50,51,130,58,52,130
90 DATA 60,50,52,130,254,13,3
  2,5,62,1,50,52,130,58,52,1
  30,38,0,111,17
100 DATA 23,64,205,234,126,58,
  51,130,38,0,111,17,26,64,2
  05,234,126,58,50,130
110 DATA 38,0,111,17,29,64,205

```

```

,234,126,17,251,127,33,29,
  64,205,34,127,17,251
120 DATA 127,33,26,64,205,34,1
  27,62,120,33,24,88,119,17,
  25,88,1,7,0,237
130 DATA 176,0,0,0,241,193,209
  ,225,255,201,237,83,80,126
  ,1,246,255,205,251,126
140 DATA 1,255,255,205,251,126
  ,201,175,9,60,56,252,237,6
  6,61,198,48,229,205,21
150 DATA 127,33,80,126,52,42,8
  0,126,205,34,127,225,201,2
  37,75,54,92,38,0,111
160 DATA 41,41,41,9,235,201,6,
  8,26,119,36,19,16,250,201
9999 SAVE d*"CLOCK"

```

Miles did send me a listing of the assembler code for the clock routine, which Bob now has, if anyone wants a copy I'm sure he will be pleased to send you one.

Amongst the other bits and pieces of general Spectrum interest which Miles has sent again because I've failed to publish/mislaid/generally lost them are a couple of early tips about Wordmaster and the DTP pack, but more about these next month.

Many thanks for now, Miles, and I'm sorry we have insufficient room for Roy Burford's material - more next month.

Until then, please keep all your snippets coming to me; without them I can't put a column together, and sometimes I find it hard work these days!

Please don't make it harder!

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STOP PRESS: The full range of SD's software and hardware will return in the next few months, if there is anything not listed above that you really need then phone Bob on 01452 412572 and he will do his best to help.

Clean A MACHINE

By:- Oliver Marsh.

If your idea of cleaning your computer is wiping your hand across the dusty monitor, you're putting your computer and its data at risk.

You may think that dirt is merely an esthetic issue, but excessive dust and grime can lead to all sorts of problems, such as sticky keys, erratic mouse movement, malfunctioning disc drives, and overheating of electronic parts.

Your computer and its peripherals will benefit from regular cleaning. The frequency of cleaning depends, of course, on your environment, but you should remove visible dust on a day-to-day basis and give your system a thorough cleaning at least every couple of months.

Unless you are using something such as a drive-cleaning disc (more about that later) which requires you to have your system up and running, turn off your computer's power before you start any sort of cleaning.

So. What do you clean first? Well lets deal with things in the order that they are most likely to get dirty.

Monitor/TV

A dirty monitor or '1V (from here on, when I refer to a monitor you can take it as read that I will mean TVs as well) is one of the first things you notice – simply because you look at it each time you use your computer.

The real problem is that in use a static electric charge builds up on the screen's surface and this attracts dust and smoke particles from the air. This dust,

combined with oils from the skin on your fingers, creates a thin layer of grime. Trying to view the screen, particularly things like text on a word processor, through this layer can cause eye fatigue and headaches. It also leads, quite often from my experience, to people turning up the brightness settings on their screen, this will often shorten the life of the monitor and increase the risk of 'burn in'. For those of you not familiar with the term 'burn in', it is where an image is left on the screen permanently because the phosphor coating has been exposed to essentially the same bright image for very long periods. If, say, you use a word-processor most of the time, then of course the main text on the screen changes minute by minute – but there are fixed parts of the display (usually top and bottom) which stay the same most of the time. It is these parts that can permanently etch themselves into the phosphor if you constantly have the brightness turned up to high – so clean that screen and turn down the brightness and you will get longer life from your monitor.

Remember a couple of precautions when cleaning monitors (or TVs). Sometimes there is a special coating on screens that will permanently streak if you use an ammonia-based cleaning product to bathe the screen. If you wipe the screen while it is on and warm, you can generate static electricity that's harmful to your system.

The best way to clean your monitor's screen is to dry-dust with a lint-free cloth. You also can clean the outside of your monitor with denatured alcohol (99% isopropyl alcohol). We suggest, however, you test the alcohol in the corner of the monitor, and we do not recommend using it on liquid-crystal displays. Because of the mechanics and high voltage inside, NEVER open your monitor's cover.

When you finish, check the connections and make sure you didn't accidentally change the brightness or contrast settings while cleaning.

Keyboard

One of the fastest ways to ruin your keyboard is to spill coffee or coke on it. Make it a rule not to have food or drink near your keyboard. Smoking around your computer can also cause damage. Hot particles falling onto your keyboard can mar the surface and ash will soon build up between and under the keys.

Of course, accidents do happen, no matter how careful you are. If you spill water on your keyboard, disconnect it and turn it over to drain as much water out as possible. Use a towel to dry what you can and let it air dry for a day or more, depending upon how much liquid you spilled. Liquids such as pop, juice, or coffee are more serious because they contain sugars and acids that can corrode the inside of your machine. An authorized technician might be able to clean things for you; but I would recommend that you do not attempt to take it apart yourself.

Daily use, with even slightly dirty hands, will result in dust and grime accumulation on your keyboard. Not only is this unsightly, but the particles of dirt or food that fall between the keys could

harm your keyboard. To prevent this, you should periodically clean your keyboard. Always be sure to turn off your computer before you begin the cleaning process. Computer accessory outlets carry a variety of cleaning items including surface-cleaning solutions, absorbent cloths, anti-static wipes, swabs, cans of compressed air that blow dirt particles out of hard-to-reach areas, and small hand-held vacuums. Keyboard-cleaner kits include tools specifically for hard-to-reach spaces between keys. You also can use denatured alcohol (99% isopropyl alcohol). Foam eye shadow applicators work well for reaching between keys and don't leave behind wisps of cotton as cotton-buds do.

Mouse & Mousepad

A dirty mouse hampers control of cursor movement. If your mousepad is dirty, the roller ball on the mouse's underside picks up the dust and grime, rolling to the inside of the mechanism. Once there, it clogs delicate parts and hinders the responsiveness of the mouse. To clean the mousepad, use a diluted solution of alcohol or a general-purpose cleaner and a lint-free towel.

You must take your mouse apart to clean it. For a mechanically operated mouse (one that uses a rolling ball), unplug it and turn it upside down. Remove the ball-access cover, take out the roller ball, and wash it in lukewarm water. Do not use any cleansers; the chemicals might damage the mouse. Wipe the ball dry with a lint-free cloth or let it air dry. With compressed air, blow the dust out of the mouse housing. Using a swab and alcohol, wipe any grime from inside the cavity that holds the ball. Inside the cavity you will see tiny wheels or rollers, be sure to clean these as well.

If the build-up is thick, you may need to use a small flat-headed screwdriver to carefully scrape the rollers clean. When you finish, put the ball back into the cavity and replace the cover. Clean the outside of the mouse with a general-purpose cleaner and lint-free towel.

Mousepads are cheap, very cheap. So if yours is showing signs of wear then get a new one.

Computer Case

The outside of the computer can be cleaned with a damp cloth. Stubborn dirt can be removed using one of the cleaning sprays sold in most computer shops.

Do not, whatever you do, ever use furniture polish to clean the case. It is surprising how many people just get hold of the household duster and wipe the dust off their machine. Fine, if it is a clean duster, but if it has been used to polish the dining table then it will only make work for you. Furniture polish on plastic just attracts the dust and almost glues it to the surface – making it far more difficult to clean in the future.

Insides?

It's easy to ignore the inner mechanics of your computer because the parts are covered by a case. Dust build-up on internal components can occur if you work in a really dusty environment, but it is not as bad as you would get with a PC type machine because our computers don't have fans sucking dust into their guts all the time—something for which I am internally grateful.

However, it is worth noting that layers of dust can cause cooling problems and shorten component life spans. If the dust contains conductive elements, it can cause partial short circuits and the corrosion of electrical contacts. Therefore,

it is worth checking, by looking into the computer through any open slots, to ensure there is little or no dust inside - if there is then the best thing is to blow it out by using a short length of fine tube (the sort used as piping to a cars windscreen washer is ideal). Insert it (carefully) into any open slots and blow like mad.

Drives & Peripherals

The openings in your disc drives may seem too small for dust to become a problem, but don't you believe it.

Dust can contaminate the lubrication on moving parts making them ineffective. It also can accumulate on read/write heads and prevent them from correctly reading and writing data.

Drive-cleaning kits are available for less than £10 and generally include multiple applications. These kits are available through computer accessory outlets, WH Smith, or Office World. They should come with a special cleaning disc and cleaning solution.

Following the directions, pour a drop of cleaning solution on the cleaner disc and insert it into the drive. Repeatedly try to boot from the drive (or if you already have DOS loaded then repeatedly try to format a disc. If the drive doesn't spin, the cleaning process won't take place.

Once done, do not insert a proper disc for at least five minutes - this is to allow all the cleaning fluid to evaporate.

Use a lint-free anti-static cloth to wipe dust from the opening and front of your drives to keep dust at a minimum. Cleaning your drives on a regular basis will keep them running smoothly and ensure a longer life for each drive.

Most other hardware that is attached to your computer will probably be cased in some way - is so then clean the outer

case in the same way as you did the computer's case.

The peripheral that really needs attention is the printer. You can clean the exteriors using a lint-free anti-static cloth and general-purpose cleaner. Use compressed air to blow paper particles and dust out of the interior of your printer or purchase special pre-moistened cleaning sheets. Ink-jet and laser printers are best left to the experts if there are no special cleaning instructions in their manuals.

Dot matrix printers really benefit from having their ribbons removed and all the guide surfaces cleaned with isopropyl alcohol, being very careful not to bend any of the guides as you clean them.

You should also clean the platen (the black rubber roller that the paper wraps around. Some platens come out so you can give them a really good clean with methylated spirit but others require too much work to remove so deal with them in place by rubbing the exposed surface with isopropyl alcohol on a lint free cloth, gradually rotating the roller so that the whole surface is cleaned.

Some TLC For Your computer

If possible, keep your computer environment smoke (and food/drink) free. Avoid direct sunlight and temperature extremes. If you can't avoid certain conditions, such as a smoky or greasy environment, use covers for your computer and its components when they are not in use.

In most cases, you can dust using a soft, lint-free, static-free cloth. Be careful that you don't run dirt picked up by the cloth across another surface; this could scratch it. Remember my earlier warning about furniture polish. Certain applicators, such as paper towels and

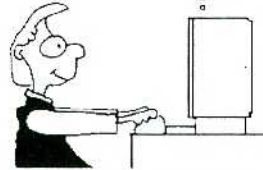
cotton-tipped swabs, also can leave particles.

None of the steps described above requires excessive time or effort, yet they keep your computer functioning properly. Cleaning your computer and its components periodically can save you time, money, and later frustration — it will also help to improve its second-hand value if and when you come to part with it.

Keep it clean.

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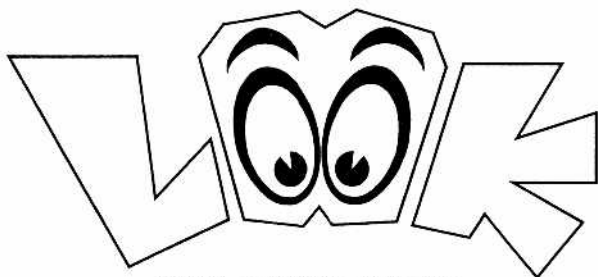
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Towers Of Hanoi

By:- M.Benjamin.

I would imagine that everyone has come across the Towers Of Hanoi puzzle at some time in the past. It is the mathematical puzzle in which a column of discs have to moved from column 1 to column 3 in such a way that no disc is placed on top of a smaller disc. An extra column, column number 2, is used as a tempory repository for moving in order to make the puzzle possible.

In my version of the program I have not attempted to represent the discs in relative size on the screen, instead I use the numbers 1 (for the smallest disc) to 6 (for the largest).

When you run the program all six discs (numbers) are piled up on the first column. The object is to get them piled up in exactly the same order on the third column, using the middle column in the process.

The minimum number of moves is given by the formula $2^n - 1$, where n is the number of discs used - in this case n will be 6 and the minimum number of moves will be 63. You may like to amend the program to deal with larger or smaller numbers of discs.

You can, if you so desire, allow the the program to `solve' the problem for you - just sit back and watch the numbers move.

Ok, here is the program, I hope you enjoy it.

```
5 REM "hanoi"  
6 INK 0: BORDER 4: PAPER 6: C
```

```
LS  
10 PRINT "TOWER OF HANOI"  
20 FOR j=1 TO 6  
30 PRINT AT j,7;INK 0;" "  
40 PRINT AT j,9;INK 0;" "  
50 PRINT AT j,14;INK 0;" "  
60 PRINT AT j,16;INK 0;" "  
70 PRINT AT j,21;INK 0;" "  
80 PRINT AT j,23;INK 0;" "  
90 NEXT j  
100 FOR j=7 TO 23  
110 PRINT AT 7,j;INK 0;" "  
120 NEXT j  
125 PRINT AT 8,8;"1"; AT 8,15;"  
2"; AT 8,22;"3"  
130 PRINT AT 9,0;"1. Do You Wan  
t To Try Yourself"  
140 PRINT AT 10,0;"2. Do You Wa  
nt The Computer to Demonst  
rate."  
150 PRINT AT 13,0;"Enter Your 0  
ption"  
160 IF INKEY$<>" THEN GOTO 160  
161 IF INKEY$="" THEN GOTO 161  
162 LET x$=INKEY$  
163 LET v=VAL x$  
164 IF v=1 THEN GOTO 200  
165 IF v=2 THEN GOTO 500  
166 GOTO 160  
200 FOR v=9 TO 13  
201 PRINT AT v,0;" "  
"  
202 NEXT v  
210 LET t=0  
220 DIM a(7,3)  
225 FOR f=1 TO 6  
230 LET a(f,1)=f  
235 PRINT AT f,8;a(f,1)  
236 PRINT AT f,15;"-"  
237 PRINT AT f,22;"-"  
240 NEXT f
```

```

245 PRINT AT 10,0;"Enter Your M
oven
246 PRINT AT 12,0;"Your Move Fr
om Row?"
250 IF INKEY$<>" THEN GOTO 250
251 IF INKEY$="" THEN GOTO 251
252 LET x$=INKEY$
253 LET c=VAL x$
254 IF t=0 AND c<>1 THEN GOTO 2
50
255 IF c=1 AND a(6,1)=0 THEN GO
TO 250
256 IF c=2 AND a(6,2)=0 THEN GO
TO 250
257 IF c=3 AND a(6,3)=0 THEN GO
TO 250
258 IF c=1 OR c=2 OR c=3 THEN G
OTO 270
259 GOTO 250
270 PRINT AT 12,0;"Your Move Fr
om Row ";c;" to "
271 FOR x=1 TO 6
280 IF a(x,c)<>0 THEN GOTO 300
290 NEXT x
300 IF INKEY$<>" THEN GOTO 300
301 IF INKEY$="" THEN GOTO 301
302 LET x$=INKEY$
303 LET d=VAL x$
305 IF c=d THEN GOTO 390
307 IF d=1 OR d=2 OR d=3 THEN G
OTO 310
308 GOTO 300
310 FOR y=6 TO 1 STEP -1
330 IF a(y,d)=0 THEN GOTO 345
340 NEXT y
345 LET a(y,d)=a(x,c)
346 LET t=t+1
350 PRINT AT 12,0;"Your Move Fr
om Row ";c;" to row ;d
355 PRINT AT y, (d*7)+1;a(y,d)
360 PRINT AT x, (c*7)+1;"-"
361 PRINT AT 10,0;"Move No. ";t;
"
362 LET a(x,c)=0
365 FOR x=1 TO 200
366 NEXT x
375 IF a(y+1,d)=0 THEN GOTO 380
376 IF a(y,d)>a(y+1,d) THEN GOT
O 420
380 IF a(1,3)=1 AND a(2,3)=2 AN
D a(3,3)=3 AND a(4,3)=4 AND
a(5,3)=5 AND a(6,3)=6 THEN
GOTO 400
390 PRINT AT 10,0;"
"
395 PRINT AT 12,0;"
"
396 IF t=99 THEN GOTO 440
397 GOTO 245
400 PRINT AT 14,0;"You Have Com
pleted The Task"
410 STOP
420 PRINT AT 14,0;"You Have Pla
ced A Larger Number On Top
of a Smaller. Yo
u Are Disqualified"
430 STOP
440 PRINT AT 14,0;"You have fai
led to complete the task -
You lose"
450 STOP
500 LET t=0
501 PRINT AT 10,0;"
"
502 PRINT AT 9,0;"
"
503 PRINT AT 13,0;"
"
510 DIM a(7,3)
520 FOR f=1 TO 6
525 LET a(f,1)=f
530 PRINT AT f,8;a(f,1)
540 PRINT AT f,15;"-"
550 PRINT AT f,22;"-"
560 NEXT f
570 LET t=t+1
580 IF t=1 OR t=7 OR t=13 OR t=
19 OR t=25 OR t=31 OR t=37
OR t=43 OR t=49 OR t=55 OR
t=61 OR t=16 OR t=28 OR t=5
2 OR t=4 THEN LET c=1: LET
d=2
590 IF t=2 OR t=8 OR t=14 OR t=
26 OR t=32 OR t=38 OR t=50
OR t=56 OR t=62 THEN LET c=
1: LET d=3

```

Turn to page 27



YOUR LETTERS

Dear Editor,

I'm sorry I did not make it to the Gloucester show in October, my car was in for repair following an unfortunate misunderstanding between its rear end and the front end of large van. I will do my best to make the next one.

My main reason for writing is to ask if anyone has a circuit diagram for the SAM Coupe power supply. I know you have covered the TV modulator side in an article but I've got a spare PSU, which I picked up at a show a few years ago, which has never worked. Having the ability to use a soldering iron I would like to have a go at fixing it, but without a diagram I'm not sure where to start.

Can you, or anyone else, help please?

Yours sincerely, Simon Hall.

Well Simon, I've searched through all my stuff and have to admit the PSU is not covered. At the moment my expert help on the subject, that nice Mr Nev Young of SD Software fame, is enjoying himself somewhere in North America so I can't ask him. However, I'm sure I can twist his arm for help when he does return - although if anyone out there in **FORMAT** land can supply a diagram of the PST T would he grateful. **Ed.**

Dear Editor,

What has been happening to the mailing of **FORMAT**? I received the August issue on the 28th October while the July one arrived on the 23rd October. I used to receive it the month that was stated on the cover, and as I am supposed

to have sent by air mail this is ridiculous. Is it possible to ever get it again by airmail or is my next subscription renewal going to be for seamount?

**Yours sincerely, Alan Rutherford.
New Zealand.**

I'm not sure why the July issue only arrived a week before the August issue Alan, I have asked our mailing company to investigate. It could be that they sent it by their slower system by accident.

It is no longer quite as simple as airmail-v-surface with the company we now use. In general we have found them to be faster than using Royal Mail, and we have certainly lost fewer items since they took over.

Of course, our being so far behind with **FORMAT** does not help you monitor things, but there should be a date on the postmark which should give you an idea of how long the envelope took to reach you. I would love to hear from you, and other overseas readers, the sort of times things are taking to get through. The mailing firm have made us certain promises regarding delivery times and I would like to see how well they are doing. **Ed.**

Dear Editor,

Last week a friend of mine, who is also a SAM owner, sent me a disc with a game he had written saved on it. When I attempted to load it I kept getting error messages each time I pressed F9.

I thought it was just a bad recording, but since I tried loading his game I keep

getting errors when loading my own discs - none of which has caused any problems in the past.

What has gone wrong? Is it a computer virus? Please help.

Your sincerely, Gordon Thompson.

I can picture it now. A cold, dark morning, the lone postman trudging wearily through the drizzle, his heavy bag laden with junk mails and bill. He walks up your path, and with cold hands that cry out for a pair of warm dry gloves, he pops an envelope through your letter box. There it lies, on a soggy mat in a draughty hall mat, until hours later you arise from your slumbers and pick it up.

Woopie! Its a disc from good old Paul, you read the scribbled note to find it is a new game he wants you to play. With all haste, and neglecting to even eat breakfast (or should that be lunch?) you rush off to your nice centrally heated computer room, switch on your SAM and insert the disc.

Horror! It doesn't load. Sector errors every time. You take it out and try one of your own discs instead, failure again. What has he done? A virus?

Well no, there is a more likely problem, dampness cause by condensation.

It is amazing how often this has happened to people I know. The disc's surface gets damp when brought from a cold environment (the postman's sack) to a warm room. If you put the disc straight in and give it a whirl, disaster. Some of the dampness, and possibly some of the oxide coating from the disc, gets on to the drive's read/write heads and will often stay there even after the damp disc is removed. The only cure is to clean the drive heads with a proprietary cleaning disc.

Prevention is, however, better than cure. Just make sure that any disc you have is allowed to sit around, out of its

packing, long enough to make sure it has reached room temperature for at least half an hour. Do that and you should have no problems. **Ed.**

Dear Editor,

Congratulations on yet another birthday for **FORMAT**, the last year has flown by and it came as a shock to realize that we were all a year older.

Please keep up the support for the Spectrum and SAM, others seem to be failing all the time—I've just heard Crashed has closed. Without my monthly dose of **FORMAT** I don't know what I would do.

Best wishes to all who help you.

Yours sincerely, Philip Willand.

Thanks for the kind thoughts Phil. Yes, I have seen reference to Crashed closing, but I've also heard there may be a rescue so don't give up hope yet. **Ed.**

Dear Editor,

Over the years I've amassed a great many programs which I have typed in from old magazines (I particularly like some of the simple games) and I was wondering what the copyright situation is with them.

I would have to go through the magazines in the loft to find the original articles (if I've still got them come to that), and often I've made lots of improvements and alterations to the original.

Of course I realize I can't claim them as my own work, but I would like to see some appear in **FORMAT** provided I'm not breaking the law in sending them in.

Yours sincerely, Frank Wilton.

Well Frank, it is a grey area, but one where I do have a policy I'm prepared to defend.

The line I take is simple. Provided that you acknowledge that the program came

from a particular magazine originally, and tell readers about where you made the alterations, then I'll be happy to see it in **FORMAT**. Of course, if you have the original author's name and the exact details of when it was published then that is even better.

Small items should be sent to John Wase for SHORT SPOT. Larger items, those that look like they will fill more than a page on their own, are best sent to us in Gloucester. Please, don't just send the program, we need to have a text file with some form of write-up. Don't worry if you feel unable to write a full article, we will do what we can with whatever you send. **Ed.**

Dear Editor,

Have you realized that next Christmas is going to be SAM's tenth birthday? It came to me just the other day as I was clearing out some old paperwork and found the letter I received from MGT telling me my order would be delivered in time for Christmas.

Do you plan any special commemorations to mark the milestone?

Your sincerely, Brian Townsend.

Mmmm. There is nothing planned at the moment. To tell you the truth it is hard to believe that it will be 10 years.

Any readers care to comment, or may suggest something? **Ed.**

Dear Editor,

I wrote to you some time ago asking for prices on the SD Software hard drive system for the SAM computer. Having heard nothing I thought I would drop you another letter to see what is happening.

I need a hard drive in order to run a large database of information on SAM which will not fit on floppy disc.

Please help.

Yours sincerely, Trevor Dart.

At the moment the SD Hard Drive interface is out of production for two reasons Trevor. First, there are no more PCBs left, although a new batch of boards could be run within a reasonable period if required. The second, and bigger problem is HDOS. Nev Young wrote HDOS using a C compiler on the PC which was designed to produce Z80 object code as its output. This was by far the most efficient way to write the operating system, I know because Nev and I talked it over on the telephone and in person for many (many) hours. However, due to a faulty hard drive on the PC, the C source for HDOS no longer exists.

Now despite selling very reasonable numbers, the system did not attract much support from the sort of people who were capable of writing software for it. Requests for assistance in advancing HDOS fell on very deaf ears. Indeed, it is true to say that a small number of people went out of their way to belittle any attempts to advance HDOS or the SAM for that matter.

The current situation is that to go further HDOS needs to be rewritten, and MasterDOS and SAM's ROM both need to be looked at closely so that they can be tidied up to make room for corrections needed by HDOS.

If the programming expertise was available then I've said I will head the project. However, it is more than a one man job.

Until then, I'm sorry to say there are no SD hard drive systems available. **Ed.**

Letters may be shortened or edited to fit on these pages although we try to edit as little as possible.

This is YOUR letters page so it is up to you to fill it with interesting things. Come on, get writing, any subject even remotely related to computers. Just keep things as short as you can so we can fit in as many as possible each month. Please write clearly or type your letters. Send them to the address on page 3 or email them to: FormatPub@aol.com

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If you have any doubts about which type of interface you need, or any questions about the drive fitting in general, then please give the FORMAT hotline a ring on 01452-412572 and they will be pleased to help you.

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INTERFACES

These interfaces work with both the SAM elite and the SAM Coupé unless otherwise stated.

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RAT

A Simple A.I. Program

by:- Frank Evans.

This program is called 'Rat'. It consists of a maze which contains a piece of cheese, and a rat.

The rat has a low I.Q. It's task is to seek and find the shortest path to the cheese. The rat can only remember the last 15 moves (I.Q) made on finding the cheese or cheese trail. After several runs it does find the shortest route, ignoring blind alleys.

This is done by using artificial intelligence. Simple arithmetic and Boolean logic is used to create the rat's brain. The routines could be used in adventure games to move characters around.

The program is written for the Sam, but should convert to the Spectrum. The maze is constructed on a 2 dimensional array. Within the array the walls are given a value of 1000 and the corridors are initially set at 0.

The rat searches the adjacent cells of the array and selects the lowest value. Priority is given in the order North, East, South, and West. The rat is thus biased to go north (the top of the screen).

When the move has been selected, the rat is printed and the old position is incremented by 1. The move is stored in the memory.

Recording stops when the cheese or cheese trail is found. The memory loop has to be put into the correct order.

The last 15 moves are then marked on the maze with '.' and the relevant array cells are altered to a negative number.

Here is the program:-

```
10 REM RAT F.Evans 1998
20 MODE 4: POKE SVAR 50,1
30 LET c=1,ch=-999,turn,=0
40 DIM g(16,16): REM maze
50 LET iq=15,k=1000
60 maze:pic
99 REM main loop
100 LET turn=turn+1,flag=0,dy=
    10,mv=0
110 LET g(5,10)=-1000: REM che
    ese
120 PRINT AT 5,10; PEN 14;CHR$
    132
130 PRINT AT 15,3;CHR$ 128: LE
    T x=15,y=3: REM rat start
140 DIM p(iq),q(iq): REM re-se
    t memory loop
150 seek
160 IF g(x,y)<0 THEN LET flag=
    1,dy=1: REM stop recording
    moves
170 IF flag=0 THEN memo: LET g
    (x,y) =g (x, y) +1
180 LET my=mv+1
190 IF g(x,y)=-1000 THEN GOTO
    210:cheese found
200 GOTO 150
210 PRINT AT 3,19;"Run ";turn
220 PRINT AT 4,19;mv;" moves"
230 mark
240 PRINT AT 18,0;"Press r to
    start new run"
250 GET a$: IF a$="r" THEN PRI
    NT AT 18,0;"
    ": GOTO 100
270 STOP
280 DEF PROC seek
290 PRINT AT x,y;" ": REM eras
    e old rat
```

```

300 LET nx=x-(1 AND x>1): REM
    north boundary
310 LET n=g(nx,y)
320 LET ey=y+(1 AND y<16),e=g(
    x,ey): REM east
330 LET sx=x+(1 AND x<16),s=g(
    sx,y)
340 LET wy=y-(1 AND y>1),w=g(x
    ,wy)
350 REM find direction
360 IF n<=s AND n<=e AND n<=w
    AND n<k THEN LET x=nx,r$=C
    HR$ 128
370 IF e<n AND e<=s AND e<=w A
    ND e<k THEN LET y=ey,r$=CH
    R$ 130
380 IF s<n AND s<e AND s<=w AN
    D s<k THEN LET x=sx,r$=CHR$
    $ 129
390 IF w<n AND w<e AND w<s AND
    w<k THEN LET y=wy,r$=CHR$
    131
400 PRINT AT x,y;r$
410 PAUSE dy: REM optional del
    ay
420 END PROC
430 DEF PROC memo: REM store 1
    ast 15 moves(iq)
440 LET p(c)=x,q(c)=y
450 LET c=c+1: IF c>iq THEN LE
    T c=1
460 END PROC
470 DEF PROC mark
480 LET home=0,f=1
490 DIM t(iq),s(iq): REM sort
    into correct order
510 LET t(f)=p(c),s(f)=q(c)
520 LET c=c+1: IF c>iq THEN LE
    T c=1
530 LET f=f+1: IF f<iq+1 THEN
    GOTO 510
540 REM mark last 15 moves 550
    FOR a=iq TO 1 STEP -1
560 IF home THEN GOTO 610: REM
    rat start found
570 IF t(a)=0 OR s(a)=0 THEN G
    OTO 610: REM no recorded m
    ove
580 LET g(t(a),s(a))=ch: REM a
    lter value in array g
590 LET ch=ch+1: REM decrement
    ch.
600 PRINT AT t(a),s(a);"."
610 NEXT a
620 END PROC
630 DEAF PRO picot
640 RESTORE 860
650 BLOCKS 0
660 FOR a=0 TO 39
670 READ b: POKE 21648+a,b
680 NEXT a
690 END PROC
700 DEF PROC maze
710 BLOCKS 1
720 RESTORE 920
730 FOR a=1 TO 16
740 FOR b=1 TO 16
750 READ j: LET g(a,b)=j
760 IF j=k THEN PRINT AT a,b;C
    HR$ 143
770 NEXT b: NEXT a
780 BLOCKS 0
790 END PROC
850 REM rats & cheese U.D.G.
860 DATA 0,36,56,16,58,58,20,8
870 DATA 8,20,58,58,16,56,36,0
880 DATA 0,0,52,126,180,64,48,
    0
890 DATA 0,12,2,45,126,44,0,0
900 DATA 0,12,112,112,104,124,
    118,126,0
910 REM maze data
920 DATA k,k,k,k,k,k,k,k,k,k
    ,k,k,k,k,k
930 DATA k,0,0,0,0,k,0,0,0,0,0
    ,0,k,0,0,k
940 DATA k,0,k,k,k,k,k,0,k,k,k,k
    ,0,k,0,k,k
950 DATA k,0,0,0,0,0,0,k,k,k,k
    ,0,0,0,0,k
960 DATA k,k,k,0,k,k,k,k,k,0,k
    ,k,k,k,0,k
970 DATA k,0,k,0,0,0,0,k,0,k,k
    ,0,0,0,0,k
980 DATA k,0,k,0,k,k,k,0,0,0,k
    ,k,k,0,k,k
990 DATA k,0,0,0,k,0,k,0,k,k,k
    ,0,0,0,0,k

```

```

1000 DATA k,0,k,k,k,0,k,0,0,0,
      0,0,k,k,k,k
1010 DATA k,0,0,0,0,0,k,k,k,k,k
      ,k,0,0,0,k
1020 DATA k,0,k,k,k,k,k,k,k,k,k
      ,k,k,0,k,k
1030 DATA k,0,0,0,0,0,k,0,0,0,0
      ,0,0,0,0,k
1040 DATA k,k,k,0,k,0,k,k,0,k,k
      ,0,k,0,k,k
1050 DATA k,0,k,0,k,0,0,0,0,0,k
      ,0,k,0,k,k
1060 DATA k,0,0,0,k,0,k,0,k,0,k,k
      ,0,0,0,0,k
1070 DATA k,k,k,k,k,k,k,k,k,k,k
      ,k,k,k,k,k
9990 DEF PROC keep
9991 SAVE "rat"
9992 END PROC

```

Ok Spectrum readers, that is the program as written for SAM.

Now, the calls to procedures, like the two made on line 60 (maze and pict) can be replaced with GOSUBS for the Spectrum. Multiple LETs on SAM like line 100 need to be replaced with individual LET statements, as do the multiple DIMs like the one on line 140.

The GET statement on line 250 will need to be replaced with INPUT or INKEY\$, to test for the appropriate keypress. BLOCKS 0 (line 650) simply turns on SAMs UDGs, on the Spectrum this is not needed. However, you will need to convert the UDG set-up routine at lines 660-680, the data for the UDGs starts at line 860.

Right, Frank has started the ball rolling, but I'm sure that things can be improved.

Let's see what you can do with the idea. We will print the best versions in a future issue of *FORMAT* for everyone to admire. Come on, it will give you something to do these cold winter evenings.

Continued from page 20.

```

600 IF t=3 OR t=9 OR t=12 OR t=
      15 OR t=21 OR t=27 OR t=33
      OR t=36 OR t=39 OR t=45 OR
      t=48 OR t=51 OR t=57 OR t=6
      0 OR t=63 THEN LET c=2: LET
      d=3
610 IF t=5 OR t=11 OR t=17 OR t
      =20 OR t=23 OR t=29 OR t=35
      OR t=41 OR t=47 OR t=53 OR
      t=59 OR t=64 THEN LET c=3:
      LET d=1
620 IF t=6 OR t=18 OR t=24 OR t
      =30 OR t=42 OR t=54 THEN LE
      T c=3: LET d=2
630 IF t=10 OR t=22 OR t=34 OR
      t=40 OR t=46 OR t=58 THEN L
      ET c=2: LET d=1
640 PRINT AT 10,0;"Move No. ";t
650 FOR x=1 TO 6
660 IF a(x,c)<>0 THEN GOTO 680
670 NEXT x
680 FOR y=6 TO 1 STEP -1
690 IF a(y,d)=0 THEN GOTO 710
700 NEXT y
710 LET a(y,d)=a(x,c)
720 PRINT AT 12,0;"My move from
      row ";c;" to row ";d
725 FOR k=1 TO 200: NEXT k
728 BEEP 0.5,1
730 PRINT AT y,(d*7)+1;a(y,d)
740 PRINT AT x,(c*7)+1;"-"
750 LET a(x,c)=0
760 IF t=63 THEN GOTO 800
770 FOR x=1 TO 200: NEXT x
780 PRINT AT 12,0;"
      "
790 GOTO 570"
800 PRINT AT 12,0;"Task Complet
      ed
      "
810 STOP

```

Editor's Note:

Two super type-in programs in one issue - just what our readers have been asking for. But we need more like these to fill our pages. So come one, dust of your favourite and send it in.

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