

LYNX USER GROUP



MAGAZINE Vol. 1 Issue 4.

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It has come to my attention that some people have certain "moans" concerning the contents of our magazine, also that others are loaning their magazine to friends rather than encouraging them to join the USER GROUP. I must point out that because there are different "kinds" of owners, a balance of content is quite a difficult task. If you have any suggestions concerning what you would like to see included then PLEASE tell me. Some of the criticisms are: a) Too many reviews, b) Not enough games, c) Not enough CP/M material, d) Too heavy on M/C code articles, e) More on M/C for beginners, etc. I will try to answer these comments:-

- a) A lot of people want reviews, because this is the only way that any software can be assessed, as most of it is totally unavailable at any retail outlet. (Hopefully this will change)
- b) One point I must make is that a very high proportion of the group are capable of writing code, and are simply not interested in games. However I will try to include at least one game per issue from now on.
- c) Concerning CP/M, i.e. 128K owners, I have to point out that you are at present, in a minority. There are as many 128K owners as those who are "into" FORTH! Also I can only publish what I receive!
- d) This ties up with b)! As I said it is difficult trying to achieve a balance!
- e) This is one area which I personally would be most interested in. However in spite of being promised material from three sources, articles on LYNX M/C, nothing has appeared! So.....

Finally to those who loan their magazine to friends or even supply copies of the mag. to others, you are cheating yourself (you paid money for it)! The LYNX is NOT in the position of other micros, i.e. 10s or 100s of thousands owned, where a certain amount of copying doesn't greatly affect the overall "health". WE ARE IN A MINORITY! There is little support for the LYNX at present, certainly the trade and software houses are VERY reluctant to have any dealings with the LYNX. This also applies to copying software of any form. As an example, great effort was put into obtaining and writing JETSETWILLY from SOFTWARE PROJECTS. Bear in mind that software is only "put" on a computer if it is COMMERCIALLY VIABLE and not because the machine is great or you personally regard it as the best micro around. It is ALL to do with MONEY!

SUPPORT YOUR LYNX and the LYNX USER GROUP.

For these reasons, I am therefore amending the aims to read:-

- 5. LUG is now affiliated to the ACC.
- 6. Owners who want to get in touch with their nearest members, only upon written request.
- 7. Deleted.

To change the subject, several people have asked when is the next show. As there is so little new material for the LYNX at present (although various "things" are in the pipeline), there is little point in having a second show until new products or software become available. However I can say that "things" are coming, and the estimate is, subject to solving certain problems, that a second show is likely nearer to Christmas, probably in November or maybe the early part of December.

Due to certain "parties" and a mix-up at CAMPUTERS - liquidation, valuable data and documentation have been lost. What I can say however is that a honorary member (ex-CAMPUTERS) who wrote the hardware manual for the 96K LYNX, has agreed to re-write the manual again for his benefit (money) and for the benefit of other owners. So please be patient everything for the LYNX will appear in due course.

Following on from the above, one member is now working "flat out" to re-generate an ARABIC LYNX and is co-operating with both ANSTON TECHNOLOGY Ltd and the linguist who originally worked with CAMPUTERS.

As I was present at the PCW show at OLYMPIA in September, there was still a lot of interest in the LYNX, both from owners and the trade from here and overseas. ABERSOFT who produced CAMFORTH and the first PAC-MAN game for the LYNX, have stated that they are still interested in doing more software. We also require a volunteer, as INTERCEPTOR SOFTWARE want 6 games taken over from the COMMODORE 64. Amongst these is a good graphic game called ARABIAN NIGHTS, so.. if you are familiar with 6502 code and would like to earn some money, please get in touch immediately! LEVEL 9 have a "glut" of COMPASS which they would like to sell, please mention LUG and you should get a good discount. What was demonstrated at the show, was the prototype SIDEWAYS ROM board plus some of the new graphic commands for \$SUPER LYNX\$, at present only on disk. Also an extra feature of fast screen printing, also to go in \$SUPER LYNX\$. To give you some idea, the normal printing in 40 columns under LYNX BASIC is approximately 300 characters/second, what was demonstrated, was printing in 32 columns at 2000 characters/second and even this can be improved to over 4000 characters/second. All this is still on the 96K using a clock of 4MHz! When this is transferred to the 128K LYNX, it means that with a clock of 6MHz, screen printing will be at over 6000 characters/second! Although slightly bugged at present, we now have a new DRAW routine which is 3 times faster than the original. Stay with your LYNX and your patience WILL be rewarded. A new flight simulator was also shown, this is DELTA WING from CREATIVE-SPARKS SOFTWARE, this should be readily available for CHRISTMAS.

R B JONES

This is a fast high resolution dot matrix printer, which is only imported by MICRO-PERIPHERALS Ltd. What will be of interest to LYNX owners, is that it appears to be compatible with every model of the LYNX. No patches!

Although not quite in the league of a cheap printer, nevertheless it is a perfect copy of the EPSON FX80, providing all the controls and text characters of that infamous printer at much lower cost. All the EPSON codes are catered for even the range of characters from other countries. It has NLQ quality at 75 chars/sec and a fast operation of 165 chars/sec hence its name! A sample of the character set is reproduced opposite:-

The matrix is either on a 9x9 basis or on a 17x17 high resolution mode. It was quite pleasing to see an accurate dump of the screen graphics using the EXT VPRINT command on the 128K without having to fiddle about with setting patches. It worked from switch-on. There are two OIL switch sets provided, one which is accessible from the rear (although rather fiddly to get at) for most of the normal configuration requirements and a second one which is primarily intended to be set up for other countries' character sets. The printer is only CENTRONICS parallel standard but thanks to its operating speed, compares very well with a serial line printer. Both tractor and friction drive are provided for and also a LIGHT/DARK control.

Other aspects of its specification are:-

Line feeds in 1/6", 1/8", 7/32", n/72, and n/216 increments, reverse line feed is also catered for.

Character sets in High speed PICA, High density PICA, ELITE, Condensed and Proportional modes, as well as normal, italic, double width etc.

Head life quoted at 100,000,000 operations!

Paper width from 4" to 10".

International character sets are USA, FRANCE, GERMANY, UK, DENMARK, SWEDEN, ITALY, and SPAIN as well as ASCII.

A very comprehensive manual is supplied, which gives all details of obtaining the character sets under software control plus details of the CENTRONICS connector, timing diagrams and even a block diagram of the circuitry.

As I obtained this for another member, I was unable to put it completely through all its features, it would have taken too long, but it left me with envy (I can't afford it yet!) and I can only strongly recommend it if you are in the market for an excellent piece of engineering at a reasonable price. 10/10.

R B JONES

This is a cassette based accounts system. The instructions consist of a single A4 sheet of paper telling you how the program loads in two parts: i) SET UP ACCOUNTS FILES and ii) HOME ACCOUNTS SYSTEM. The program is designed to help you keep a month by month record of your finances.

After loading Set Up Accounts Files, which takes about three minutes, the screen displays the instructions. The tape recorder is set up for RECORD and then "any key is pressed". If you have a remote facility on your recorder, then the recorder starts automatically, otherwise you will have to do this yourself. The screen instructions tell you which month is being created. On completing each month a beep is sounded and the next month file is formed, each taking about one minute to SAVE. It is possible to list this program and on doing so many more instructions can be found. There should be some mention of this facility in the written instructions. All the REM statements can be deleted and this would greatly speed up the LOADING time.

Having set up the Accounts Files you then have to LOAD "HOME ACCOUNTS", which takes about four minutes. The first page of instructions asks you to enter the month, and at the bottom of the screen there is a command line, which also shows Help and Exit. The month file is then loaded, and the screen shows four headings; ENTRY, DETAILS, DEBITS, CREDITS and a BALANCE. All screen inputs are entered on the command line when prompted to do so. This enables them to be edited before they are included in the accounts. If you are in difficulty, a HELP screen can be produced by typing "H". Over a hundred entries may be made. To enable this number of entries to be viewed the screen may be scrolled up or down by using the arrow keys, or by typing "J" for top and "B" for bottom. Additions and Deletions may be made to any item. As each entry is made the Balance keeps a running total. Once all the data is entered, you Exit the program and are prompted as to whether you wish to SAVE the data or not. If you do, the tape recorder has to be set and the file is SAVED, and the program ends.

Generally I thought this program lacked style, the presentation was poor, there being no sleeve to the cassette and a lack of documentation. The program worked well, and appears to be bug free. If you have a very large budget each month or own a disk drive perhaps this program will be of use. However for the average home, I feel using a calculator would be a quicker way of working out your finances. Apart from these criticisms, the program was well written in BASIC and being able to copy the tape is a great help. There are many useful routines in the program for a programmer to use. The cost was £7.95 and overall I award the program 7/10. A.R.BRISTOW.

"GETTING THE MOST FROM YOUR LYNX"

Books devoted solely to the LYNX are so rare that the appearance of this one comes as a pleasant surprise. As LYNX buffs are only too well aware, it is unlikely that there will be many more books to add to the LYNX's library. Therefore owners are virtually certain to buy this present one, but is the book really worth having? If the title is an accurate indicator, it is! "GETTING THE MOST FROM YOUR LYNX" implies a wide and complete coverage of the machine's capabilities, but the slimminess of the volume (128p) raises immediate doubts.

A quick glance at the chapter headings reveals that much of the book is devoted to LYNX BASIC. Much that is covered in the COMPUTER'S USER MANUAL is repeated, but with many of the features of the language being treated in greater detail. Short programs illustrate their use, e.g. FOR.....NEXT loops, and commands such as STR\$ and TEXT, absent from the USER MANUAL, are described, as well as multi-dimensional arrays.

Chapter 6 entitled Graphics and Sound, is one of the most absorbing sections, and includes sections on high resolution and user defined graphics. Methods of filling rectangles and triangles with colour are described, and the drawing of a chess board and creation of chess pieces are used to illustrate some of the techniques available. The value of the PROTECT command is made very clear in the chess graphics program and the effect that this instruction has on the subsequent use of the various colours is also explained.

As for the use of sound, BEEP is explored quite thoroughly and a useful table of frequencies and wavelengths of musical notes is presented. On the other hand, the SOUND command is dealt with inadequately. Examples show how to store "sounds" in the memory and recall them, but the way in which the required parameters are arrived at, is not explained.

A special chapter is devoted to hints and tips on such things as scrolling, altering the auto-repeat rate (and even switching it off), novel ways of listing programs, writing to the alternative green bank, retrieving programs after NEWing them and recovering from crashes. Needless to say, connecting the machine to TV sets, monitors and cassette players is also described and hints are given on overcoming LOADING problems and faulty TV displays. Brief information on add-ons and how a computer works, is also included in separate chapters.

Most of the material in the book applies to the 48K LYNX, but the final chapter concentrates on the 96K and 128K versions. Short accounts of their extra capabilities are given, along with a description of their new commands.

Presumably discussion of the LYNX monitor and the monitor commands have been omitted for want of space. This is unfortunate in a volume whose title implies comprehensiveness, but just as serious, if not more so, is the lack of an index. In the LYNX USER MANUAL, the Contents list serves as a

reasonable alternative but this is not so in the book under review. Indeed the way in which the subject matter is arranged makes an index imperative if this new book is to be used as a work of reference.

In spite of the afore-mentioned shortcomings Steven Jedowski and Penguin Books are to be congratulated on producing a book for a machine which, sadly, many other authors and publishers have ignored. It is well worth having. A number of useful and interesting matters are included which have not appeared in the previous books and will point the reader in some of the right directions for ... getting the most from their LYNX.

A Rendall.

TREASURE ISLAND

The first part of this graphical adventure only takes a short time to load, this auto-runs and produces a picture of Captain Long John Hook with his treasure chest beside him. The computer starts to play "What shall we do with the drunken sailor?" as well, although slightly off key. The LYNX asks you if you require instructions; if you do, it gives an explanation of the game and the four verbs which you can use: "take", "drop", "use", and " " (do nothing)!. This although it seems very limited, is also quite flexible. The instructions also give you one or two very useful clues. After this you are taken back to the first screen again and asked to load the second program.

The second part is also quite quick to load, it auto-runs and you are at the first location in the adventure. The adventure is part graphic, part animated and these on the whole are quite reasonable, however they could not be called brilliant by any means! The puzzles are for the most part, quite good with one or two very good ones.

There are, as far as I know, about nineteen or twenty locations though I have only been able to get to sixteen of them. (How do you get past the green fog?). I bought the game from Phoenix Software and it cost £2.99 which, in my view is very good value indeed, hence for value=9/10 and overall=7/10.

R Harries-Harris.

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LINE WRAPPER

I bought a Parallel Printer interface for my LYNX but was not wholly satisfied with the software provided, so I disassembled the print routine to see how it worked. One of my gripes had been that upon listing a long line on my printer the print head reaches the right hand end, then hammers away, producing a neat black dot on the rubber roller, instead of wrapping the line over. To my surprise I find that this facility has been included in the software, but not properly implemented - all it needs is a few bytes of machine code to rectify this.

The following routine works very well:-

```
F5 05 3A 01 61 47 3A C2 61 80 20 05 3E 0
D 0D 26 9F 01 F1 C3 26 9F
```

This routine is fully relocatable so it can be used from a CODE line or entered through the monitor. If the latter method is used it can be tacked onto the bottom of the print routine, the whole thing dumped to cassette and then loaded as a package. The routine above simply compares two of the bytes used by the parallel print routine and issues a carriage return when they are the same. To initialise it 86202 has to point to the start of the routine, and 861C1 initialised to the required length. This can be done by POKEing the value in or modifying the parallel print loader which initialises this byte to 20 anyway. -See NULUG Issue 6 "Interfacing non-standard printers." for instructions on how to break into the software.

I don't know if the routine will work on a 96k LYNX but would be interested to know.
J.S. Colombo.

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LYNX Technical Information

The SERIAL PORT

There are two distinct serial systems on the LYNX computers. The 48K and 96K machines have simple systems that run at 2400 Baud and are fixed at one start bit, one stop bit, no parity and runs with eight bit data without handshaking. The 128K Laureat machine however runs a software configurable serial system that does support handshaking. Its maximum baud rate is 78.4 Kbaud, which should be fast enough for most applications.

The systems on the 48K and 96k machines are driven by a 6402 UART device which is socketed on the main board. Therefore it is possible to remove this device and insert a "piggy-back" board to allow full use of the UART's flexibility regarding data protocols.

The final point on this matter is to note that the clock for the UART passes through the links at the rear right hand quarter of the main board. The link should normally be on the pins nearest the front of the computer. The rearward pin pairs provide 4800 and 9600 baud data rates. Therefore if the only changes required of the serial system is that it should run at a lower baud rate, then it is possible to effect this by inserting a dividing network between these pins.

Z80 PORTS

The Z80 I/O ports on the LYNX computer have been organised in such a way as to allow certain locations to be used for home enthusiasts projects without fear of interfering with Computer's peripherals. To this end, port locations 840 to 84F have been reserved for the hobbyist.

The operation of the I/O ports warrant some explanation. When an OUT instruction is performed that does not correspond to certain internal ports, the RD and EWR (early write) lines at the expansion connector are not activated and the address bus is not multiplexed. Therefore it is not necessary for the port decoding logic to either demultiplex the address bus nor for it to observe the RD and EWR signals. Note that the low byte of the address bus consists of A0 to A6 and A13, not simply A0 to A7.

One point that should be noted as a result, it is not possible for external READ and WRITE ports to occupy the same physical addresses. It is suggested that for systems requiring both input and output ports, A0 may be used in place of the missing RD/WR signals.

In general it is anticipated that the A13 line will be ignored due to the requirement that the C register be set before an OUT instruction, if it is to carry useful information.

Note that during memory access cycles, both the RD and EWR signals are active but that the EWR signal is an Early Write signal and is not the WR signal direct from the CPU.
Simon Roberts.

The EXT COMMAND

The following article was to appear in LYNX USER (3), which of course was never produced. Although there was no supplied sample program, it is to be hoped that at least some people in the group will find the following information of interest. (Editor).

The following demo program shows how to add new EXT commands to LYNX BASIC.

EXT commands are tokenised by the EXT token (341) followed by a second byte which can have any value. EXT commands are divided into 4 groups according to the value of the second token byte:-

800 to 83F	Available to users.
840 to 87F	3rd internal ROM (84000 to 85FFF).
880 to 8BF	2nd XROM (8C000 to 8DFFF), disk utilities.
8C0 to 8FF	1st XROM (8E000 to 8FFFF), includes Disk commands.

The 3rd internal ROM contains routines for handling the EXT token, so except on the 48K LYNX, the user need not supply these.

The user must supply the following:-

- 1) A list of ASCII command words.
- 2) A list of addresses for syntax checking.
- 3) A list of addresses for execution.
- 4) A 3-word block containing addresses of lists.

Requirements for the ASCII list 1) are:-

- (a) The first byte gives the number of words.
- (b) The first character in each word has BIT 7 set.
- (c) The list is terminated by a byte 8B0.

The block 4) is pointed to by a word in RAM.

Each group of tokens has its own RAM pointer, i.e.:-

Group 800 to 83F	8B1E6
Group 840 to 87F	8B1E8
Group 880 to 8BF	8B1EA
Group 8C0 to 8FF	8B1EC

On power up, all 4 pointers are set to 0. Before a group of EXT commands can be used, the appropriate pointer must be filled in with the address of the 3-word block. Thus on the 96k and 128K LYNXes, the pointer at 8B1E8 is set up immediately after power up as part of the 3rd ROM initialisation. Similarly the pointer at 8B1EC is set up when the disk ROM is called (i.e. XROM (RETURN)).

The demo program shows how to set up three user EXT commands, namely:-

EXT ALPHA	Tokenised as 41 00
EXT BETA	Tokenised as 41 01
EXT GAMMA	Tokenised as 41 02

Addr.	Obj. code	Mnemonics	Comments
5000	21 07 50	LD HL,BLOCK	;Routine to
5003	22 E6 b1	LD (8B1E6),HL	;initialise
5006	C9	RET	
			;Addresses of lists
			BLOCK:
5007	00 50	DW ASCII	
5009	1050	DW SYNTAX	
500B	2350	DW EXECUT	
			;List of command words
ASCII:-			
H500D	03	DB 3	;Number of words
500E	C1 4C 50 48	DB 8B0 "A", "LPHA"	
5012	41		
5013	C2 45 54 41	DB 8B0 "B", "ETA"	
5017	C7 41 4D 40	DB 8B0 "G", "AMMA"	
501B	41		
501C	80	DB 8B0	;Terminator
			;List of syntax checking
SYNTAX:-			
501D	24 50	DW SYALPHA	
501F	29 50	DW SYBETA	
5021	29 50	DW SYGAMMA	
			;List of execution
EXEC:-			
5023	24 50	DW EXALPHA	
5025	29 50	DW EXBETA	
5027	24 50	DW EXGAMMA	

Syntax routines can be written by the user, or if the syntax is the same as for a system command, then the routine in the system ROM can be used.

SYALPHA:-
code.....

SYBETA:-
code.....

SYGAMMA:-
code.....

Routines to execute must be supplied by the user.

EXALPHA:-
code.....

EXBETA:-
code.....

EXGAMMA:-
code.....

From the above it is apparent that the LYNX had the potential to support probably the biggest BASIC the world has ever seen or is ever likely to be seen. If you work it out, it means that under the token techniques described above, the LYNX could support 65,536 BASIC commands and functions! This would of course mean a vast ROM capacity, even more than ~~THE~~ SUPER LYNX ~~THE~~ supports (128K increase). It might be interesting if someone would care to suggest (including the existing ones) even a 1000! PHEW!

R B JONES.

FINAL SCORE

```

100 DIM N$(10),(80),C$(80),B$(80),D$(80), 660 DEFPROC results(n)
E$(80),O$(80) 670 LET f=0
110 LET I=0 680 FOR I=2 TO n STEP 2
120 RANDOM 690 LET y=ASC(MID$(B$,I-1,1)),z=ASC(MI
130 PROC read(B0,1) D$(B$,I,1))
140 PROC six(B0,1) 700 IF C(y-b4)=1 THEN GOTO B30
150 PROC six(40,2) 710 LET H$=N$(y-b4),A$=N$(z-b4)
160 PROC read(64,21) 720 LET d=VAL(LEFT$(H$,1))-VAL(LEFT
170 PROC six(64,3) $(A$,1))
180 PROC six(32,4) 730 PROC score(-d,t)
190 PROC six(16,5) 740 LET h=s
200 PROC six(8,6) 750 PROC score(d,1-t)
210 PROC semi 760 LET a=s
220 PROC final 770 IF a>h THEN LET N$(y-b4)="Z"
230 PRINT "Do you want another run ? N/Y" 780 IF h>a THEN LET N$(z-b4)="Z"
* 790 IF a=h THEN LET f=f+1
240 LET K=GETN 800 ELSE LET C(y-b4)=1,C(z-b4)=1
250 IF K=89 OR K=121 THEN RUN 810 PRINT TAB 9;RIGHT$(H$,9);TAB 19;
260 END h;TAB 22;RIGHT$(A$,9);TAB 32;a
70 DEFPROC six(n,r) 820 IF I=42 THEN PROC pause
280 PROC draw(n) 830 NEXT I
290 PROC print(n,r) 840 LET t=0
300 PROC pause 850 IF f>0 THEN PROC replays
310 FOR x=1 TO n 860 ELSE PROC sort(n)
320 LET C(x)=0 870 ENDPROC
330 NEXT x 880 DEFPROC replays
340 PROC results(n) 890 PROC pause
350 PROC pause 900 PRINT "Replays follow"
360 ENDCPROC 910 LET I=1
370 DEFPROC draw(n) 920 PROC results(n)
380 LET C$="" 930 ENDPROC
390 FOR I=65 TO 64+n 940 DEFPROC score(b,v)
400 LET C$=C$+CHR$(I) 950 LET s=-6
410 NEXT I 960 FOR J=1 TO 11+b+(v=0)
420 LET B$="",D$="",E$="" 970 LET s=s+RAND
430 WHILE LEN(C$)>1 980 NEXT J
440 LET R=RAND(LEN(C$))-1 990 LET s=INT(s*1.4+(1.4*(v=0)/2))
450 IF R=1 THEN LET E$=B$+LEFT$(C$,1) 1000 IF s<0 THEN GOTO 950
,D$="" 1010 ENDPROC
460 ELSE LET B$=B$+MID$(C$,R,1),D$=LE 1020 DEFPROC sort(n)
FT$(C$,R-1) 1030 LET A=1
470 LET E$=RIGHT$(C$,LEN(C$)-R) 1040 FOR k=1 TO n
480 LET C$=C$+E$ 1050 IF N$(k)="Z" THEN GOTO 1070
490 WEND 1060 LET N$(A)=N$(k),A=A+1
500 LET B$=B$+C$ 1070 NEXT k
510 ENDPROC 1080 ENDPROC
520 DEFPROC print(n,r) 1090 DEFPROC semi
530 CLS 1100 PRINT "Draw for semi-finals"
540 PRINT "Draw for round "r;" follows" 1110 PRINT RIGHT$(N$(1),9);" versus ";RI
550 FOR I=2 TO n STEP 2 GHT$(N$(2),9)
560 LET y=ASC(MID$(B$,I-1,1)),z=ASC(MI 1120 PRINT RIGHT$(N$(3),9);" versus ";RI
D$(B$,I,1) GHT$(N$(4),9)
570 PRINT RIGHT$(N$(y-b4),9);" versus 1130 PROC pause
" TAB 20;RIGHT$(N$(z-b4),9) 1140 LET D=RAND(5),E=RAND(5)
580 IF I=42 THEN PROC pause 1150 IF D=E THEN GOTO 1140
590 NEXT I 1160 LET F=RAND(5),G=RAND(5)
600 ENDPROC 1170 IF F=G THEN GOTO 1160
610 DEFPROC pause 1180 PRINT @ 33,30;"SEMI-FINAL SCORES"
620 PRINT @ 27,230;"Press a key to cont 1190 PRINT @ 27,60;RIGHT$(N$(1),9); @
inue" 57,60;D; @ 66,60;RIGHT$(N$(2),9); @ 9
630 LET K=GETN 6,60;E
640 CLS 1200 PRINT @ 27,80;RIGHT$(N$(3),9); @
650 ENDPROC 57,80;F; @ 66,80;RIGHT$(N$(4),9); @ 9

```

THE CUBE by D. NESS

A RUDIC CUBE game which makes use of the LYNX's colour graphics but which can also be played on a monochromatic display.

The display of the cube consists of two isometric views, the left-hand view showing the front, top and left-hand faces and the right-hand view showing the rear, bottom and right-hand faces from the same viewing point. That is, the insides of the faces as though the cube was transparent.

In order to identify the move required, the cube is divided into 3 slices in the X, Y and Z directions as given below. +ve rotations are clockwise when viewed in the direction of the arrows shown.

FIG.1.

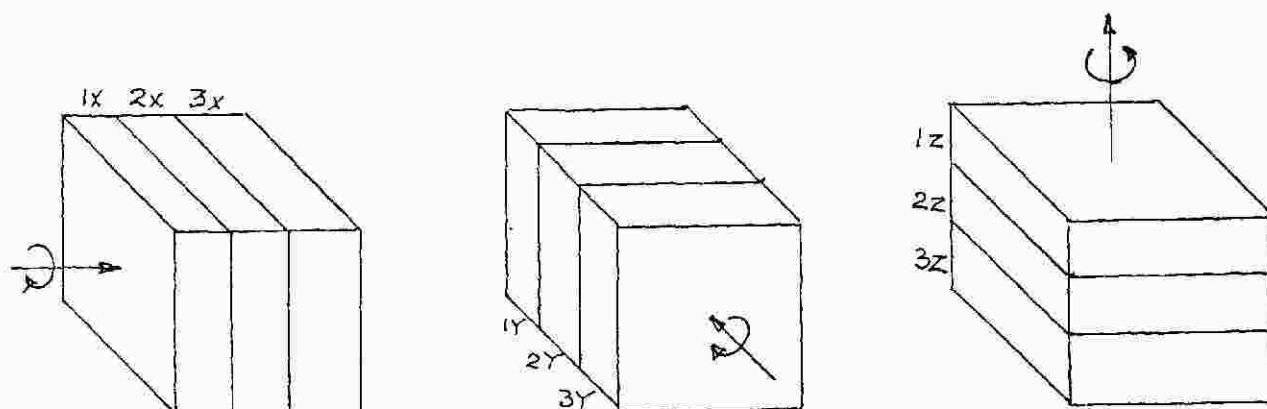
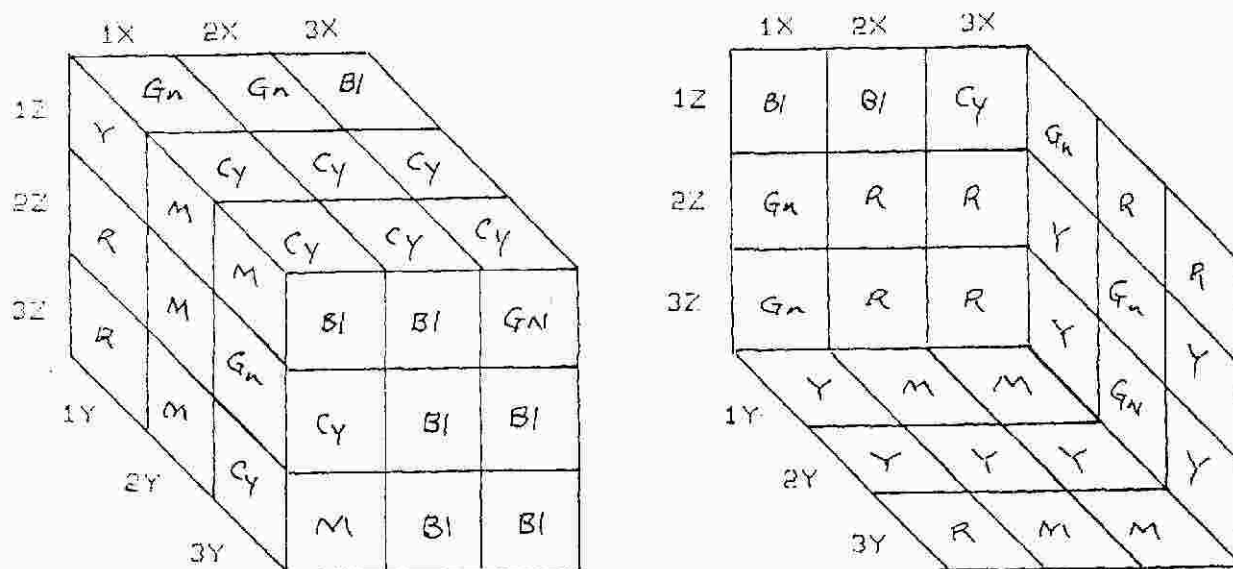


FIG.2. ACTUAL SCREEN DISPLAY



The level of difficulty chosen controls the number of random moves made by the computer from the initial correct position. There is a replay option available which shows the computer's and the player's moves. There are 18 possible moves that can be input at any time during the play. Each slice can be moved in a +ve or -ve direction. Moves are input by entering a three character string such as for example -3Z.

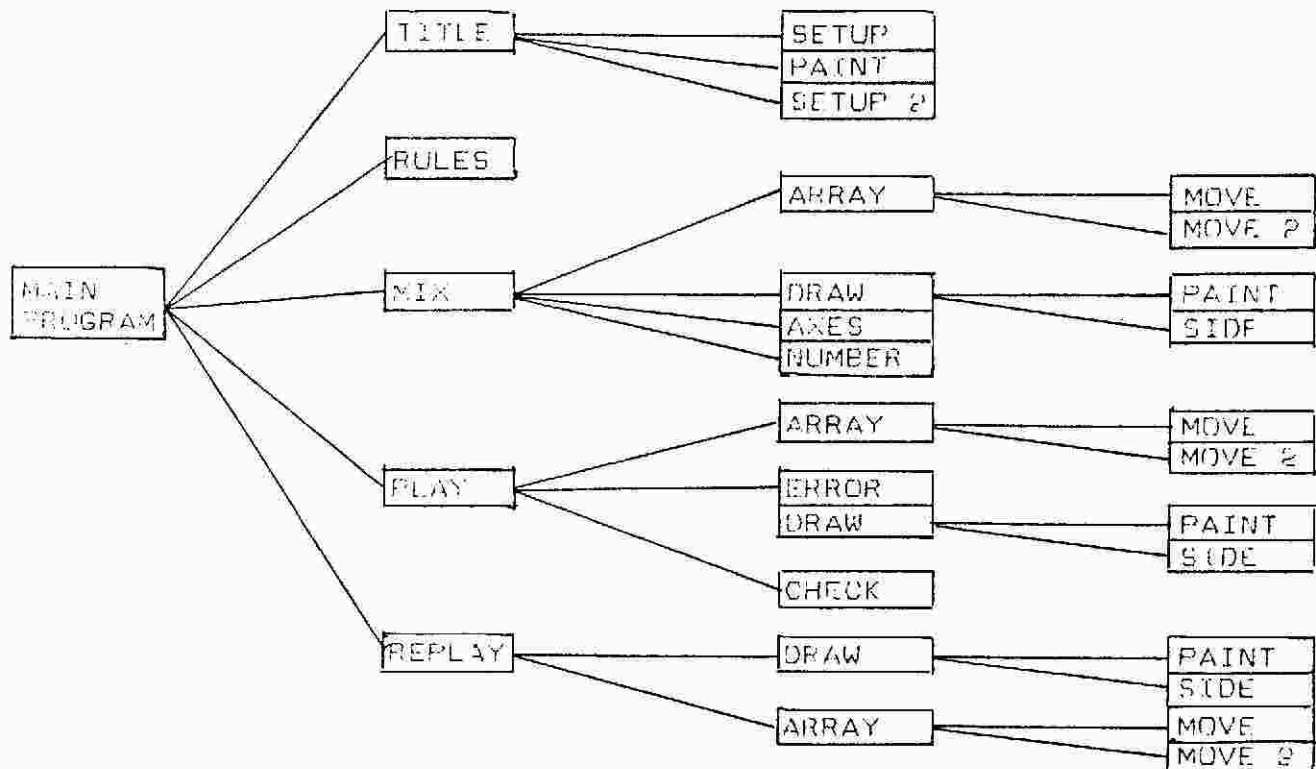
If the number of moves made by the player reaches 3 times those made by the computer the game is terminated. If a B/W display is being used, a number representing the colour square is added to the two views of the cube.

PROGRAM CUBE

Listing of routines:-

TITLE	- Draws the title on the screen
RULES	- Writes instructions on the screen
MIX	- Mixes the cube to give a random start
PLAY	- Main routine
REPLAY	- Replays previous game
SETUP	- Data to draw cube on the screen and to check input
SETUP 2	- Data to define moves, label slices and number face colours
DRAW	- Draws cube
PAINT	- Draws one square
SIDE	- Numbers faces with number representing the colour
ARRAY	- Rotates a slice
MOVE	- Rotates the twelve edge squares of a slice
MOVE 2	- Rotates the nine face squares of an outer slice
NUMBER	- Labels slices to define moves
ERROR	- Checks input for a move
CHECK	- Checks for correct solution
AXES	- Draws axes between the two views of the cube

Flow diagram for the program:-



PROGRAM CUBE - Listing

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100 PROTECT 0
110 RANDOM
120 WINDOW 0,126,0,248
130 VDU 1,4,2,0,4,24
140 PRINT @ 36,50;"STOP THE TAPE";CHR$(
25)
150 GOSUB LABEL TITLE
160 GOSUB LABEL RULES
170 LABEL RESTART
180 GOSUB LABEL MIX
190 LET y=1,z=0
200 REPEAT
210 GOSUB LABEL PLAY
220 IF s=0 THEN GOTO LABEL SKIP
230 IF y<3 THEN LET a=GETN
240 LET y=y+1
250 IF a<>78 THEN LET y=4
260 PRINT @ 0,160;" ";
270 VDU 30,31,30,31,30,31
280 UNTIL y=4
290 GOSUB LABEL REPLAY
300 LABEL SKIP
310 VDU 1,4,2,0,4
320 PRINT @ 2,20;"Another game?"
330 LET a=GETN
331 LET r=0
332 FOR t=1 TO 6
333 FOR p=1 TO 9
334 LET C(r)=t,r=r+1
335 NEXT p
336 NEXT t
340 IF a<>78 THEN GOTO LABEL RESTART
350 END

360 LABEL TITLE
370 GOSUB LABEL SETUP
380 CLS
390 FOR a=0 TO 4 STEP 2
400 LET b=938
410 FOR c=1 TO 9
420 PROC PAINT(A(a)+60,B(b),C(c),D(a
+1),E(a),F(a),G(a),H(a))
430 LET b=b+1
440 NEXT c
450 NEXT a
460 VDU 1,4,24
470 PRINT @ 40,60;"THE CUBE";
480 GOSUB LABEL SETUP2
490 RETURN
500 LABEL SETUP
510 DIM A(125),B(125),C(53),D(5),E(5),F(
5),G(5),H(5),I(107),J(15),K(162),S(47)
520 DIM A$(31)/179
530 LET e=0,K(162)=0
540 FOR b=0 TO 5
550 LET D(b)=21,E(b)=1,F(b)=15,G(b)=0,
H(b)=0
560 FOR c=1 TO 9
570 LET C(c)=b+1,e=e+1
580 NEXT c
590 NEXT b
600 LET F(2)=-10,G(2)=-10,F(3)=-10,G(3)=
610 FOR a=0 TO 53
620 READ A(a),B(a)
630 NEXT a

1000 NEXT a
1010 GOSUB LABEL SIDE
1020 RETURN
1030 LABEL SIDE
1040 IF K(162)=0 THEN RETURN
1050 FOR J=0 TO 53
1060 VDU 1,0,2,C(J)
1070 PRINT @ A(J+72),B(J+72);C(J),
1080 NEXT J
1090 VDU 1,7,2,0
1100 RETURN
1110 LABEL RULES
1120 VDU 1,4,4
1130 PRINT @ 4,10;"THE CUBE";CHR$(125);
1140 PRINT @ 0,40;"Two views of the cub
e will be displayed";CHR$(131);"The left
shows the front faces and the right the
rear faces"
1150 PRINT @ 0,80;"Moves are entered by
, for example, +1X"
1160 PRINT @ 0,100;" +VE moves are clock
wise when viewed in the direction of the
axes"
1170 PRINT @ 0,140;"For a B&W display e
ach face is numbered to indicate it's c
olour"
1180 PRINT @ 4,180;"Is your display B&W
?"
1190 LET a=GETN
1200 IF a<>78 THEN LET K(162)=1
1210 RETURN
1220 LABEL ARRAY
1230 LET Z=31P,Y=Z,X=P+36,W=X
1240 IF P>2 AND P<=5 THEN LET Z=31(P-3)
+36,Y=Z+54,X=P+15,W=X+54
1250 IF P>5 THEN LET Z=31(P-6)+18,Y=Z+1
08,X=P-b,W=X+108
1260 GOSUB LABEL MOVE
1270 IF P=1 OR P=4 OR P=7 THEN RETURN
1280 LET V=18,U=V
1290 IF P=2 THEN LET V=27,U=V
1300 IF P=3 THEN LET V=9,U=V+54
1310 IF P=5 THEN LET V=0,U=V+54
1320 IF P=6 THEN LET V=36,U=V+108
1330 IF P=8 THEN LET V=45,U=V+108
1340 GOSUB LABEL MOVE2
1350 RETURN
1360 LABEL MIX
1370 VDU 4,24
1380 PRINT @ 10,50;"Level of difficulty
- 1,2 or 3"
1390 LET N=GETN
1400 LET N=(N-49)/4+8
1410 IF N=8 OR N=12 OR N=16 THEN GOTO L
ABEL JUMP
1420 PRINT @ 10,220;"Wrong input !"
1430 PAUSE 5000
1440 GOTO LABEL MIX
1450 LABEL JUMP
1460 PRINT @ 10,50;"Please wait I am de
stroying the cube"
1470 FOR J=0 TO N-1
1480 LET J1J)=RAND(18)
1490 NEXT J

2110 FOR Q=1 TO x
2120 IF P<>18 THEN GOSUB LABEL AFFR
Y
2130 ELSE GOSUB LABEL ERROR
2140 FOR J=0 TO 53
2150 SWAP C(J),I(J)
2160 NEXT J
2170 NEXT Q
2180 IF P<>18 THEN GOSUB LABEL DRAW
2190 IF P<>18 THEN LET z=z+1
2200 GOSUB LABEL CHECK
2210 IF s=0 THEN LET z=y/1N
2220 WEND
2230 IF s=0 THEN RETURN
2240 PRINT @ 2,180;"You have had ";y;"x
the number of goes that I had."
2250 IF y<3 THEN PRINT @ 0,210;"Do you
give up?";CHR$(7)
2260 IF y=3 THEN PRINT @ 0,200;"I must
insist that you give up";CHR$(7);CHR$(7
)
2270 RETURN
2280 LABEL ERROR
2290 PRINT @ 20,240;"Invalid Input";
2300 FOR J=54 TO 107
2310 LET I(J)=0
2320 NEXT J
2330 FOR J=0 TO 53
2340 SWAP C(J),I(J)
2350 NEXT J
2360 PRINT @ 20,240;"
2370 RETURN
2380 LABEL CHECK
2390 LET s=0
2400 FOR a=1 TO 6
2410 LET q=(a-1)/49
2420 FOR b=1 TO 8
2430 IF C(q)<>C(q+b) THEN LET s=1
2440 NEXT b
2450 NEXT a
2460 IF s=1 THEN RETURN
2470 VDU 1,4,2,0,4,24
2480 PRINT @ 36,50;"WELL DONE";CHR$(125)
2490 FOR a=0 TO 33
2500 BEEP 31-3,80,63
2510 PAUSE 300
2520 NEXT a
2530 CLS
2540 RETURN
2550 LABEL REPLAY
2560 CLS
2570 PRINT @ 2,20;"Do you want a replay
of the game?"
2580 LET t=GETN
2590 IF t=78 THEN RETURN
2600 CLS
2610 LET r=0
2620 FOR t=1 TO 6
2630 FOR p=1 TO 9
2640 LET I(r+54)=0,C(r)=t,r=r+1
2650 NEXT p
2660 NEXT t
2670 GOSUB LABEL DRAW
2680 PRINT @ 2,120;"Here are my ";N;"

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640 DATA 50,51,50,74,50,97,67,51,57,74,6
7,97,84,51,84,74,94,97,155,15,155,38,155
,51,175,15,172,38,172,61,189,15,189,38,1
89,61,23,26,35,38,47,50,23,49,35,61,47,7
3,23,72,35,84,47,96
650 DATA 217,26,229,38,241,50,217,49,229
,61,241,73,217,72,229,84,241,96,15,15,32
,15,49,15,27,27,44,27,61,27,39,39,56,39,
73,39,156,84,173,84,190,84,189,96,195,96
,202,96,179,108,196,108,213,108
660 FOR J=0 TO 17
670 READ A$(J)
680 NEXT J
690 DATA +1X,+2X,+3X,+1Y,+2Y,+3Y,+1Z,+2Z
,+3Z,-1X,-2X,-3X,-1Y,-2Y,-3Y,-1Z,-2Z,-3Z
700 RETURN
710 LABEL SETUP2
720 FOR J=0 TO 161
730 READ K(J)
740 NEXT J
750 DATA 51,48,45,52,49,46,53,50,47,42,3
9,36,42,40,37,44,41,38,20,23,26,19,22,25
,18,21,24,29,32,35,28,31,34,27,30,33,0,3
,6,1,4,7,2,5,8,9,12,15,10,13,16,11,14,17
760 DATA 6,3,0,7,4,1,8,5,2,15,12,9,16,13
,10,17,14,11,38,41,44,37,43,43,36,39,42,
47,50,53,46,49,52,45,48,51,27,30,33,28,3
1,34,29,32,35,18,21,24,19,22,25,20,23,26
770 DATA 29,32,35,28,31,34,27,30,33,20,2
3,26,19,22,25,18,21,24,0,3,6,1,4,7,2,5,8
,9,12,15,10,13,16,11,14,17,42,39,26,43,4
0,37,44,41,38,51,48,45,52,49,46,53,50,47
780 FOR J=54 TO 125
790 READ A(J),B(J)
800 NEXT J
810 DATA 78,5,26,5,94,5,94,5,71,85,76,98
,82,111,70,22,70,45,70,68,6,5,17,5,24,5,
2,86,7,97,12,109,0,22,0,45,0,66
820 DATA 27,57,27,80,27,102,26,57,36,80,
26,102,45,57,45,80,45,102,80,21,80,44,80
,67,88,21,88,44,88,67,97,21,97,44,97,67,
8,28,14,39,20,51,8,50,14,52,20,74,8,74,1
4,14,86,20,97
830 DATA 105,27,111,40,117,53,105,50,111
,63,117,74,105,74,111,84,117,95,13,15,21
,15,30,15,18,27,26,27,35,27,24,39,33,39,
41,39,32,84,91,84,100,84,89,96,97,96,106
,96,96,106,106,106,111,106
840 RETURN
850 DEFPROC PAIN(A,B,C,D,E,F,G,H)
860 INK C
870 FOR d=1 TO D
880 MOVE A,B
890 PLOT D,F,G
900 LET B=84E,A=A+H
910 NEXT d
920 ENDPROC
930 LABEL DRAW
940 LET b=0
950 FOR a=0 TO 5
960 FOR c=1 TO 9
970 IF C(5)<>I(b=54) THEN PROC PAIN
7(A(b),B(5),C(5),D(a),E(a),F(a),G(a),H(a
))
980 LET b=b+1
990 NEXT c

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1500 FOR J=54 TO 107
1510 LET I(J)=0
1520 NEXT J
1530 FOR M=0 TO N-1
1540 IF J(M)<=8 THEN LET P=J(M),x=1
1550 ELSE LET P=J(M)-9,x=3
1560 FOR Q=1 TO x
1570 GOSUB LABEL ARRAY
1580 FOR T=0 TO 53
1590 LET C(T)=I(T),I(T)=0
1600 NEXT T
1610 NEXT Q
1620 NEXT M
1630 VDU 4,25
1640 GOSUB LABEL DRAW
1650 GOSUB LABEL AXES
1660 GOSUB LABEL NUMBER
1670 RETURN
1680 LABEL MOVE
1690 FOR J=0 TO 53
1700 LET I(J)=C(J)
1710 NEXT J
1720 FOR a=1 TO 3
1730 LET I(K(Y))=C(Z),Z=Z+1,Y=Y+1
1740 NEXT a
1750 LET Z=Z+b,Y=Y+b
1760 FOR a=1 TO 3
1770 LET I(K(Y))=C(Z),Z=Z+1,Y=Y+1
1780 NEXT a
1790 FOR a=1 TO 6
1800 LET I(K(W))=C(X),W=W+3,X=X+3
1810 NEXT a
1820 RETURN
1830 LABEL MOVE2
1840 FOR a=1 TO 9
1850 LET I(K(U))=C(V),U=U+1,V=V+1
1860 NEXT a
1870 RETURN
1880 LABEL NUMBER
1890 LET Q=0
1900 FOR J=54 TO 71
1910 PRINT @ A(J),B(J),RIGHT$(A$(Q),2
);
1920 LET Q=Q+1
1930 NEXT J
1940 RETURN
1950 LABEL PLAY
1960 PRINT @ 16,140;"FRONT FACES",,
REAR FACES"
1970 PRINT @ 40,160;"HERE IS YOUR CUBE"
1980 WHILE zcyIN
1990 FOR J=0 TO 53
2000 LET I(J+24)=C(J)
2010 NEXT J
2020 PRINT @ 20,180;"You have had ";z
;" moves so far"
2030 PRINT @ 20,200;"Enter your next
move"
2040 INPUT Z$
2050 LET P=18
2060 FOR J=0 TO 17
2070 IF Z$=A$(J) THEN LET P=J
2080 NEXT J
2090 LET S(z)=P,x=1
2100 IF P>8 AND P<18 THEN LET P=P-9,x
=3

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moves"
2690 LET u=0,v=8,x=0,r=N,q=0
2700 REPEAT
2710 LET r=r-x,p=1,x=0
2720 IF r<8 THEN LET v=r
2730 FOR e=u TO u+v-1
2740 FOR J=0 TO 53
2750 I(J+54)=C(J)
2760 NEXT J
2770 PRINT @ 16,110+1,135+g,A$(J)
e);
2780 LET P=J(e),q=1
2790 IF P>8 THEN LET P=P-9,q=3
2800 FOR Q=1 TO q
2810 GOSUB LABEL ARRAY
2820 FOR T=0 TO 53
2830 SWAP C(T),I(T)
2840 NEXT T
2850 NEXT Q
2860 GOSUB LABEL DRAW
2870 LET p=p+1,x=x+1
2880 PAUSE 5000
2890 NEXT e
2900 LET u=u+x,g=10
2910 UNTIL e=N
2920 PRINT @ 2,160;"Here are your ";z;"
moves"
2930 LET u=0,v=8,x=0,r=z
2940 REPEAT
2950 LET r=r-x,p=1,x=0
2960 IF r<8 THEN LET v=r
2970 FOR e=u TO u+v-1
2980 PRINT TAB (p-1)14+1,A$(5(e));
2990 LET p=p+1,x=x+1
3000 NEXT e
3010 VDU 31
3020 LET u=u+x
3030 UNTIL e=2
3040 PRINT @ 2,0;"Press any key to cont
inue";
3050 LET e=GETN
3060 RETURN
3070 LABEL AXES
3080 INK 4
3090 MOVE 130,120
3100 PLOT 3,-12,-12
3110 MOVE 130,120
3120 PLOT 3,15,0
3130 MOVE 130,120
3140 PLOT 3,0,-25
3150 DOT 118,109
3160 DOT 119,108
3170 DOT 118,110
3180 DOT 120,108
3190 PRINT @ 55,102;"Y";
3200 DOT 131,96
3210 DOT 132,97
3220 DOT 129,96
3230 DOT 128,97
3240 PRINT @ 64,84;"Z";
3250 DOT 143,118
3260 DOT 144,119
3270 DOT 143,122
3280 DOT 144,121
3290 PRINT @ 73,115;"X";
3300 RETURN

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DOMINOES

10 REM DOMINOES/6216

15 REM (C) 2011 in I. Clayman 1984

20 CODE 00 00 00 00 00 00 00 00 00 00 0

30 00 00 00 00 00 00 00 00 00 30 30 00

40 00 00 00 00 00 00 00 00 00 00 00

50 00 00 00 00 00 00 00 00 00 20 20 0

60 00 00 00 00 00 00

70 LET I=1,W=3,H=10,S=6,M=5+I,G=H+1,K=G+

80 G,N=27,Q=200,r=-1,H\$=CHR\$(23)+CHR\$(M)

90 DIM D(N),d(I),h(I),H(N+N),X(W),Y(W),D

(W),E(W),G(S),Y(S),S(I),T(I),Q(I)

100 LET T(I)=FALSE,T(FALSE)=FALSE

110 DPOKE GRAPHIC,LOCN(H+H)

120 RANDOM

130 REPEAT

140 PROC table

150 PROC shuffle

160 PROC start

170 REPEAT

180 LET p=NOTg,i=d

190 IF g AND r THEN PROC you

200 ELSE PROC me

210 UNTIL NOT(d(g) OR Q(FALSE)=d AND Q(I)=d

220 IF r THEN LET T(I)=T(I)+S(I),T(F

230 LSE)=T(FALSE)+S(FALSE)

240 PAPER RED

250 INK YELLOW

260 IF NOT(d(I)) THEN PRINT H\$*YOU WON!

270

280 ELSE IF NOT(d(FALSE)) THEN PRINT H

290 \$*I WON!;

300 ELSE PRINT H\$*STALEMATE!;

310 PRINT " Scores: "S(g); " v "S(NOTg)

320 " in Game "r

330 INK WHITE

340 PRINT " TOTALS- You: "T(I); " v Me

350 " "T(FALSE);

360 LET X\$=GET\$(X\$=UPC\$(X\$)

370 UNTIL X\$="G"

380 WINDOW W,120,S-I,245

390 DPOKE GRAPHIC,LETTER(32

400 PAPER BLACK

410 END

420 DEFPROC start

430 LET s=-1,q=RAND(3+I)

440 FOR x=FALSE TO 1

450 FOR j=FALSE TO h(x)

460 PROC value(H(N+N+j))

470 IF p=q AND p/s THEN LET s=p,i=j

480 ,3P

490 NEXT j

500 NEXT x

510 WHILE s=-1

520 LET g=NOTg

530 PROC take

540 IF d=q THEN LET s=p

550 WEND

560 PROC place (I,I)

570 LET E(FALSE)=p,E(I+I)=p,E(W)=p

580 ENDPROC

590 DEFPROC you

600 PAPER RED

610 REPEAT

620 LET i=v+y

630 WHILE i>I AND i=a AND i<v

640 IF NOTi THEN LET v=i

650 ELSE IF H(N+I-I)>I THEN LET v=i

660 ELSE LET i=i+y

670 WEND

680 ENDPROC

690 DEFPROC me

700 FOR i=FALSE TO S

710 LET G(i)=FALSE

720 NEXT i

730 LET a=FALSE

740 FOR j=FALSE TO h(g)

750 PROC value(H(N+g+j))

760 PROC legal

770 LET a=a+v

780 IF w THEN LET i=j,b=s

790 NEXT j

800 IF a THEN LET v=a,s=b

810 IF w THEN GOTO 1090

820 PROC take

830 PROC legal

840 IF NOTv THEN ENDPROC

850 IF w=1 THEN GOTO 1260

860 LET s=-1

870 FOR j=FALSE TO s

880 IF NOTG(j) THEN GOTO 1260

890 LET a=FALSE

900 FOR i=FALSE TO h(g)

910 PROC value(H(N+g+i))

920 LET a=a+(j=p OR j=q)

930 NEXT i

940 IF a>s THEN LET s=a,b=j

950 NEXT j

960 LET i=-1

970 REPEAT

980 LET i=H(I,G(b))=FALSE

990 PROC value(H(N+g+i))

1000 PROC legal

1010 UNTIL G(b)

1020 PROC place(i,s)

1030 ENDPROC

1040 DEFPROC value(n)

1050 IF n>I THEN LET p=INT(7.5-SQR(225

1060 -M(n-n)/2,q=n+p*p/2-6.5*p

1070 ELSE LET p=-1,q=-1

1080 ENDPROC

1090 DEFPROC domino(p,q)

1100 IF p>q THEN SWAP p,q

1110 LET n=b.5*p-p*p/2+q

1120 ENDPROC

1130 DEFPROC legal

1140 LET w=FALSE,s=w

1150 IF p=-1 THEN ENDPROC

1160 FOR e=FALSE TO z

1170 PROC fit(p,q)

1180 PROC fit(q,p)

1190 NEXT e

1200 ENDPROC

1210 DEFPROC fit(x,y)

1220 IF NOTw OR E(e)<E(s) THEN IF E(e)

1230 =x AND i>I OR V(x) AND (d<S-I OR d)=H-I

1240 OR i<I OR x=y AND d)=S-I THEN LET G

1250 (y)=1,s=e,w=w+I

1260 IF ABS(D(s))=H THEN LET v=p,q,a=X

1270 (s)+(S-I)*I(D(s))(I)*v,b=Y(s)-S*v,X(s)=X(s)

1280 +D(s)-(S-I)*SGN(D(s))*v

1290 IF ABS(D(s))=K THEN LET v=p(q,a=X

1300 (s)-(I+I)*NOTv,b=Y(s)+G(I(D(s))(I)*NOTv,Y

1310 (s)=Y(s)+D(s)-G*SGN(D(s))*NOTv

1320 IF E(s)=q AND D(s)=I OR E(s)=p AND

1330 D(s)<I THEN SWAP p,q

1340 IF E(s)=p THEN LET E(s)=q

1350 ELSE LET E(s)=p

1360 IF p=q THEN LET V(p)=I

1370 PROC piece(a,b,v)

1380 PROC blank(S+M+I*G,v+215*G)

1390 ENDPROC

1400 DEFPROC equal

1410 LET w=FALSE

1420 FOR e=FALSE TO z

1430 LET w=w+(E(e)=E(s))

1440 NEXT e

1450 IF w=1 THEN ENDPROC

1460 LET w=RAND(w)

1470 REPEAT

1480 LET e=e-I,w=w-(E(e)=E(s))

1490 UNTIL w=-1

1500 LET s=e

1510 ENDPROC

1520 DEFPROC take

1530 LET Q(g)=d,p=-1,q=p

1540 IF d=-I OR d=I AND z>I OR d(g)=H TH

1550 EN ENDPROC

1560 IF d<M+M THEN PROC blank(I,H+d*10)

1570 LET i=FALSE,a=I

1580 WHILE i<d(g) AND a

1590 LET a=H(g*(N+I))-I,i=i+a

1600 WEND

1610 IF i>h(g) THEN LET h(g)=i

1620 PROC value(D(d)*g-NOTg)

1630 PROC piece(S+M+I*G,w+215*G,FALSE)

1640 PROC value(D(d))

1650 LET H(g*(N+I))=n,d(g)=d(g)+I,d=d-I,S

1660 (g)=S(g)+p+q

1670 ENDPROC

1680 DEFPROC shuffle

1690 IF r=-1 THEN PROC intro

1700 ELSE PRINT H\$

1710 PRINT

1720 LET r=r+I,d=N,p=FALSE,X(I)=b2,X(F

1730 ALSE)=X(I)-H,E(I)=I

1740 FOR i=FALSE TO N

1750 LET D(i)=i

1760 NEXT i

1770 FOR i=I TO H*H

1780 SWAP D(RAND(N+I)),D(RAND(N+I))

1790 NEXT i

1800 FOR g=FALSE TO I

1810 LET S(g)=FALSE,d(g)=FALSE,h(g)=f

1820 LSE,Y(g)=G*H,X(W-g)=X(I),D(g)=H(g+g-I)

1830 D(W-g)=K*(g+g-I),Y(W-g)=Y(g)-S+D(W-g)

1840 FOR i=FALSE TO S

1850 PROC take

1860 LET V(i)=FALSE

1870 NEXT i

1880 NEXT g

1890 FOR i=FALSE TO d

```

510 PRINT H$CHR$(H), "Point at your dom
ind!
520 PROC point(h(I)+I,G)
530 LET j=v,w=j
540 IF j THEN PROC value(h(N+j)-I)
550 IF j THEN PROC legal
560 UNTIL NOT j OR w
570 IF NOT j THEN PROC take
580 IF NOT j THEN PROC legal
590 IF NOT j AND w THEN LET j=i+I
600 PAPER RED
610 WHILE j AND w<>I
620 PRINT H$CHR$(H), "Point at its joi
ning side!";
630 PROC point(I,H)
640 LET w=FALSE,s=w
650 FOR e=FALSE TO z
660 IF v THEN PROC fit(q,p)
670 ELSE PROC fit(p,q)
680 NEXT e
690 WEND
700 IF j THEN PROC place(j-I,s
710 ENDPROC
720 DEFPROC point(a,b
730 LET v=I,x=(S-I)I(b=G)+jIGI(b<>G)
740 REPEAT
750 PRINT @ x+vIb,Q;CHR$(125);
760 REPEAT
770 IF J$="J" THEN LET k=INP(8007A)
,y=(NOT(k BNAHD M+I) AND v(a)-(NOT(k BNA
ND W+I) AND v),k=k BNXOR &OFF
780 ELSE LET k=GETN,y=(k=G+I AND v<
a)-(k=K AND v),k=I+(k=ASCII" ")I&001F
790 UNTIL k
800 PRINT @ x+vIb,Q;" ";
810 IF b=G AND y THEN PROC move
820 ELSE LET v=v+y
830 UNTIL k BNAHD &0020
840 ENDPROC
850 DEFPROC move
1460 ENDPROC
1470 DEFPROC piece(x,y,v)
1480 REM Horiz. 19 x 10 or Vert. 9 x 21
pixels
1490 PAPER BLACK
1500 PROC half(x,y,p)
1510 PROC half(x+(S-I)I NOT v,y+GIv,q)
1520 INK YELLOW
1530 MOVE x+xI(H-I)I NOT v,y+HIv
1540 IF k>-I THEN PLOT W,Mxv+y,(H-I)I NO
Iv
1550 INK WHITE
1560 ENDPROC
1570 DEFPROC half(a,b,k)
1580 INK WHITE
1590 PRINT @ a,b;" "; @ a+I,b;
1600 IF k>-I THEN PRINT CHR$(128+k+(k=5
AND NOT v));
1610 ELSE PRINT " ";
1620 INK BLACK
1630 MOVE a+a+M+I,b
1640 PLOT W,FALSE,H-I)
1650 ENDPROC
1660 DEFPROC blank(x,y)
1670 PAPER GREEN
1680 PRINT @ x,y;" " @ x+M,y;" ";
1690 PAPER BLACK
1700 ENDPROC
1710 DEFPROC place(i,s)
1720 IF o THEN PROC equal
1730 PROC value(h(NIg+i))
1740 LET o=o+I,H(gIIN+i)=-I,d(g)=d(g)-I,S
(g)=S(g)-p-q,Q(g)=N
1750 IF ABS(I(s))=H AND (X(s)<15 OR X(s)
>H+H) THEN LET X(s)=X(s)-D(s)I(D(s)<I),
O(s)=SGN(D(s))I K,Y(s)=Y(s)+D(s)I(D(s)<I)
1760 ELSE IF ABS(O(s))=K AND (Y(s)<40 O
R Y(s)>120) THEN LET Y(s)=Y(s)+GHI O(s)<
I,O(s)=-SGN(O(s))I H,X(s)=X(s)-(S-I)I(O
(s)<I)
2310 PROC value(-I)
2320 PROC piece(I,N+I)I3,FALSE)
2330 NEXT i
2340 ENDPROC
2350 DEFPROC table
2360 PAPER GREEN
2370 CLS
2380 INK BLUE
2390 PRINT @ FALSE,217;"PASS";
2400 INK RED
2410 MOVE FALSE,15
2420 DRAW 245,15
2430 DRAW 245,215
2440 DRAW FALSE,215
2450 MOVE 23,-I
2460 DRAW 23,FALSE
2470 PAPER RED
2480 INK WHITE
2490 ENDPROC
2500 DEFPROC intro
2510 WINDOW W,123,Q,Q+H+H
2520 PRINT H$ "Joystick or Keyboard?"
2530 REPEAT
2540 LET J$=GET$,J$=UPC$(J$)
2550 UNTIL J$="J" OR J$="K"
2560 PRINT "Star Dominoes (Y/N)?"
2570 PROC ask
2580 LET z=I+(I+I)I(D$="Y")
2590 PRINT "Would you like a demonstrati
on (Y/N)?"
2600 PROC ask
2610 IF D$="N" THEN LET r=r+I
2620 ENDPROC
2630 DEFPROC ask
2640 REPEAT
2650 LET C$=GET$,D$=UPC$(D$)
2660 UNTIL D$="Y" OR D$="N"
2670 ENDPROC

```

ANALOGUE CLOCK

```

100 REM --I-- E.J.EDWARDS. --I--
--I-- JAN. 1995 --I--
110 PROTECT BLACK
120 VDU:1,7,2,0,4
130 PRINT @ 3,225;" ";
140 INPUT "ENTER TIME (HH.MM) ";H
150 PRINT @ 61,60;"12"; @ 77,68;"1";
@ 85,90;"2"; @ 91,128;"3"; @ 88,150;"4";
@ 77,17;"5"; @ 62,180;"6"; @ 46,17
0;"7"; @ 37,150;"8"; @ 34,120;"9";
160 PRINT @ 34,90;"10"; @ 45,68;"11";
170 PRINT @ 3,225;"Press any IKEYI to S
TART clock."
180 LET M=FRAC(H)I100,LET M=360-MI6,LET
E=M-180,LET H=360-HI30,LET R=H-180,LET N
=RAD(E),LET U=RAD(R)
190 INK RED
200 MOVE 128+30ISIN(U),124+30ICOS(U)
210 DRAW 128,124
220 PROTECT RED
230 INK BLUE
240 MOVE 128+35ISIN(N),124+35ICOS(N)
250 DRAW 128,124
260 PROTECT MAGENTA
270 REM --I-- DRAW CLOCK FACE --I--
280 INK GREEN
290 FOR C=0 TO 359 STEP 30
300 LET A=RAD(C)
310 MOVE 128+50ISIN(A),124+50ICOS(A)
320 DRAW 128+45ISIN(A),124+45ICOS(A)
330 NEXT C
340 LET Q=GETN
350 PROTECT BLACK
360 PRINT @ 3,225;" ";
370 PROTECT MAGENTA
380 REM --I-- MAIN PROGRAM LOOP --I--
390 FOR J=174 TO -180 STEP -6
400 LET A=RAD(J)
410 FOR I=4 TO 0 STEP -4
420 INK I
430 MOVE 128+40ISIN(A),124+40ICOS(A)
440 DRAW 128,124
450 PAUSE 1870IT+1
460 NEXT I
470 NEXT J
480 INK BLACK
490 PROTECT RED
500 MOVE 128+35ISIN(N),124+35ICOS(N)
510 DRAW 128,124
520 INK BLUE
530 LET E=E-b,N=RAD(E)
540 MOVE 128+35ISIN(N),124+35ICOS(N)
550 DRAW 128,124
560 PROTECT MAGENTA
570 INK BLACK
580 PROTECT CYAN
590 MOVE 128+30ISIN(U),124+30ICOS(U)
600 DRAW 128,124
610 INK RED
620 LET R=R-0.5,U=RAD(R)
630 MOVE 128+30ISIN(U),124+30ICOS(U)
640 DRAW 128,124
650 PROTECT MAGENTA
660 IF E<-180 THEN LET E=174
670 GOTO 390

```

CODE LINE GENERATOR

This program will generate CODE lines directly from the Monitor. (Ed. This article was originally submitted to NILUG magazine for publication).

The program assumes that there is a machine code routine starting at 89000. When CALLED, the program (residing at 89200, although it can easily be relocated), assembles a CODE line, (line number no. 10000, this also can be changed) containing the machine code routine located at 89000. It also assumes that the m/c routine finishes with a C9 (RETURN). The CODE line must not be longer than 240 bytes.

The program can be divided into several sections:-

1) SET UP LINE NUMBER AND CODE TOKEN.

The program reads in the End Of Basic pointer into DE, sets HL=Top of data table (located at the end of program), sets BC=07 (number of bytes) and uses the LDIR instruction to transfer the data. The line number takes 5 bytes (C4 10 00 00 00), the next byte is the line length, which is set to zero initially and filled in later and the CODE token (33) is the 7th byte. The machine code follows directly on from this.

2) STORE MACHINE CODE ROUTINE.

Firstly the DE register is saved (at this point DE=Address of line length byte + 2) and the B register is zeroed. HL is set to the beginning of the machine code routine to be copied and DE points to the first location for the data to be copied to. Then follows a routine to transfer each byte, check for a C9 and continue until a C9 is found.

3) STORE END OF LINE TOKEN & END OF BASIC TOKEN.

The DE register is incremented past the last byte of machine code (which is C9), and the end of line token 80D is inserted. The End Of Basic token 88C is stored in the next location. The value held in DE is then transferred to HL for use later.

4) STORE LINE LENGTH

DE is "POPPed" and is decremented twice to bring it back to the address of the line length byte. B is recalled and has 809 added to it to bring it up to the line length. It is then stored in the correct byte.

5) RESTORE END OF BASIC POINTER

H=High byte of end of BASIC.

L=Low byte of end of BASIC.

These two are stored into the locations 861FD and 861FC and then a return is executed.

The program as it stands has several limitations:-

- 1) Machine code programs to be copied must have a "C9" at their end, but no where else (i.e. this program will not work on itself).
- 2) Maximum length of 240 bytes.
- 3) The program can be re located provided that the third instruction has its argument changed. i.e.

LD HL,89235. The argument =Start address + 835. Thus the program is not suitable for use in a CODE line since these lines will move around as a BASIC program is edited.

- 4) Before calling the routine it is important that the last BASIC line has a value <10000 but the value of 10000 can be changed by altering the data table at the end of the routine.

Finally, the program was written in m/c for several reasons:-

- 1) Speed
- 2) It was a challenge compared to BASIC.
- 3) I was not sure whether standard variables were stored at the end of a BASIC program, in which case they would be overwritten by the CODE line.

NOTES	CODE	MNEMONICS	COMMENTS
Set up	2A FC 61	LD HL, (861FC)	;End Of Basic-Start
line	EB	EX DE,HL	;of created line
No. &	21 35 92	LD HL,89235	;Start of data table
CODE	01 07 00	LD BC,07	;No. of bytes
token	ED 80	LDIR	;Load in data
	05	PUSH DE	;Store address
	A0	XOR B	;Set counter
STORE	21 00 90	LD HL,89000	;Beginning of m/c
M/C	7E	LD A,(HL)	;loop begins
	12	LD (DE),A	;Store m/c
	FE 04	CP 8C9	;Check for return
	28 05	JRZ,805	;If RET then end
	13	INC DE	;Next byte
	23	INC HL	;Next byte
	04	INC B	;Increment counter
	1B F5	JR,&F5	;Back to loop start
St.End	13	INC DE	;Advance to end
of line	3E 00	LD A,80D	;of line byte
token	12	LD (DE),A	;Insert token
St.End	13	INC DE	;Advance to end of
of	3E 80	LD A,880	;program byte
Basic	12	LD (DE)	;Insert token
token	EB	EX DE,HL	;Save end of BASIC
St.line	D1	POP DE	;Line length byte+2
length	1B	DEC DE	;Get to line length
	1B	DEC DE	;byte address
	78	LD A,B	;Recall bytes-1
	06 09	ADD A,809	;Make up line length
	12	LD (DE)	;Store it
Restore	7C	LD A,H	;Address high nibble
End of	32 FD 61	LD 861FD,A	;Store it
Basic	70	LD A,L	;Address low nibble
pointer	32 FC 61	LD 861FC,A	;Store it
	C9	RET	
Data	C4		;First 5 bytes
Table	10		;line no. (10000)
	00		;6th byte=line lngth
	00		;fill in later
	00		;7th byte=Code token
	00		
	33		
		END	

P.Cottingridge.

TOWER OF HANOI

50 REM TOWER of HANOI by E J EDWARDS

60 PROTECT BLACK

70 VDU 1,7,2,2,4

80 PRINT @ 6,35;"INSTRUCTIONS (Y/N) ";

90 LET A=GETN

100 IF A=ASC("N") OR A=ASC("n") THEN GO TO 240

110 IF A=ASC("Y") OR A=ASC("y") THEN GO TO 130

120 GOTO 80

130 PRINT @ 6,25;"The object of this game is to move all"

140 PRINT "the Discs from one pile to another, mov-

150 PRINT "ing one at a time. The only restriction"

160 PRINT "is that a larger Disc cannot be placed"

170 PRINT "on a smaller. To make a move, type in"

180 PRINT "the pile from which the Disc is to be"

190 PRINT "removed and the pile on which it is to"

200 PRINT "be placed"

210 PRINT

220 PRINT "Hit [SPACEBAR] to Begin.";

230 LET A=GETN

240 DIM A(3:8)

250 REM [] INITIALIZE SCREEN AND ARRAY []

260 VDU 1,3,2,0,4

270 PRINT @ 23,25;"T O W E R O F H A N O I"

280 PRINT @ 23,30;CHR\$(21);"=====

=====";CHR\$(20)

290 FOR X=28 TO 208

300 DOT X,160

310 DOT X,161

320 NEXT X

330 FOR Y=159 TO 100 STEP -1

340 FOR X=58 TO 178 STEP 60

350 DOT X,Y

360 NEXT X

370 NEXT Y

E.J. EDWARDS

380 FOR Z=159 TO 100 STEP -9

390 IF Z=159 OR Z=141 OR Z=123 OR Z=105

5 THEN INK CYAN

400 ELSE INK MAGENTA

410 FOR Y=Z-2 TO Z-6 STEP -1

420 LET W=(Z-90)/3-2

430 FOR X=118-W TO 118+W

440 DOT X,Y

450 BEEP 1*X,2,63

460 NEXT X

470 NEXT Y

480 NEXT Z

490 FOR X=0 TO 2

500 PRINT @ 27*X:130,175;X+1;

510 NEXT X

520 FOR Y=2 TO 8

530 LET A(2:8-Y)=9-Y

540 NEXT Y

550 LET A(1:8-1)=1,A(2:8-1)=8,A(3:8-1)=1,N=0

560 PRINT @ 6,225;"ENTER NEXT MOVE : ";

570 REM : --[]-- ACCEPT MOVE --[]--

580 GOSUB 1000

590 LET F=A

600 GOSUB 1000

610 LET T=A

620 IF A(F:8-1)>1 AND A(F:8-A(F:8-1))<A(T:8-A(T:8-1)) THEN GOTO 710

630 IF A(T:8-1)=1 THEN GOTO 710

640 PRINT @ 6,225;" - INVALID, RE-ENTER "

650 BEEP 90,200,63

660 BEEP 200,100,63

670 BEEP 90,200,63

680 PAUSE 1000

690 PRINT @ 6,225;"

;"

700 GOTO 560

710 PRINT @ 6,225;"

;" @ 6,225;"

720 REM : --[]-- MOVE DISK --[]--

730 LET Z=168-(A(F:8-1)-1)*9,V=58+60*(F-1),W=3*A(F:8-A(F:8-1))

740 FOR Y=Z-2 TO Z-6 STEP -1

750 FOR X=V-W TO V+W

760 INK PAPER

770 DOT X,Y

780 BEEP 200-X,1,63

790 NEXT X

800 INK GREEN

810 DOT V,Y

820 NEXT Y

830 LET A(T:8-1)=A(T:8-1)+1,A(T:8-A(T:8-1))=A(F:8-A(F:8-1))

840 LET A(F:8-A(F:8-1))=1,A(F:8-1)=A(F:8-1)-1,N=N+1

850 LET Z=168-(A(T:8-1)-1)*9,V=58+60*(T-1),W=3*A(T:8-A(T:8-1))

860 IF Z=159 OR Z=141 OR Z=123 OR Z=105 THEN INK CYAN

870 ELSE INK MAGENTA

880 FOR Y=Z-2 TO Z-6 STEP -1

890 FOR X=V-W TO V+W

900 DOT X,Y

910 BEEP 1*X,2,63

920 NEXT X

930 NEXT Y

940 INK GREEN

950 PRINT @ 23,195;"MOVES SO FAR : ";N;"

960 IF A(1:8-1)<>8 AND A(3:8-1)<>8 THEN GOTO 560

970 REM : --[]-- END OF GAME --[]--

980 PRINT @ 6,225;" YOU TOOK ";N;" MOVES"

990 END

1000 REM [] ROUTINE ACCEPT MOVE []

1010 LET A\$=KEY\$

1020 IF A\$="" THEN GOTO 1000

1030 ELSE LET A=VAL(A\$)

1040 IF A<1 OR A>3 THEN GOTO 1010

1050 FOR J=50 TO 70 STEP 2

1060 BEEP J,8,63

1070 NEXT J

1080 PRINT A;" "

1090 RETURN

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However in case we have to register and to update our records, I have to ask further questions:-

- 1) Do you have any objection to the fact that your details are held on disk, please answer YES or NO:-
Please make any comments on the back of this form.
- 2) If you are no longer interested in the LYNX for any reason, do you want your details erased from the files, YES or NO:-
- 3) If you have changed computers, do you still want to receive the outstanding magazines:-
- 4) Please insert here which LYNX and/or peripherals you now possess:-

If you don't return this form, I will assume that your answers to 1), 2), and 3) will be "NO", "NO", and "YES" respectively. Please respond as soon as possible. EDITOR, R.B. JONES.