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MARCH/APRIL 1989

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Now things will really get moving and ordering by mail WILL be EVEN easier!

Information Enterprises will be able to give you first class, back up, products and prices. Along with this they will be able to give you assembly, packing, order picking, exports and despatch, efficiently and promptly. Information Enterprises's policy is to save you time, effort and money - and this they hope to give you with the move.

This month Information Enterprises is introducing a number of new products, and hopes that you will take advantage of the special introductory prices, as these will only be valid for the month of April. Amoungst the new products are monitors (new range), printers (latest arrivals in S.A.), disc drives and high performance PC's.

FRAGILE

Specci owners have not been forgotten - the latest titles are on order and a soon as they arrive in the country you will be notified. This is going to be done in this way, simply because a lot of disappointment has been caused by the non -arrival of titles which we have ordered. Titles which have been re-ordered include Operation Wolf, Double Dragon, Robocop, Football Manager II and expansion kit, History in the making, Inn Crowd, Giants, Supreme Challenge - to name a few.

I am really working on getting you the best prices possible for peripherals for you computer, as well as for software.

I will keep you posted with all developments!

The only reason why you will start seeing more things in the newsletter for IBM compatible machines, is because so many of the clubs members have upgraded to these and have asked I.E. to get these items for them. So, please bear with them!

Anne

FOR OUR YOUNG ENTHUSIASTS

THE LANGUAGE OF COMPUTING — Jacqueline Snell

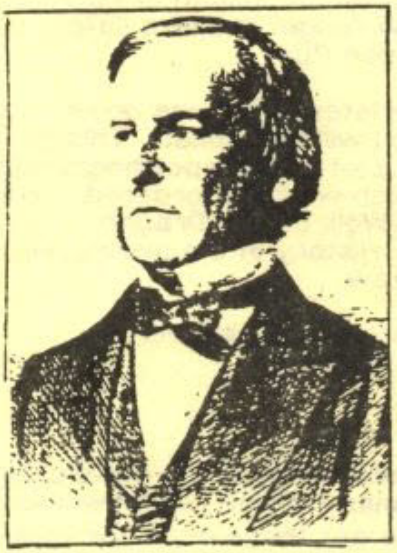
THE LAWS OF THOUGHT

A CENTURY BEFORE THE ELECTRONIC COMPUTER WAS INVENTED GEORGE BOOLE PUBLISHED HIS IDEAS ON MATHEMATICAL LOGIC

DID YOU KNOW

GEORGE BOOLE 1815-1864

George Boole was born before electronic computers were ever imagined yet he is one of the founders of the mathematical logic used by today's computers. He was the son of a cobbler and taught himself mathematics in his spare time. He was convinced that the everyday decisions that people make were based on reason, and that this reason could be refined into mathematical logic. He published his ideas in 1847 and almost overnight became famous and was invited to become the first professor of mathematics at the newly founded University of Cork.



SETS OF INFORMATION

Imagine one night you go to a Disco at your school. You want to dance so you look for a partner. Your friends in the hall are EITHER dancing OR NOT dancing - they cannot be doing BOTH. The partner you approach must be either a boy or a girl. Obviously, a person can be male or female but not both. Now Boole would have made a different approach. He would have seen a dance floor containing "sets" of people, the male set and the female set, or M and F. Boole would also have seen D and W, or the set of people dancing and the set of people waiting to dance. His partner would have to satisfy two conditions: be a female and also be waiting to dance. Boole noticed the importance of the "and" connecting the two conditions and gave it a symbol - an upside down U. He was then able to list the set of possible dance partners as $F \cap W$. However, if he did not want to dance but just chatter to a friend, he could choose anyone from M or F because these two sets include everyone in the room. Again he saw the importance of the innocent looking "OR" in the condition and gave it the symbol - U. So in his logical algebra $M \cup F$ contains all the males and all the females in the room.

The logical GATES found in computers are named after Boole's symbols such as AND and OR. There is a very picturesque interpretation of Boolean logic - invented by the English Mathematicians John Venn (1834-1923) and Charles Dodgson 1832-1892), better known as the author Lewis Carroll.

****
* SOMETHING FOR YOU TO DO *
****

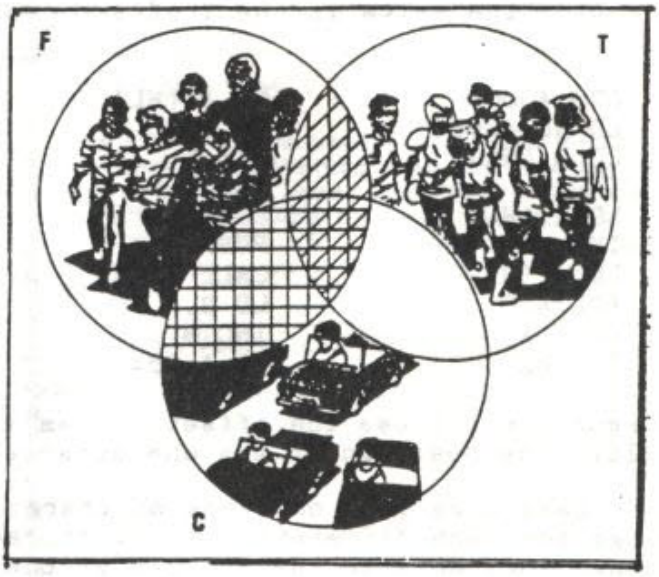
Let us take a practical problem. Imagine you have stored a list of your acquaintances in the memory of your computer. With each name is listed other information - such as the telephone number, hobbies etc. One afternoon you decide you want to play tennis at a court on the other side of town. You need a friend (as opposed to an acquaintance) who plays tennis and owns a car. Your computer is instructed to print out the name and telephone number of every person who satisfies all three conditions: plays tennis AND owns a car AND is a friend. The program listed below first asks for information about each acquaintance: are they friends, do they have a car, do they play tennis? It is assumed that you have 5 acquaintances but you can change the number of acquaintances to any you want (remembering to change the 5 in the bracket of the DIM statement in line 10). The list is then scanned using an IF..THEN command into which has been inserted a multiple condition. Finally, the name and telephone number of any acquaintance who satisfies the condition - that they are friend and play tennis and have a car is printed.

****
* PROGRAM LISTING *
****

```
10 DIM N$(5,20):DIM D$(5,12):DIM
   F$(5, 3):DIM T$(5,3):DIM C$(
   5,3)
15 REM NAME,PHONE NUMBER,FRIEND?
   ,TENNIS?,CAR?
17 PRINT "ENTER DETAILS IN THE
   FORM:"
18 PRINT "NAME,PHONE, YES/NO,YES
   /NO,YES/NO
20 FOR K=1 TO 5
30 INPUT N$(K),D$(K),F$(K),T$(K)
   C$(K)
40 NEXT K
45 REM SEARCH ROUTINE
50 FOR J=1 TO 5
60 IF F$(J)="YES" AND T$(J)="YES
   " AND C$(J)="YES" THEN GOSUB
   100
70 NEXT J
80 STOP
90 PRINT N$(J);D$(J)
95 RETURN
```

****

Venn Diagrams



SPEED PLOT by D.HULLEY

One of the most useful subroutines that are contained within the SPECTRUM ROM is the PLOT SUBROUTINE found at address 22E5(Hex), and it looks like this :

HEX ADDR	HEX CODE	ASSEMBLER MNEMONICS	NOTES CONCERNED WITH BASIC
22E5	ED437D5C	LD (23677),BC	
22E9	CDAA22	CALL 22AA (Hex)	gosub 8874 (Dec)
22EC	47	LD B,A	
22ED	04	INC B	
22EE	3EFE	LD A,FE (Hex)	LET A register = 254 (Dec)
22F0	0F	RRCA	Rotate A right with carry
22F1	10FD	DJNZ -3	LET B=B-1:IF ZERO THEN GOTO 22F0
22F3	47	LD B,A	
22F4	7E	LD A,(HL)	
22F5	FD4E57	LD C,(23698)	P FLAGS, CONCERNING BASIC
22F8	CB41	BIT 0,C	
22FA	2001	JR NZ,+1	22FD (Hex)
22FC	A0	AND B	
22FD	CB51	BIT 2,C	
22FF	2002	JR NZ,+2	2303 (Hex)
2301	A8	XOR B	
2302	2F	CPL	COMPLEMENT A
2303	77	LD (HL),A	
2304	C3DB0B	JP 0BDB (Hex)	GOTO SUB THAT ALTERS ATTRIBUTES

To use the SPEED PLOT, I will be using a modification of the above SUBROUTINE that shortens it by half, (from 36 bytes to 16 bytes long).
This subroutine makes use of a more complicated subroutine at 8874 (Dec) (22AA Hex). This subroutine converts the B and C Registers into a Screen Address in the HL Register. Thus, when one enters the first subroutine, we need B = ROW No between 0 and 175, and C = COLUMN No between 0 and 255. So if you called subroutine 22E5 (Hex) with B = 175 and C = 5, HL would be equal to 16384 (Dec).

The following program when called takes an X and Y value out of addresses 40098 and 40099 respectively. From 40100 onwards must be offset values of the initial X and Y values. The X values need not only be positive but can be negative too. The Y values MUST be positive! The subroutine acts in the same way as a PLOT OVER 1 statement and can therefore erase whatever it has just drawn if you recall it.
The subroutine exits if the Y offset (vertical co-ordinate) is 255. Here it is:

```
     ORG 40000
     LD HL,40098
     LD D,(HL)
     INC HL
     LD E,(HL)
loop INC HL
     LD A,(HL)
     ADD A,D
     LD C,A
     INC HL
     LD A,(HL)
     CP 255
     RET Z
     ADD A,E
     LD B,A
     PUSH HL
     CALL #22AA
     LD B,A
     INC B
     LD A,254
polo RRCA
     DJNZ polo
     LD B,A
     LD A,(HL)
     XOR B
     CPL
     LD (HL),A
     POP HL
     JP loop
```

The reason why I use the offset system is because all that have to be changed to alter the position of the character are the co-ordinates.

If you have more than one type of character to draw, you might need several codings for each different type of character. Then before you call the routine, load HL with the address of the co-ordinates of the character and call 40003.

The next routine at 40040 is a TEST ROUTINE. It checks to see that a character is exactly as it is in memory. This is useful because if two characters move onto each other, the pixels at the point of overlap are erased. So if a missile hits a wall, then the routine would pick it up because there would be a few pixels missing at the tip of the missile.

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HINTS AND TIPS

In a +2 if you still want to use extra memory via paging (not Ramdisc) but don't like the new editor for Basic, then type USR 0 in 128K Basic - you then go to 48K mode, but paging still works! This may be used with an assembler which won't work in 128K mode, but needs paging.

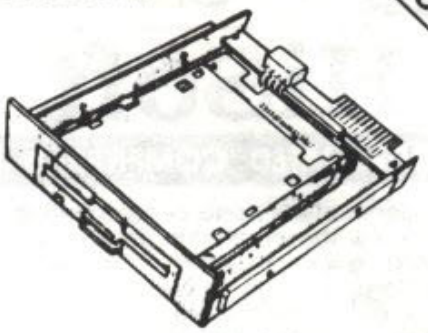
From: M. Vockerodt in Port Elizabeth

NEW

FLOPPY DISK DRIVES

NEW PRODUCT ANNOUNCEMENT

IBM PC/XT INTERNAL
3½" FLOPPY DISK UPGRADE KIT



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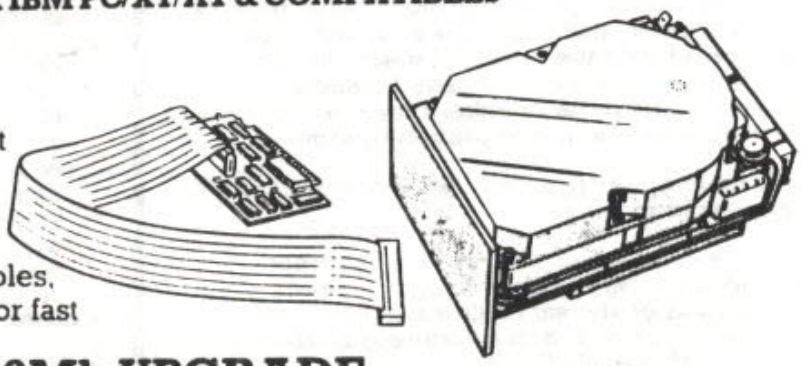

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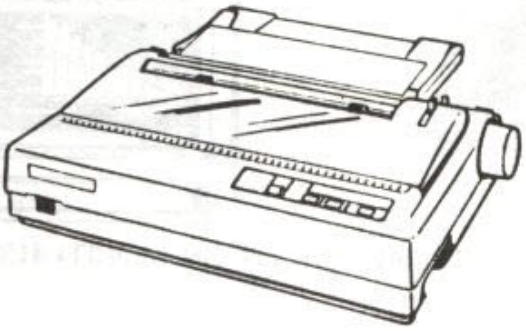

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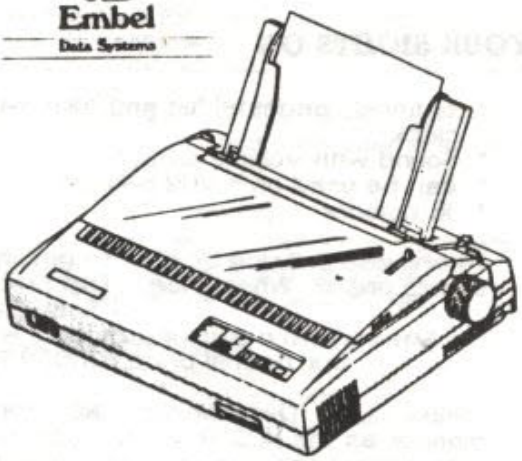

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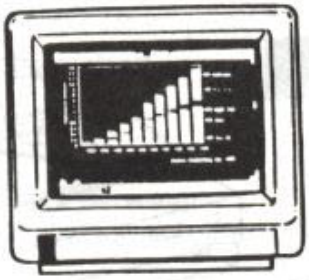

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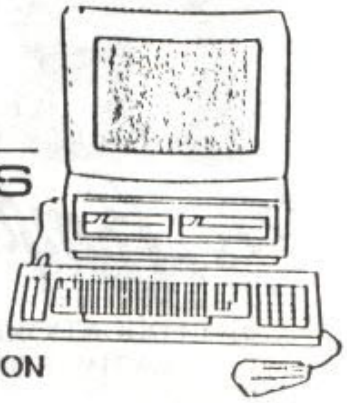

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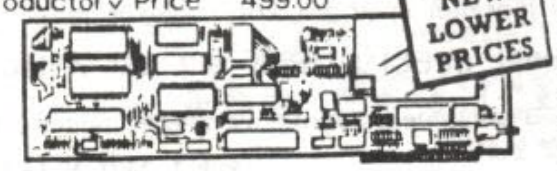

IBM SOFTWARE

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GOOD NEWS!!

The ZX Mushroom Club is starting a LIBRARY for serious users and those of you who want to learn more about the workings of your computer. The Club's executive committee has voted to start the library as books for the Spectrum are not readily available. Conditions for the use of the library will be given with the application to use the library.

Books in the library thus far include:-

1. Learn & use assembly language on the ZX spectrum
   BY:- Tony Woods
2. The Spectrum programmer
   BY:- S.M. Gee
3. The ZX Spectrum and how to get the most from it
   BY:- Ian Sinclair
4. Over the Spectrum
   BY:- Philip Williams
5. Understanding your Spectrum
   BY:- Dr Ian Logan
6. The complete Spectrum Rom Disassembly
   BY:- Dr Ian Logan & Dr Frank O'Hara
7. Basic made easy for your ZX Spectrum
   BY:- Garry Marshall
8. Software projects for the Spectrum
   BY:- Rudolf Smit
9. Delving deeper into your Spectrum
   BY:- Dilwyn Jones
10. Programming your ZX Spectrum
    BY:- Tim Hartnell & Dilwyn Jones
11. Guide to playing The Hobbit
    BY:- David Elkan
12. The ZX 81 companion
    BY:- Bob Maunder
13. Games for your Spectrum
    BY:- Peter Shaw
14. Instant Arcade Games for the Spectrum
    BY:- Jean Frost
15. Games to play on your Spectrum
    BY:- Martin Wren-Hilton
16. Creating adventure programs on the Spectrum
    BY:- Peter Shaw & James Mortleman
17. An introduction to VU-CALC SPREADSHEETING for the Timex/Sinclair 2000 and the Sinclair ZX Spectrum
    BY:- Harry Anbarlian
18. Clefs pour le ZX Spectrum et Timex 2000
    By:- Jean-Francois Sehan
19. la pratique du ZX Spectrum et du Timex 2000, programmation en language machine
    BY:- Marcel Henrot
20. The Sinclair QDOS companion
    BY:- Andrew Pennell
21. QL introduction to Superbasic
    BY:- Andrew Nelson
22. Profiting from the Sinclair QL - financial and other spreadsheet applications
    BY:- Barry Miles
23. Word processing with the Sincalir QL
    BY:- Mike O'Reilly
24. QL Easel
    BY:- Alison Spottiswoode
25. Pascal with style
    BY:- Henry Ledgard, Paul Nagin & John Hueras
26. Z80 assembly language programming
    BY:- Lance A. Leventhal
27. Computing in a small business
    By:- Howard Horner
28. Practical hardware projects for the BBC micro
    BY:- Joe Telford
29. The century computer programming course for the COMMODORE 64
    BY:- Peter Morse & Brian Hancock
30. The century computer programming course for the ZX SPECTRUM
    BY:- Peter Morse & Brian Hancock

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1. A copy of your I.D. is to be sent with your applicaion to the Library, in the case of persons under the age of 18, a copy of your parents I.D.
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5. The same applies to damaged books, e.g. coffee spilt on a book.
6. No writing & making of notes under any circumstances to be made in the books.
7. Books are loaned and not purchased.
8. I agree to pay the postage on the books to and from the Mushroom Club at standard rates, as advertised in the newsletter. The domicilium et citandi of the Mushroom Club is 417 Milner Street, Waterkloof, Pretoria, 0181, & I accept the jurisdiction of the Magistrates Court of Pretoria for the settlement of any disputes that may arise.
   This will only be neccessary in the case of the non-return of books, or non-payment of fines.
9. Borrowing fee for the loan of books is R4.00 per month. Over and above the borrowing fee, a refundable deposit of R20.00 is requested before any books are sent out.
10. For popular titles, books may be reserved if not in at the time of request. As soon as the book is returned to the library, it will be sent to you.

I accept the conditions for the use of the Library, and return this page to the ZX Mushroom Club as proof thereof.

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ARE ALL YOUR FRIENDS STILL MEMBERS OF THE CLUB? Just a reminder for the forgetful fundies out there! Membership fees are R10.00 per year. Paid up members will receive a newsletter every 2 months, and a circular every month.

The routine returns with the carry flag set if there is overlap, and if not then the carry flag is reset. It is very similar to the previous routine.

```
     ORG 40040          LD A,(HL)      polo RRCA
     LD HL,40098        CP 255              DJNZ polo
     LD D,(HL)          RET Z               LD B,A
     INC HL             AND A               LD A,(HL)
     LD E,(HL)          ADD A,E             AND B
loop INC HL             LD B,A              XOR B
     LD A,(HL)          PUSH HL             CPL
     ADD A,D            CALL #22AA          CP (HL)
     LD C,A             LD B,A              POP HL
     INC HL             INC B               JP Z,loop
                        LD A,254       ------|     |--------------
                                               |     | LD HL,65535
                                        SCF    | or  | LD (HL),1
                                       ------|     |--------------
                                        RET    |     | RET
```

The choice here is important because obviously if you call the routine from BASIC, you would not know if the CARRY FLAG is set or not. With the second option you could at least PEEK into 65535 and see whether it is equal to 1 or not. It therefore seems obvious that 65535 should be set to zero before calling the routine from BASIC.

IMPORTANT - ALWAYS PUT TWO TERMINATING BYTES at the end of the offset values. EACH of the two termination bytes MUST be equal to 255.

I would suggest that you draw a grid and fill it in before entering the co-ords.

Try this :

```
10   FOR Q=40100 TO 40218 STEP 2
20   READ A,S
30   POKE Q,A : POKE Q+1,S
40   NEXT Q
50   DATA 0,4,0,1,2,4,2,1,4,2,4,3,6,5,6,4,6,3
60   DATA 6,2,6,1,6,0,8,3,8,2,7,4,7,1,7,3,7,2
70   DATA 1,3,1,2,3,3,3,2,2,2,2,3,5,2,5,3,255,255
```

RUN and it will end with a message " E : OUT OF DATA "

RANDOMIZE USR 40000 will give a small example of the speed of the program. Try changing the position of the character by changing the amounts in 40098 and 40099.

COMING SOON : PROGRAMMES BASED ON AND USING THE ONES HERE.

N.B. GET AN ASSEMBLER TO KEEP UP ! ! !

FIRSTLY FORTH

L.Groenewald.

Pascal is a language that has recently been featured in the club newsletter. In this article I want to look at a language called FORTH. Most micro's have FORTH available for them as FORTH can run successfully on systems with as little as 16K of memory. Further FORTH is a public domain language with information on implementation freely available from the Forth interest Group.

Forth was developed around 1968 by Charles Moore to control radio telescopes at the National Observatory in the USA. But due to the nature of the language Forth is used in applications as diverse as monitoring heartbeat in real time to running large databases. What makes Forth different from all the other high level languages that are available? The answer is not simple, but lets look at some of Forth's features.

1. Forth is programmed by extending the language! In other words Forth consists of commands (called WORDS) which are used to create new commands (WORDS). It is thus possible to create your own language that is problem-orientated. A very good example of the above mentioned property of Forth is the WHITE LIGHTNING package. This package is basicly a Forth package which includes a group of "words" collectivly called "the IDEAL language" which is used to create arcade type games.

2. Forth uses a "stack" which is directly under user control. This necessitates the use of post fix notation (also called Reverse polish notation and used in Hewlett Packard calculators). The basic *PRINT 15+39* becomes *15 39 + .* in Forth. (. is the Forth print instruction. Similarly Basic's *PRINT (2+3)*(4+5)* becomes *2 3 4 5 + ROT + * .* (this particular example could be written in various ways). ROT is a stack manipulation word. The above example could be visualised as follows:

2	3	4	5	+	9	ROT	3	+	5	*	45	(top of stack)
	2	3	4		3		2		9			
		2	3		2		9					
			2									

Using the stack effectivly takes a while to get used to!

3. Futher Forth is both an interpretor as well as a compiler. The interpretor works similar to Speccy Basic, ie it responds to instructions as soon as enter is pressed. Type *2 3 + ." THE ANSWER IS " .* in FORTH and the computor would respond with *THE ANSWER IS 5* (." is the FORTH for PRINT THE FOLLOWING TEXT). But the above could also have been compiled by typing *: ADD 2 3 + ." THE ANSWER IS " . ;* the computor would now respond with *ok* but typing *ADD* and the computor would respond with *THE ANSWER IS 5 ok* we have now compiled a word with the name ADD. The interpretive mode is useful for testing and debugging while the compiler is used for programs.

Programming in FORTH: As already mentioned programming in Forth is achieved by expanding the language. For example lets say we require a program that controls a bottling machine. First we create the words we require for all the actions we require, these may be *FILL, CORK* and *LABLE. Lets say CORK* consists of *: CORK POS1 LUBE FIT POS2 ;* we see that cork contains 4 words which was defined at an earlier stage. The words *FILL,CORK* and *LABLE* may again be combined as one word maybe *: BOTTLE FILL CORK LABLE ;* now *"BOTTLE"* which would be our whole program!
It must be noted however that the lower lever lexicons would have to be created first in practice.

DISADVANTAGES:

1. One of the disadvantages of FORTH words that are compiled (by using the : and ; instructions) is that the source typed in on the terminal is lost, as only the compiled code remains. Therefore FORTH is supplied with an editor which enables one to enter the source into "screens" which may be saved to a mass storage device, these screens may then be compiled from this device.

2. As FORTH does not specify a standard editor the ease of use is dependent on the FORTH package used. FORTH does however specify the "screen" layout, each screen holding 1K of source programming.

3. The language further has the problem of having more than one standard "dictionary" (as the supplied WORDS are collectively known as) for instance there is a FORTH-79 as well as a FIG-FORTH standard. This is however not a serious problem as it is normally a simple matter to define the necessary words,

example: The FORTH-79 standard word: *DUMP* could be defined as *: DUMP OVER + SWAP DO I CR I @ 5 U.R 2 +LOOP ;* Also remember any FORTH word can be redefined if the user should wish to do that, EX *: PRINT . ;* now instead of using . to display information the user could type *PRINT*

ADVANTAGES:

1. Adaptability. FORTH can be used to create "own languages" ie with FORTH one can create a specific group of words that make "sense" for the application they are used in. For instance one could create *UP, DOWN, LEFT, RIGHT, TAKE and LET-GO* for a robotic arm, or even *ENTER, REMOVE, CHANGE, GET, FIND and ALL* for a data base type program. The end program would be very user friendly and simple to program as each section is clearly defined by its execution name. It must be noted that each of the above words is a command in its own right, and not an identifier for a subroutine as in other languages.

2. As FORTH is a compiled language the speed increase in execution is astounding. (FORTH compiled code executes up to 10% as fast as standard basic). But by using the interpretive mode FORTH is extremely easy to debug.

3. There is also the satisfaction of learning a new language. The limitation of FORTH is only the limitation of Your imagination.

If this article is an incentive to try FORTH, worthwhile further reading may be:
STARTING FORTH by Leo Brodie
THINKING FORTH " " "
DISCOVER FORTH by Thom Hogan
FORTH FUNDAMENTALS by McCABE

NUWE ONDERWYS METODES VIR VOLWASSE-OPLEIDING IN DIE 90TIGE-JARE

OLAF BACON, Pretoria.

Gedurende die dekade voordat die een en twintigste eeu begin sal u met multi-media rekenaarondersteunde volwassene-opleidings metodes meer verandering deurleef as wat ons voorouers gedurende die laaste twee milleniums met verskillende sienswyse ondervind het.

Die huidige akademiese systeem van volksonderrig waarin volwasse leiers van die samelewing hul wysbegeerte, ideë, gewoontes, kultuur en tegniese kennis in die bewussyn van die volgende geslag inspuit, is gebaseer op die akademiese sisteem wat ontwikkel is deur die filosoof PLATO in die vierde eeu voor Christus. Die akademiese onderrigmetode gebruik geskrewe informasie wat 'n opsomming is van die kennis van die vorige geslagte. Dit is uitgebrei deur lesings wat 'n dosent voor groepe studente hou.

Gedurende die tagtiger jare het die getal studente wat vir onderrig by die Tegnikons en Universiteite ingeskryf het so geweldig vermeerder, tesame met 'n ontploffing in kennis in alle vakrigtings en 'n styging in onderwyskostes, dat persoonlike onderrig op 'n persoon tot persoon basis belemmer is. Die student bemeester nie met volle begrip die inhoud en besonderhede van die vak nie. Daar is min geleentheid om die informasie 'n tweede of derde keer te herhaal. Dus bevind die meeste studente dat hulle net 'n algemene kennis van 'n sekere vak kry wat nie volledig deurdink is nie. Dus is 'n nuwe metode ontwikkel om die kennis van die verlede op 'n meer doeltreffende metode aan 'n leerling oor te dra.

Die nuwe onderwysmetode behels 'n multi-media rekenaarondersteunde opleidingsysteem waarmee die student die lesing op sy eie tempo op sy mikrorekenaar kan deurwerk. En hier verwag ek dat u op die Spectrum +3 dieselfde soort programme sal kan hardloop as op 'n PC. Die rekenaarprogramme en onderrig inform sie sal of op videoband of op rekenaardiskette gestoor word. Verdere inligting sal vanaf opleidingsentrums oor die telefoonsysteem deur 'n modem (wat aan die rekenaar gekoppel is) beskikbaar wees. Vanaf die rekenaarsleutelbord sal videospeler, oudio, handboek en volkleur monitorskerm beheer word. Nou sal u as student die kursus materiaal op u eie tyd kan leer. U sal nou kans kry om enige seksie terrug te kan speel, en weer daardeur te kan werk. Wanneer u met die inhoud tevrede is, kan u toetse doen in voorbereiding vir eksamens.

Meer informasie sal met die BEXA skou in September 1988 hieroor beskikbaar wees.

Die van u wat PC opleiding programme het, probeer om hulle in Spectrum taal oortewerk, asook om die idees en formaat te verbeter. Die "MUSHROOM CLUB" sal dan die programme kan laat versprei onder lidmate, op redelike koste. Dus sal ONS ZX - SPECTRUM gebruikers die groot PC manne wys dat ONS tuis rekenaar beter gehalte sal lewer as hul groot en duur rekenaars.

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