

EDITORIAL

I have pages of notes to be turned into an Editorial. It is difficult to know where to start. So, please forgive if it all sounds a bit disjointed this time.

A number of you have suggested that the programs in the collection could be furnished with instructions. Also there are problems with some programs that can only be used with certain hardware configurations. TIHOME programs are the cheapest on the market and are supplied on an 'as is' basis. It would be nice to turn all programs into polished packages complete with instructions, etc., but I'm afraid time and cost do not allow it. For those of you who don't know, the offer of 4 programs of your choice, free, still stands if you inform me of a valid error in any TIHOME program. So, come on, you have purchased one of the most sophisticated machines our civilisation has to offer. I suggest you get stuck in and learn to use it. If you use it for games only, and games that you expect someone else to supply, then you will soon get fed up with it and pass on to the next toy. If you really learn how to use the instrument you have bought, you will find it very rewarding and very useful. It has always amazed me that someone can find no other use for a TMS9900 but Space Invaders.

A word about TIHOME. TIHOME is now about 2½ years old. It started with a group of enthusiasts and developed from there. It is run by myself in the evenings and the weekends, with help from my wife when she is not seeing to her five sons, two daughters-in-law and four grandchildren. We do the best we can, we are learning fast the details of how to run a business. We make quite a lot of mistakes. Among the things we have learned is the fact that you cannot run a user group for a home computer on a home computer. Most of my time is spent recording tapes, printing listings, and doing accounts. Incidentally, it would help a lot if you sent in small tapes when you want a program. I have had orders for 12 programs, and the member has sent me 6 C90 tapes and requested one program on each side. Why, I'll never know. Can you imagine how long it takes to rewind 12 C90 tapes. Especially as the longest program you can put on tape is about 3½ minutes.

Another of my problems is listings. Please order programs on tape rather than paper, if you possibly can. Someone once ordered £42 of listings in the days when listings were 50p each. It took me 4 weeks to fulfil the order, fitting it in as best I could. I only have the TI Thermal Printer and its speed is pathetic. It's fine for a user but useless for a business. So, no listings unless you really have to.

On the subject of phone calls, I suggest you remember the WW2 motto, 'Is your call really necessary?' I love to talk to you, but not at 11 p.m. when I am in bed, and not at 7 a.m. on Sunday when I am also in bed. Please try to restrict your calls to the hours of 7 – 10 p.m. on a weekday, 10 a.m. to 5 p.m. on Saturdays and Sundays.

On the label of the envelope in which your copy of Tidings arrives there is a membership number. It would be useful if you could quote this in correspondence. It would give us a fighting chance when we get cheques with no signature and letters with no name and address.....

One last point and then I promise I'll stop moaning. There are 3 entities. There is Texas Instruments, there is TIHOME and there is the 99'er magazine. They are all totally separate and no connection with each other. While we all do our

best, we are none of us responsible for the actions of the others. For instance, TI have published, in their software booklet, the names of all the programs held by all the User Groups in the world and labelled them 'User Groups'. This does not mean that software is available from every User Group. The only software available from TIHOME is that detailed in the Software Catalogue.

Right, moan over, and now for the good and bad news. Arrangements have been made to give TIHOME members the ability to subscribe to the 99'er magazine on a yearly basis. A year's subscription will cost you £31. There is a form for you to fill in, in this issue of Tidings. If you decide to have the magazine, please return the form as soon as possible so that I can give the shipper his instructions. I think you will find the magazine really useful. Incidentally, it now comes out monthly.

A number of members seem to be under the impression that their membership runs from January to January. I have received a number of cheques which were well ahead of their time. Membership runs from the date of your cheque to a year hence. Please do not worry about rejoining. I will write to you and tell you when.

I have recently been contacted by a new magazine, called 'Personal Computer News'. They are ready to publish any programs or articles about any micro computers. Here's a chance! They do not want to end up with stuff for the BBC, the Sinclair and the rest of the popular micros. They want to scan a broad horizon. So, get with it, send them your articles and programs. Remember, magazines are user-driven, they publish what they get.

Do read TI NEWS in this issue. I think you will find a lot of useful information there. We all know there are new computers coming out this year. So here's your chance to see what TI says about them.

Something for those of you that worry about such things. TIHOME does not claim copyright for anything published in Tidings, with the exception of three things. TIHOME claims copyright in the Editorial, the Close Routine and, by third party for Texas Instruments, for TI NEWS. So you can send me anything you want. I will claim copyright in nothing you send. What I publish is purely for the information of TIHOME members.

God bless you

Good computing

Paul Dicks.

```

90 REM **BRACD STEAM SPRITE**
95 REM **BY CHRIS EVERNDEN***

100 CALL CLEAR
105 REM VCHAR
110 D$="000000000000000000"
120 G$="FFFFFFFFFFFFFFFF"
130 FOR A=2 TO 16 STEP 2
140 F1=CEG$(G$,1,A)
150 CALL CHAR(126+A,F1)
160 E1=CEG$(D$,1,A)&SEG$(G$,A+1,
16-A)
170 CALL CHAR(127+A,E1)
180 NEXT A
185 REM HCHAR
190 DATA FF,00,7F,80,3F,C0,1F,E0
,0F,F0,07,F8,03,FC,01,FE
200 FOR N=1 TO 16
210 READ A1
220 FOR X=1 TO 3
230 A$=A1&A$
240 NEXT X
250 CALL CHAR(143+N,A1)
260 NEXT N
265 REM RIGHT
270 FOR C=10 TO 21
275 CALL SOUND(100,-6,2)
280 FOR A=2 TO 16 STEP 2
290 CALL HCHAR(6,C,142+A)
300 CALL HCHAR(6,C+1,143+A)
310 NEXT A
320 CALL HCHAR(6,C,32)
330 NEXT C
335 REM DOWN
340 FOR R=7 TO 16
345 CALL SOUND(100,-5,2)
350 FOR A=2 TO 16 STEP 2
360 CALL VCHAR(R,22,126+A)
370 CALL VCHAR(R-1,22,127+A)
380 NEXT A
390 NEXT R
395 REM LEFT
400 FOR C=21 TO 10 STEP -1
405 CALL SOUND(100,-6,2)
410 FOR A=16 TO 0 STEP -2
420 CALL HCHAR(16,C,142+A)
430 CALL HCHAR(16,C+1,143+A)
440 NEXT A
450 NEXT C
455 REM UP
460 FOR R=15 TO 6 STEP -1
465 CALL SOUND(100,-7,2)
470 FOR A=16 TO 2 STEP -2
480 CALL VCHAR(R+1,10,126+A)
490 CALL VCHAR(R,10,127+A)
500 CALL VCHAR(R+2,10,32)
510 NEXT A
520 NEXT R
530 CALL VCHAR(7,10,32)
540 GOTO 270
550 END

```

HELPFUL HINTS by Alan Harrin

One of the shortcomings of TI Basic is the lack of a PRINT AT facility. This is of course available in Extended Basic, but what can those of us, who have not yet got this little gem of a plug-in, do. Let's say we have a display on the screen and we want to print the phrase "LETTERS USED", such as we might want to in the game of Hangman. We want to print it starting in row 5, column 6. With Extended Basic we would use:—

```
100 PRINT AT (5,6):"LETTERS USED"
```

One way to do it with TI Basic is to use the PRINT command as in the following example.

```
100 PRINT :::::::::::::::::::: TAB(5);"LETTERS USED"
```

We have got our words in the right place but what has happened to our display. It has disappeared off the top of the screen never to be seen again. We must therefore look for an alternative way to output our string. The only course open to us is to use CALL HCHAR. Try typing in the following program:—

```
100 CALL CLEAR
110 FOR I=1 TO 12
120 READ L
130 CALL HCHAR (5,6+I,L)
140 NEXT I
150 DATA 76,69,84,84,69,82,83,32,85,83,69,68
160 GO TO 160
```

Now if we RUN it — Hey Presto! LETTERS USED appears just where we want it. What the program does is to go round a loop 12 times reading the value L in line 120 and printing the ASCII character corresponding to that value starting at position 5,6. Each time we loop we increment the horizontal position by the loop counter so that the letters appear in a row. If we didn't do this all the letters would appear one at a time in the same place until we were finally left with a "D" on the screen. The data statement contains the ASCII values for the letters we want to print. Note that 32 is the space character.

Well this method is OK but it does take time to look up the ASCII values and type in the data. Is there a quicker way you might ask. Well I think there is. Try typing this in:—

```
100 CALL CLEAR
110 FOR I=1 TO 12
120 READ A$
130 CALL HCHAR(5,6+I,ASC(A$))
140 NEXT I
150 DATA L,E,T,T,E,R,S," ",U,S,E,D
160 GO TO 160
```

The program is similar to the previous version but this time the data is entered as the letters we want to output. This makes data entry more convenient but we have to alter the program to suit the new format. This time we read in the data as a string. ASC(A\$) in line 130 changes the string into a value and the CALL HCHAR outputs the value as an ASCII character. A bit round and round in circles, but well worth the effort saved in typing in the data. A word of warning here — the space we require in our output must be enclosed in quotes. If you just leave a space between the commas, in the data statement the computer will squeeze it up and when it tries to read it, it will crash with a BAD ARGUMENT error message.

Right if you're still with me let's take this one step further. Try:—

```
100 CALL CLEAR
110 READ A$
120 FOR I=1 TO LEN(A$)
130 CALL HCHAR(5,6+I,ASC(SEG$(A$,I,1)))
140 NEXT I
```

```
150 DATA LETTERS USED
160 GO TO 160
```

Now the data looks just like a string that you would output with a PRINT statement. However this time we use the SEG\$ a letter at a time. This routine also has the advantage that we do not need to know how many times we need to go round the loop to read all the data. This is automatically done for us in line 120 by use of the LEN command.

Well there you have three ways of doing the same thing. It's up to you to choose which one you want to use.

Now, how about going one stage further. Suppose what you want to output is continually changing. Maybe its the score of your game or the height of your plane in the aircraft simulator program that you're writing. Whatever it is here is one approach.

```
100 CALL CLEAR
110 READ A$,B$
120 FOR I=1 TO LEN (A$)
130 CALL HCHAR(5,6+I,ASC(SEG$(A$,I,1)))
140 NEXT I
150 DATA SCORE,0000
```

This prints the word SCORE near the top left of the screen. 0000 is the starting value of the score. Now we want to simulate a score. We can do this by generating a random number which we shall call R.

```
160 R=INT(RND*10)
```

Now we must add this to the previous score and then convert it to a string so that our output routine can handle it.

```
170 B$=STR(VAL(B$)+R)
```

All that remains now is to print it.

```
180 FOR I=1 TO LEN(B$)
190 CALL HCHAR(5,12+I,ASC(SEG$(B$,I,1)))
200 NEXT I
210 GOTO 160
```

Just a word or two of warning. Make sure that what you want to output will fit into the space allowed. If it is too long the column counter will exceed the line length and the program will crash with a BAD VALUE error message. Also if the length of the output i.e. the score in this case, reduces in length then the last character remains on the screen. One way round this is to right justify the output, but I will leave that to you to sort out. Maybe I will give you the answer in a future 'Helpful Hints'.

Well that's all for now. Perhaps if you have any useful ideas or tips you could drop me a line so that I may incorporate them in future articles for Tidings. My address is under COUNTY CONTACTS.

Good luck with your programing.

Alan Harrin.

Babbling Brooks

INTRODUCTION

Over the Christmas period I dropped out of the rat-race for two weeks, visiting family and friends in London and Ramsgate. Towards the end of my freedom I descended on Paul Dicks and his family. The last time I saw him was on the occasion of my visit to the PCW show in September '82. At that time the 4A had not fully learned to imitate hot cakes and was not therefore selling like them. Although Paul's workload was heavy, he was then coping, with the aid of his wife, Nicky, as secretary and general factotum.

By the end of December '82, his daily postbag equalled a full month's worth of mine, and his phone rang throughout the day during the holiday period (and during normal weeks can ring after 10 p.m.!), with requests for help and advice from erst-while ordinary members of the public now afflicted with 4A-itis. (He managed to make time though to show me round some of the bigger brothers to the 99s which he plays with for a living — or maybe they play with him!)

At that time, membership of TIHOME stood at 700+ and was rising in leaps and bounds. (Thanks to bad marketing strategy by TI, no machines have been available over the Christmas period, and the next shipment is not due until February '83 when the climb in membership numbers should continue!).

The commonest problem (judging by the phone calls) seems to be the Alphalock key and its effect on joysticks. If I heard Paul answer that one once, I heard him answer it a dozen times. Either lots of people haven't read the manual (which, I understand, is so full of bugs it would interest a microbiologist!) or the manual doesn't make the use of the key crystal clear.

The cost of running TIHOME has turned out to be quite high, what with the cost of producing the newsletter (which would appear to compare very favourably indeed with all others) and back copies. While I was with Paul I learn that 99er, the specialist glossy from the States, has gone monthly, with an annual subscription of £36, no less! Because of the format of these glossies (their high advert content, for example) they can usually afford to go out very much more cheaply than our Tidings, and I think that 99er's publishers ought really to reduce this price if they expect to make any sales on this side of the Atlantic. I can't see many TIHOMERs dipping into their moneyboxes at that price, especially since some have been unjustly treated in the recent past by companies purporting to supply 99er. I will be writing to Gary Kaplan in an attempt to clarify the situation, and I will report any correspondence as and if it arises.

I'm writing this Babble over two years — '82 to '83 — so although it won't actually appear until February, I'd like to propose a vote of thanks to Paul and Nicky for having steered TIHOME through another year, and for having taken Tidings up another rung in the ladder. Thanks are also due to the contributors in '82 who joined the Old Diehards (Mike, Stephen, and some scruff called Babbling) in staining sheets of wood pulp (writing, for those not familiar with my obscure style!), and '83 starts off with a handful of new contributors, of which more later. Here's to even more

participation by you folks out there in '83.

Let me begin the Babble for '83 with a 'noticeboard' of queries and requests passed to me from members.

NIGEL CLEMONS, of 45 Seagrave Road, COVENTRY, West Midlands, CV1 2AB, is in the process of trying to convert an Apple II Algebra Checker (published in Personal Computer World in November '82) to run on the 4A. After much perseverance he has managed to get PCW to pass his request for assistance on to the author (one Mike Liardet), and has begun to produce a flow-chart for the program to help translate into TI BASIC. If anyone has any knowledge about the use of PEEK and POKE on the Apple II – i.e. how the memory map is laid out – would they like to contact Nigel and offer any help? (As I write, Nigel has had his second or third letter published by one of the popular micro mags – well done, sir).

ALLEN BURT, of Twyford, asked me if I could uncover the bug that exists in a 99er program (Vol. 1, No. 5) called SPRITER. The program keeps crashing and there is no apparent cause. I have narrowed it down through successive setting of BREAKPOINTS to something in line 980, probably caused by a CALL in another part of the program. As I haven't asked Allen for permission to publish his address, would any member with a solution or comment like to write in to me (address given elsewhere) and I will pass anything on to him, and to TIHOMERs generally through these pages. All contributions acknowledged.

Through a friend I have learned that Debenhams in SWINDON are keen to know if there is a TIHOME contact nearby to whom they could refer potential/recent 4A owners. I have agreed to stand in for the time being, but I would be grateful if someone could come forward – I live some 40 miles away from Swindon, so I'm not exactly on the doorstep. If you don't feel confident enough to go it alone as a contact, I am willing to give any candidate all the support I can. Any takers?

BEN CLEWETT, 11 year-old shortly-to-be member from Oxford, has been helping me out in my favourite occupation, namely discovering things which TI don't know/haven't released about the 99s. You may remember the last pages in December's Tidings giving some information about the use of the Control key with Extended BASIC to give some of the 'tokens' used – some of them Reserved Words. Well, Ben and I have discovered that the same sort of thing is available with TI BASIC as well. You need to use a REM at the beginning of each line, followed by the usual space, and then you can type in the control characters to make up the statements as you wish. Which reminds me, a little while back Paul asked in the questionnaire if anyone wanted to see a Young 'Uns section in Tidings, written by young people for young people. Do we have any takers?

Still on the keywords, machine-code maestro **GARY HARDING** has been also adding to the list using the Function key. I have yet to check them all out, but once I have they'll be added onto the postscript which I inevitably have to add to these ramblings. You will notice that Gary has also started a series on 9900 programming – this is intended for owners of the Mini-Memory module, Editor/Assembler, or Extended BASIC and 32K treasure chest, but if you're thinking of delving into machine code and haven't taken the financial plunge yet, then read Gary's articles to get the flavour, and maybe drop him a line to ask about specific points.

In fact, this issue sees contributions from a couple of people who have put pen to paper, one of whom is Gary, and another is **BILL van KERKORLE** from Holland, who has offered me ready-translated copies of his articles for the Dutch magazine *Tijdingen*. I have retyped his articles (there were 2, as he is trying to bring us up to date with his current writing) and edited them slightly, trying to retain the original flavour. If there is anything not clear, blame me, and write in to the address given elsewhere. Some of his points are being made in a different way in the *Babble* (and in previous articles, namely 'FOR PETE'S SAKE'), and I think that it will be good to present alternative ideas on similar subjects so that we stand a better chance of reaching more members. I will pass any comments/queries on to Bill, who may later accept direct correspondence if I can persuade him. It is very generous of him to translate his articles into English for us, as I am not capable of doing the same for his group when I send a copy of my *Babble* over.

Another member to send in a contribution is **DAVE HEWITT** of Hoddesdon, who relates a cautionary tale of micro-addiction. Incidentally, Dave is setting up an embryonic group in his area. Currently they number 3 consoles (who have remained nameless so far) and a few cartridges (modules, GROMS, cartridges ... I wish TI would decide on one name!), and I have no doubt that they would welcome some more. They are currently advertising in the local rag for more to come forward, and although Dave hasn't given me direct authority to publish his details, I think he'd be pleased to hear from you at 22 The Meadway, HODDESDON, Herts.

Because of the extra contributions this issue (2 of which will be with us for a few more editions yet) I am holding back the final part of the 3D Noughts & Crosses and I am relegating SCIENCEWATCH to be an occasional filler. The next item in the pipeline was to have been Video disks, but it can wait. If anyone actually WAS following the 3D OXO series, don't worry, it'll conclude next issue. The usual BEGINNER'S BASIC and RE-INTRODUCTION TO MATHEMATICS are present, as is SOAPBOX, with both the second part of the Changing Times article AND a tirade on the subject of cables. This will no doubt be rounded off with a Postscript as I add all those things which I forgot to put in this introduction!!

Which reminds me, I am experimenting on odd occasions with placing characters which are restricted to use with CHR\$() on the 99/4, directly in strings/text on the 4A. I haven't managed to document all the characters available, but so far it looks as though 4A owners won't have to type CHR\$(159) & CHR\$(159) whenever they want to put those two characters on screen or in a string variable. I'm pressed for time these days, so it may be a little while before I have the full information (I still haven't found time to put the Hints and Tips booklet together yet, and at this rate I never will) but it will find its way onto these pages eventually.

Before I go and forget it, I'd better give you my address (although it may also appear in the Contacts List):—

Pete Brooks, 68 Kelburne Road, COWLEY, Oxford OX4 3SH.

My work phone number is Oxford 64811, Ext. 335. If the Ansaphone is on, please feel free to leave any message. I'm not on the phone at home, so this is probably the quickest way to contact me should you need to.

A couple of new micro mags have hit the streets this month, only one of which I have managed to pick up. It is called MICRO UPDATE and if you're looking for a very full list of just about all the micros on the already-packed market, this is the one to get. They have also published a full club list (as have others this month), but for some reason TIHOME has become a Surrey group instead of a National one!

Finally, if you want a list of educational micro-users, get a copy of Jan/Feb. Computer Answers. Their list is far too long to reprint here, and I know that we have at least three teachers amongst our happie thronge!

A cautionary tale from Hoddesdon member DAVE HEWITT

Mine is a sad tale, but true. I only tell it now as a salutary warning to others who may be tempted by the bright lights, fast-moving graphics, and slick product-pushing in the computer jungle.

I used to be your average Mr. Nice Guy – you know, suburban semi, two kids, nice wife, a pleasant job wandering the streets of Hertfordshire plying my trade as an itinerant television repair man.

I well remember that fateful day last December when I first started down that slippery slope to micro madness. There I was, standing in W.H. SMITH's minding my own business while my wife purchased the usual Yuletide wrapping paper, etc. Idly perusing, with one eye, the covers of ahem those magazines that are reserved for the top shelf, I happened to spy a portable TV with some display or other flickering and flashing on the screen. Seeking only to give the sales assistant some advice on how to cure this sort of fault on a portable TV, I ambled over to where he stood.

Too late I realised that this was not a malfunctioning telly, but one of Uncle Clive's magic boxes. In just a few minutes all was lost and I was hooked, a voice was saying: 'American Express? That will do nicely, sir,' and another poor soul was lost to the miseries of micromania. Still trying to put a brave face on it, I said to my wife: 'Well, it will make a lovely Christmas present for the boys'.

From that day forward nothing was ever the same; Christmas passed in a blur, the addiction and frustration intensified, Tell-tale signs began to appear: the glazed look that comes only after staring into a monitor screen hour after hour; hardened fingernails from assaulting a keyboard and worst of all the terrible mental anguish (understandable only by other addicts) when the program which you have just spent hours writing crashes.

Soon the ZX81 was not enough of a fix, and that is when sanity when clean out of sight and I started mainlining on a 99/4A. If you think that JR is the most sinister thing to come out of Dallas, then brother you haven't met Tex!

Now money seemed to be no object: 'What do you mean, the kids need new shoes and the budgie hasn't had a square meal in weeks? I NEED the Extended BASIC module, and I've GOT to have it regardless of anything else. Yes, I know it was really a present for the kids, but I MUST finish that Alien Mother-in-Law Program, I've just GOT to!'

Oh, yes, and then there is that sinking feeling in the pit of your stomach when your 10 year-old son looks at you sympathetically and says: 'No, Daddy, that's not the way to write that statement, it won't run. Let me show you, it's easy!'

So be warned. Before it is too late, go back to talking to the wife and playing with the kids. Stop talking to a flashing VDU or else people will shun you as an outcast. They do me, telling their children to turn their faces to the wall while the Micro Man goes by!

Beginner's BASIC

I seem to be plagued with typos these days. Once again I find myself apologising for an incorrect reference in the last article. On page 35 I said that 'E' was explained in Vs.6 Tidings. It should have been V2.5, so my apologies to anyone who spent fruitless hours searching the Maths article last issue for enlightenment.

As usual, if there is anything to be entered into your 99s it will be indented on the page thus:—

```
PRINT "GOOD CONSTERNOON AFTABLE"
```

where each line of instructions (which may be more than one screen line) is to be typed in and ENTERED when you are sure it is correct.

This article is devoted to the use of IF...THEN...ELSE — the CONDITIONAL JUMP or BRANCH, and the RELATIONAL OPERATORS and EXPRESSIONS. These may sound rather imposing, but once you understand what they mean in plain English (or as close as I come to it, anyway) you'll wonder why they seemed so formidable. The use of these functions is important in INPUT VALIDATION, which we touched upon briefly last issue, and in particular the use of IF... is what gives the computer the ability to make what we would call a decision. Take for example this instruction: 'IF today is a weekday THEN go to work, OTHERWISE have a lie-in'. No-one really wants to keep typing OTHERWISE in BASIC, so we use ELSE. The restriction in TI BASIC (but not so much in Extended BASIC) is that you can only GOTO after THEN or ELSE, although you don't need to enter GOTO, just the line number (or DESTINATION as it is sometimes called). The program is thus able to BRANCH by performing a 'test' — i.e., is it a weekday? Yes or NO? Or, as the BASIC equivalent has it, TRUE or FALSE? If the response is 'TRUE, it IS a weekday', the branch will be made to the line number which follows THEN. If the response is 'FALSE, it is NOT a weekday', the branch will be made to the line number following ELSE. In fact, with this function, as with several others in TI BASIC, the use of ELSE can be 'optional'. That just means that if the line number which would follow ELSE is also the next line number in the program, then you don't need to use ELSE, because if the test has a FALSE result the computer will automatically follow on to the next line number if ELSE is not present.

We can use IF...THEN...ELSE in many circumstances. One use of it is in checking the response to an INPUT. If you remember, we can use INPUT in BASIC to stop the program so that the user can enter information (a number or a word or sentence). When ENTER is pressed, the computer will perform an initial check to see if the way in which any information entered is not correct — for example,

entering 1.2.3 when a number is asked for, – but any further checking is left to the program (and thus the programmer).

Suppose we wanted to prevent our program from being used by anyone but ourselves. The kind of thing I have in mind is the use of a password. If the correct password is not given, the program will not proceed. Of course, this use of a password is more than a little tongue-in-cheek, as anyone with a little knowledge could break the program and find out what our password was, or even alter the program a little to avoid doing any such checking of the password: For example, try this small routine:–

```
1 CALL CLEAR
2 INPUT "WHAT'S THE PASSWORD ?":P$
3 IF P$ = "TI ME KANGAROO DOWN" THEN 4 ELSE 1
4 CALL CLEAR
5 PRINT "THE FOSTERS ARE IN THE BILLABONG"
```

If you then RUN it, until you enter TI ME KANGAROO DOWN in exactly the way in which it appears within the quotes in line 3, the program will not reveal the location of the vital Australian tippie. It should be fairly straightforward to follow, but just in case, here is a blow-by-blow account:

- Line 1: this is a special command which is available on the 99s to clear the screen, and which we first encountered in the last article.
- Line 2: this is an INPUT (also covered last issue) with a 'prompt' which is printed up on the screen, asking you for the password. If you press ENTER after you have decided on your response (perhaps it was DON'T GIVE ME THE OLD RAW PRAWN SHEILA), the text is then stored in a string variable called P\$.
- Line 3: here comes the INPUT VALIDATION. This says: 'If the contents of P\$ is the same as "TI ME KANGAROO DOWN" then jump to line 4, otherwise go back to line 1 and continue the program from there'.
- Line 4: simply clears the screen again ready to print the all-important information.
- Line 5: and this is where the golden brew is being kept.

Suppose you wanted the user of your program to answer a question with either YES or NO and nothing else? (There is an easier and quicker way of doing this, as we shall see later in the series!) How might we go about it? Let's look at what we might need to do. First, we want an INPUT – an answer to the question (sa, 'Have you stopped beating your wife yet?') which we wish to pose. Then we want to store the response in a string variable. Then the validation can begin. We will need two tests: one to see if the response was 'YES' and the other to see if it was 'NO'. If it was neither of these, we will go back and ask the question again. (If we wanted to make it a little more complicated, we could, if the response was neither YES or NO, print out a short reminder, or reprimand the user for attempting to make an invalid entry!) Assuming that the program will proceed to two different sections depending upon the response, it might look a little like this:–

```
1 CALL CLEAR
2 INPUT "HAVE YOU STOPPED BEATING YOUR WIFE YET ?":A$
3 IF A$ = "YES" THEN 100
```

```

4 IF A$ = "NO" THEN 5 ELSE 1
5 CALL CLEAR
6 PRINT "WHY NOT, YOU SWINE!"
7 STOP
100 PRINT "AND ABOUT TIME TOO!"

```

See if you can follow the flow of the program, and RUN it, entering different responses, and see if you understand what it is doing. Note how stupid the computer is (or the programmer!) if you enter an like like YES YES — it doesn't recognise that you have answered YES at all.

The '=' in lines 3 and 4 is not used in the same sense that it is when you assign a value to a variable. In the case of 'A\$ = "WELL DONE, DUMMY!"' or 'A = A + 4', you would get a better understanding of the meaning if you pronounced the '=' as 'become' thus: 'let the contents of A\$ BECOME "WELL DONE, DUMMY!"' or 'let the new contents of A become the current contents plus 4', the '=' does have its 'equal to' meaning, but here its function is slightly different. Here its role is as one of the RELATIONAL OPERATORS. There are a number of these, and they can be seen on some of the keys on the 99 keyboard. There are just three operators, which can be combined to produce 6 tests. The '=' is one, and the other two resemble letter Vs which have fallen over. The '<' is pronounced 'less than', while the '>' is 'greater than'. In combination, they produce '<=' (less than or equal to — it doesn't matter which is put first), '>=' (greater than or equal to), and '<>' (not equal to). These operators can compare variables, or expressions (equations), and can not only be used with IF but can also be used in assigning values to variables, as we shall see. Let's recap on the full range of combinations, in case you haven't managed to disentangle them from the previous text:

A	=	B	Equal to
A	<	B	Less than
A	>	B	Greater than
A	<=	B	Less than or Equal to
A	>=	B	Greater than or Equal to
A	<>	B	Not equal to

If we wanted to restrict entry of a number, using INPUT, to being between 1 and 9 but not necessarily as an integer (so that 4.15 would be a valid entry, for example), we could test to see if the entry was less than one or greater than 9, and continue or go back accordingly. The kind of test we will be performing is an 'exclusive' one, which means that it tests for values which are excluded from the valid range. Our two tests will be '<1' and '>9', and the routine could look like this:

```

1 CALL CLEAR
2 INPUT "ENTER A NUMBER BETWEEN 1 AND 9 " : N
3 IF N < 1 THEN 1
4 IF N > 9 THEN 1
5 PRINT "OK"
6 GOTO 2

```

Try running this program — if you enter an invalid number, the screen is cleared, and you are prompted again; if you enter a valid number, the computer responds with OK and leaves the screen to get slowly filled with questions and answers, and test it by using a range of numbers, both valid and invalid. Try altering the acceptable range of numbers to be say 5 and 50, or whatever you like.

We come now to the use of RELATIONAL OPERATORS, which involves the understanding of how the computer presents TRUE and FALSE.

```
PRINT 2 = 2
```

This should give -1 on the screen. This is the computer's equivalent of TRUE. It looks at the expression ' $2 = 2$ ', and if the result is TRUE (and as 2 is equal to 2, it is TRUE!) the computer responds with a value of -1 . If it is false, the value is 0.

To check this, try:

```
PRINT 2 = 3
```

You should get the answer 0, because of course 2 isn't equal to 3.

```
A = 5 = 10
```

```
B = A = 0
```

```
PRINT A,B:3 * (A = B)
```

(The spider between the 3 and the left bracket is in fact an equivalent to the asterisk on this typewriter!) The printout from this is 0, -1 , and 0. Can you see how it was produced? In the first line, the expression ' $5 = 10$ ' is evaluated. It is false, so a value of 0 is produced. This is then assigned to variable A (NOT compared with it). In the second line, the expression ' $A = 0$ ' is evaluated, which is TRUE, returning a value of -1 which is then assigned to variable B. During the printout, the values of A and B are printed, and there is also a small expression involving a comparison between the current values of A and B — they aren't equal, so a value of 0 is returned — and this is then multiplied by 3 and the result printed. The expression ' $A = B$ ' has to be placed within the brackets to ensure that the computer compares A with B, and not B with $(3 * A)$. This is a common requirement, as the computer's mathematical rules are such that it could cause an incorrect comparison. For example, if you wanted to evaluate $A * (B + C)$ you couldn't simply enter $A * B + C$, as the rules for execution mean that the computer first performs multiplication and division before it performs addition and subtraction. This is a standard practice in mathematics. Highest priority of all, though, goes to expressions within brackets. They get done before any others. In a future edition of the Maths series we will look at mathematical hierarchy, and what it means.

Although it might not be resoundingly obvious, there are a number of uses for those relational operators and expressions, and I will leave you with one for next time. Your task is to try and figure out what this short routine does and how it does it!

```
1 CALL CLEAR
2 A = A + 1 + 10 ( A ) = 10)
3 PRINT A
4 GOTO 2
```

What number will you NEVER see with an expression like this?

Part 1 : The Basics

a) HOW?

On the TI 99/4A the step to Assembly Language programming may be made in two ways: with the aid of the Mini-Memory module (£75) or the Editor/Assembler (also £75 but useless without at least £600-worth of extra hardware). Of the two, the Editor/Assembler offers far superior features — in fact, with the Screen Editor, Assembler, and Debugger it provides the humble 99/4A with a software development environment not terribly far removed from that found on TI's DS990 range of mini-computers!

Naturally, though, the sheer cost of putting together such a system will mean that most of us who want to write in Assembly Language on the 99s will utilise the Mini-Memory's Line — By — Line Assembler. This is a pretty sophisticated tool in itself: it certainly beats Machine Code programming (working out the actual numbers which represent Assembly Language instructions and poking them into memory) as is much practised on other small computers. The one thing missing from the Mini-Memory package is a good 9900 Assembly Language manual, which is where this series — hopefully — comes in.

b) WHY?

I am not suggesting that Assembly Language is in any way the Logical Next Step for 99 owners to take. On the 99/4A, TI have provided a very powerful BASIC interpreter with excellent file-handling capabilities and easy access to colour graphics and sound, and for most tasks BASIC is the best language to use. However, there will be occasions (you may already have encountered some) when the speed of TI BASIC is just not up to the job, partly because of the way that programs and data are stored in VDP RAM (not easy for the 9900 to get at quickly) and partly because it is an interpreted language.

Imagine for a moment how long it would take you to get through a Russian newspaper if all you had was an English — Russian dictionary. Well, that's precisely the position in which your TMS 9900 microprocessor finds itself when you run a BASIC program. In fact what you actually run is the BASIC interpreter, which reads your program as data. It reads it a line at a time, looks it up in its internal 'dictionary', and then executes the Assembly Language 'translation' of your BASIC statement.

This process is slow — sometimes too slow. The only two ways round this speed problem are to get somebody to translate the whole Russian newspaper for you before you read it (this is what a COMPILER does when it translates a program from a high-level language into Machine Code) — or, more simply, buy an English newspaper (analogous to writing your program in Assembly Language directly). There are problems with mixing BASIC and Assembly Language if you don't have the memory expansion (it seems to me that only 100% Assembly Language programs can make use of the new bit-mapped graphics mode on the 99/4A), but in general using Assembly Language to speed up time-critical operations is a good idea — and quite easy too.

c) WHAT?

This is going to be the hardest part! What is an Assembly Language? Well, all microprocessors come with their own instruction sets with which they may be programmed — not quite the same as LET, GOTO, GOSUB, etc., but the principle is the same. However, as we are now operating at the lowest-possible level, the CPU (Central Processing Unit) will recognise only binary numbers as instructions, not the pseudo-English of TI BASIC. Unless we are to resort to Machine Code programming, what we need is another semi-English language that is easy to understand yet corresponds directly to the CPU's instruction set. This — surprise, surprise — is what an Assembly Language is; the process by which an Assembly Language program is converted into the equivalent Machine Code (or OBJECT CODE) is called ASSEMBLY, which — wait for it — is what an Assembler does! It can't be that difficult, after all — even I can understand it!

Let's concentrate on our very own TMS 9900 microprocessor. It has a fairly comprehensive instruction set consisting of 69 instructions, five of which are 'external' instructions designed for use with TI's minicomputers and which have no effect on the 99s. The remaining 64 instructions fall into seven broad categories:—

- i) Data transfer — moving data around in memory
- ii) Arithmetic — the basic four functions plus a few others
- iii) Comparison — of data in memory with other data/constants
- iv) Logical — Boolean operations or setting/clearing of bits
- v) Shift — moving bit-patterns rightwards or leftwards
- vi) Branch and Jump — including subroutine linkage
- vii) CRU — forget about these for the time being!

I shall be running through the instruction set in future editions of Tidings, but there is a fair amount to get through before we get to that stage. The transition from BASIC to Assembly Language involves a lot more than merely learning a new set of instructions, as the way in which Assembly Language instructions are used differs considerably from TI BASIC.

Each instruction in an Assembly Language program corresponds directly with just one CPU operation, whereas the execution of a single instruction or statement in a TI BASIC program causes, via the interpreter, a sequence of many such 9900 instructions to be executed. This one-to-many relationship is what makes BASIC a high-level language. The TI BASIC system also relieves the programmer of the responsibility for allocating storage space in memory for variables. It automatically reserves eight bytes for each numeric variable in a BASIC program, and allocates the requisite number of bytes (one per character plus one containing the string length) for each string variable, re-arranging memory as necessary dynamically, for example when two or more strings are concatenated during program execution. When using Assembly Language, however, none of this convenient housekeeping is done automatically for the programmer (i.e., you); it's up to you to reserve space in memory within your program in order to maintain a set of variables. This is the main reason why Assembly Language programming takes more effort than writing in a high-level language — you need to have a far more detailed knowledge of what is going on inside the machine to be able to make full use of its facilities.

The basic unit of storage as far as the 9900 is concerned is the BYTE, although it is more usual to use a pair of consecutive bytes, termed a WORD. The CPU may address 64K bytes of memory directly, numbered 0 to 65535 with words starting at even byte addresses, i.e. 0, 2, 4, etc. Many of the 9900 Assembly Language instructions come in two varieties to allow the same operation to be performed on both word and byte operands. What you store in a particular word of memory, and how you interpret it, is completely up to you as there are no pre-determined data types such as the numeric and string types in TI BASIC. Most of the commonly-used 9900 instructions, however, assume that the contents of the words on which they operate are to be interpreted as 16-bit integer numbers.

Now, you're probably all familiar with the fact that the eight bits of a byte may be arranged in 256 different ways and hence a byte may represent any integer (whole number) from 0 to 255. Well, a 16-bit word can similarly hold 65536 (2 to the 16th power) different bit patterns and may thus represent integers from 0 to 65535. These are known as UNSIGNED INTEGERS as they are all positive (oh, all right then, all non-negative!). As you'll have no doubt noticed, these limits are the same as the 9900's addressing limits, which means that the numeric address of any byte in the 9900's 64K address space can be held in a single word. This turns out to be rather handy, as we'll discover later. Anyway, back to the unsigned integers. In many circumstances it's useful to be able to hold negative numbers as well as positive — which is where SIGNED integers come in. If you've used the PEEK and POKE facilities in either Extended BASIC or the Mini-Memory, you'll have noticed that the range of valid addresses does not run from 0 to 65535 but from -32768 to +32767. This is because addresses are interpreted (unfortunately, in my view) as signed integers in what is called 'TWO'S COMPLEMENT' form. Without going into too much detail, two's complement is a method by which those 16-bit patterns representing integers from 32768 to 65535 (i.e. those with the left-most bit set to 1) may also be interpreted as negative (signed) integers from -32768 to -1. What it boils down to is that you can only hold 65536 different patterns/ numbers in one 16-bit word, but depending upon your interpretation of those patterns they can be either unsigned (0 to 65535) or signed (-32768 to 32767). And in fact this concept carries through to bytes as well: an unsigned byte contains an integer in the range 0 to 255, while a signed byte contains values from -128 to 127.

These integers, as you may by now have realised, are the only numbers the 9900 can manipulate directly with its instruction set. This may seem a little restrictive after the real (floating point) numbers available in TI BASIC, but for many programs you will find that integers are all that is required. And if you should want to use real numbers, then with both the Mini-Memory (in ROM) and the Editor/Assembler (on diskette) TI provide a suite of Utility Routines which handle all the more complicated aspects of handling floating point numbers (e.g., arithmetic, and conversion to and from integers).

Okay — now I'm afraid we have to look a little bit deeper into how the 9900 holds its act together and actually executes these instructions that we've been hearing so much about. Just like any other kind of program, an Assembly Language program resides in memory, in RAM like the Line-By-Line Assembler which comes on cassette with the Mini-Memory, or in ROM like the TI BASIC interpreter in the 99/4A console.

Single instructions take up 1, 2, or 3 words of memory each and are executed in the sequence in which they appear in memory, unless of course a branch or jump instruction is encountered. At all times the status of the program being executed can be determined by examining the contents of the three 16-bit words called PROCESSOR REGISTERS. These actually live on the chip itself and are not part of the 64K address space of the 9900. All three are vitally important to the operation of the CPU, and need to be explained in some detail.

- a) The PROGRAM COUNTER (PC for short) enables the 9900 to keep track of its whereabouts, figuratively speaking, in memory as it travels through, furiously executing instructions as it goes. The PC always contains the address of the next instruction to be executed by the 9900 and is automatically updated continually by the CPU, normally just by adding the address of the current instruction to its length (2, 4, or 6 bytes). If the instruction is a branch or jump instruction, however, then the PC is modified as specified by the instruction instead. In short, the PC is used to control program flow by acting as a pointer to the next instruction in the program.
- b) The STATUS REGISTER (ST for short) contains, among other things, a set of flags which hold information about the result of the last instruction executed. Together with the 13 different jump instructions, the ST register makes it possible to program conditional branches in Assembly Language, similar to IF...THEN in TI BASIC.
- c) The third processor register is the WORKSPACE POINTER (WP for short), and this, as it introduces the fundamental concept of the workspace, needs so much space that I've decided to leave it until the next issue of Tidings. So don't go 'way!

Well, here endeth the first lesson. I hope I've managed to lay some kind of foundation for the rest of this short series of articles. If you think I'm making a pig's ear of it by making it too easy or too hard to follow, then drop me a line and tell me. Any feedback at all would be much appreciated, even if it's just to tell me to give up and go back to being a dustman!

My address is:—

Gary Harding, Flat 2, 12 Belmont, Lansdown Road, BATH BA1 5DZ.

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A RE-INTRODUCTION TO MATHEMATICS

The final (!) part in the drawn-out saga of the dreaded Logarithms. If YOU have any comments on this series (like 'that idiot Brooks has got it all ace about farce!'), then please drop me a line. Like-wise if you have a particular topic or three which you would like to see covered (always supposing I know how to!), or if there is one, or two, which you would like to cover yourself. The title of this section may be Babbling Brooks, but I don't own the space, I just fill it in!

As usual, if there is something for you to work out on the 99s it will be indented on the page, thus:

DEF AID = BETTER – HEARING

You simply type the line as it appears on the page here (and one line on here might actually be more than one on the TI), ENTERing it when you are sure that you have got it right. I hope that's clear...

Right, down to business. Consider the following:--

(1) $\log_4 X = 3$

(2) $\log_b 27 = 3$

In (1), the aim is to find the unknown quantity, X. You are given the information that the logarithm of a certain number is 3. You are also told that the base of the logarithm is 4. To find that certain number, you would take the anti-log of 3 (using the base, 4) which, if you remember, is arrived at by raising the base (4) to the power of the number (3). That makes it 4^3 , which is 64 if you work it out in your head, or:

PRINT $4^{\wedge}3$

Check back to Tidings V2.4 if you are unsure. To remind you, the general rule is that:

$\text{Log}_{\text{base}} \text{value} = \text{Number}$ and $\text{value} = \text{base}^{\text{Number}}$

Check that the answer is correct by putting 64 in the place of X and using \log_4 to see if the result really is 3. To remind you how \log_4 can be produced on the 99s, enter the following line:

100 DEF ALOG(X) = LOG(X) / LOG(B)

Having entered the line, RUN it. See V2.5 and 2.6 on logs and the use of DEF in the provision of extra facilities for use in the Immediate mode (i.e. what we are working in now). V2.6 will also show you how to obtain different bases just by altering the B variable. Now enter:

B = 4

which primes the function ALOG to be base 4.

PRINT ALOG(64)

should give you 3. Try experimenting with different values for X and for the base.

Now let's look at the second problem. Here the aim is to find the base, b. You are given the information that the log of 27 is 3, but you don't know from which base the logarithm is derived. How would you go about finding the base? Well, another way

of looking at it is that the antilog of 3 is 27. In other words, the base raised to the power 3 is $27 : b^3 = 27$. You may already begin to see how you might solve this; if b^3 or $b * b * b$ is 27, then b is the cube root of 27. It is possible to use logs to find the roots of a number, and any log will do. To find the cube root of a number, you find the log of that number, divide it by 3, and then find the anti-log of that. Couldn't be simpler, eh? (What do you mean, No!?) We can use our ALOG function, just to show that we know how to use it. First of all, we find the log of 27, which is just $ALOG(27)$. We then divide by 3 (to find the cube root; to find the square root, divide by 2, to find the Nth root, divide by N), to make it $ALOG(27)/3$, and then find the anti-log, which involves raising the base to the power of $(ALOG(27)/3)$. Our base using the ALOG function is contained in variable B, so that the final result can be found by:—

```
PRINT B ^ (ALOG(27)/3)
```

If all has gone well, the answer should be 3. Check that what I have been saying is true by resetting the B variable to say 10 or 9.1 or whatever, and execute the PRINT instruction as above. Now let's see if the answer is right! Set B to be 3 thus:

```
B = 3  
PRINT ALOG(27)
```

and see if the answer is 3 (i.e., that $\text{Log}_3 27 = 3$).

OPTIMAL EFFICIENT PROGRAMMING

Bill van Kerkoerle

Hello there. My name is Guillaume van Kerkoerle, and I have offered to write a series of articles for Tidings. They will be the equivalent of my contribution to the Dutch Tijdingen. As I am unaware of your experience, for some of you I will no doubt be opening doors which have already been opened! I will take that risk on the assumption that there are parallels between the groups in our two countries — namely that 75% of TI users are still at a Beginner's level.

My subject this time is a result of observing that often the length of a program is inversely proportional to its output. For those like myself not used to typing, shorter programs are a blessing and besides work faster and claim less memory space. Who hasn't come across 'MEMORY FULL' through too large arrays, too little space for ASCII characters, etc.?

Examine the market for RAM Expansion, and you'll come away disgusted with the price, but while more memory may offer greater possibilities, it may not be necessary if you optimise a program's use of memory. For short programs this is overkill, I agree, but generally a good short program will eventually be added to, to make it multi-functional for example, and that is where efficient programming comes in.

Who's Afraid Of For—Next Loops?

The first rule is: never use the variables controlling loops carelessly, as every variable consumes memory. The variable used for a loop can also be used as a counter,

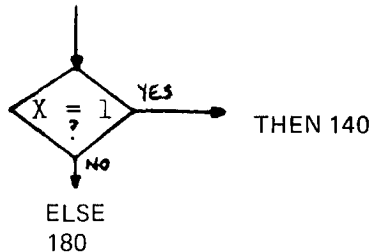
a component in an equation, an array subscript, or part of a conditional expression. Its exit value can be used as a choice or flag in subsequent statements, or it can be used again as the control variable in the next loop.

Are you also the victim of the suggestion that a loop may not be jumped into? It may, of course, provided you take care – if you jump in after the FOR you MUST jump out before the relevant NEXT. The best thing is to use the same flag variable for both actions. The following is an example of such a construction. The formula used in line 170 is illustrative only. An explanation of the operation of the routine is also given.

I do realise that I have not covered everything that I could about FOR NEXT statements, but I don't think it is a good idea to go into detail first time round. There will be, therefore, a follow-up series on IF starting with Logical Operators (Boolean Maths) concluding with conversions for statements of the type IF A = B THEN LET C = D, the latter being one of my personal favourites.

2. The IF statement is a very useful one, which few of us are sufficiently skilful to do without. For the programmer, IF is a valuable asset saving time and work. The TI BASIC IF may transfer control to line numbers, whereas under Extended BASIC both THEN and ELSE may contain a string of statements as well, although there are a few which may not be used – FOR NEXT is one. This is logical, considering that any program flow must be able to find its way from the FOR to the NEXT unconditionally. Let us use a pictorial representation to clarify the execution:

nnnn IF X = 1 THEN 140 ELSE 180:–



In other words, if (X = 1) is TRUE (i.e., the value of X is 1), the flag value is –1, and if it is FALSE, the value is 0. For the rest of this item, to reduce typing, let B stand for TI BASIC and EB for Extended Basic.

Logical Operators

EB: provides 4 logical operators. They are: NOT, XOR, AND, OR. They are available in B but need to be written differently – just remember that –1 is TRUE and 0 is false.

EB: IF NOT X = 1 THEN ... i.e., if X = 1 is FALSE, then ...

B: IF (X = 1) = 0 THEN ...

EB: IF X = 1 XOR Y = 1 THEN ... i.e., branch if one or the other is TRUE but not both.

B: IF (X = 1) + (Y = 1) = –1 THEN ...

EB: IF X = 1 AND Y = 1 THEN ... i.e., branch only when both are TRUE

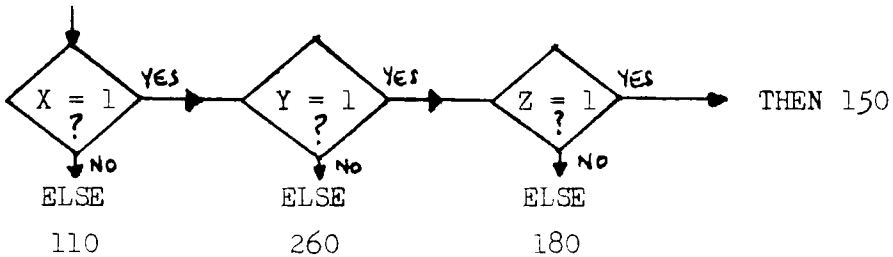
B: IF (X = 1) + (Y = 1) = -2 THEN ...

EB: IF X = 1 OR Y = 1 THEN ... i.e., branch if either is TRUE

B: IF (X = 1) + (Y = 1) = 0 THEN ...

X, Y, or 1 may be replaced by any expression. The same goes for relational expressions and arithmetic operators. Be careful though when using multiply and divide and remember that the computed result must comply with your requirements. You can make all kinds of interesting combinations, but test them fully before using them. For example, if you use IF (X = 1) + (Y = 1) + (Z = 1) = -2 THEN ... it means that 2 out of the three must be TRUE.

There is another construction in EB: IF X = 1 THEN IF Y = 1 THEN IF Z = 1 THEN 150 ELSE 180 ELSE 260 ELSE 110. Pictorially this is explained thus:—



To implement this kind of construction in B requires that it be broken down thus:—

```
100 IF X = 1 THEN 110
101 IF Y = 1 THEN 260
102 IF Z = 1 THEN 150 ELSE 180
```

Note that in the EB line above if the line following is numbered 110 the trailing ELSE can be omitted.

Risks with IFs

Sometimes bugs can drive you mad and take the fun out of programming entirely. Often the fault lies hidden in an erring IF statement — not even seasoned programmers are immune to this. Using EB for example, using C = A AND B and IF C THEN ... is not the same every time as IF A = B THEN ... When C contains a non-zero value (specifically -1), this will work, but the result of C = A AND B is not always the same as the result of A AND B in an IF statement. This problem is caused by Boolean arithmetic and is luckily not one which B programmers can experience.

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Philip Cass.

SO A P B O X

It is surprising how often you can overlook the most obvious things for the most remarkably long periods of time. Do you realise that it is only recently that I have been reminded that TI are about the only company in the home computer market (which I understand they claim to have created) to leave out a basic essential from its package. They in fact make it a ridiculously expensive additional item, and it is so fundamental to getting up and started with your 99/4A that I am amazed that they have gone for so long without rectifying the omission.

What am I raving about? The cassette cable, of course! It was only when the dealers ran out of them over Christmas (not the only thing they ran out of, thanks to some really creative marketing ploys, presumably originating from the States!) that it was brought home to me — I don't know of another micro-manufacturer in the home market who DOESN'T include all leads with the computer! How about it TI? Are you going to include the cable in future, or will you reduce its price to a more realistic level, by which I mean a sight less than the £10 or thereabouts it currently costs? (£2.50 would be nice if you find that it would actually damage sales to include it for free! And if you physically can't reduce the cost, will you recommend that the State-side designer(s) be hung drawn and quartered for coming up with such a stupid design?)

While I'm on my usual bandwagon (TI's pricing policy), a recently-joined member has written to me with regard to programming in Assembler, and the cost imposed by TI. I agree totally with everything that this member said (I quote below): there is a growing 'awareness' on the part of some recent owners/users of micros that many of the machines (both business and leisure) are grossly overpriced (compare the fact that a Vic 20 costs more to make than a Vic 64, but the 64 will cost you double the Vic 20's price), and in some cases (guess who ?) are deliberately 'crippled' in order to restrict their use. For example, a 'dedicated' word processor wastes tremendous amounts of processing power; one which was bought by a University department at my hospital cost £14,000. Literally 3 months after its installation it was superceded by the then new 80 column, 96K PET, (casually described as a '4K toy' by the company rep who sold the WP machine), and at a fraction of the price. To this date the WP manufacturers have refused to release any details of the cpu at the heart of the machine, or to provide any details about or even facilities for, user-access. The maintenance contract is stupendous — 15% of cost price, i.e. £2100 per annum — and the individuals in charge of the machine are victims of the manufacturer-promoted delusion that the machine could have no use other than WP. (The WP software is disk-based, NOT in ROM!) They refuse to press the manufacturers for any further information or facilities. Can you imagine the furore there would be if someone bought the latest BL estate, only to find that the rear door had been welded shut, being only for show, that there was no access to the rear storage compartment on the grounds that anything you'd want to carry could fit on the back seat, that the engine had been sleeved from 3000 cc to 800 cc on the grounds that the kind of market at which the vehicle is aimed is one in which the user averages 30 mph and only makes urban trips, and that the bonnet is locked by a special key, which, surprise, surprise, is not given to you and is not publicly-available?

Next year the model will come with a 3000-sleeved-to-1200 cc engine, the rear door-handle will actually turn, but won't open, access to the rear storage compartment is still to be denied the user, but the back seat will be made deeper to take more items,

and you get the key to the bonnet to enable you to do your own maintenance, but the manuals are not provided on the grounds that if you want to maintain the vehicle you will already have done a course in Difficult Mechanical Engineering (run by BL at £500 per day for 3 years). Oh, and you can't get the tools 'cos all the nuts are non-standard, but they are on sale in Outer Mongolia and shipments are expected any day now... And yes, it is cheaper than last year's model, but the petrol tank has been reduced in capacity as Market Research has shown that the average car driver does 2.3 miles per day, so who needs a 150 mile capacity tank?

This is what our writer had to say:

"TI's attitude to making low-level programming freely (well, cheaply!) available leaves a lot to be desired. The full Editor/Assembler package including peripherals is so ludicrously expensive that only the serious commercial programmer can really be interested. Mini-Memory, whilst appearing to meet a need, turns out to be a cynical confidence trick. TI can now say that all the PEEKs and POKEs and 'machine code' facilities are available on a plug-in module and thereby deflect a lot of criticism, but to provide only 3/4K for programs and give instructions which are inadequate to the point that they assume prior knowledge of Assembly Language programming is quite ridiculous.

Why should TI do this? Well, the answer is there between the lines. TI are obviously interested in selling more and more modules and peripherals. Firstly a better Mini-Memory will no doubt follow and be a sufficient improvement to make all the buyers of the present one think about buying another. Secondly, with easy low-level access the market would be flooded the cassette-base user – or third-party-written software which would show that some of TI's modules are not actually all that good. After all, one of the best, TI Invaders, was written by a student in 2 weeks (per Robin Frowd).

There is of course a Catch 22 for TI, because the more-cynical owners will start to wait for the 'proper' article (at a lower price?) or even buy another computer."

I'd like to underline a couple of points in the above: firstly, when Sinclair's ZX80 came out (which I rejected in favour of the NTSC 99/4 which I still have, and which won't be replaced by a PAL 4A until the price comes down to £100 – say Xmas '83), its critics decried it because there was no steady display during processing. Third-party software not only provided that (which Uncle Clive himself had said was not possible), but also went on to provide arcade-quality games, all through low-level access. The whole industry which has grown up around providing peripherals for the ZX series has been the making of that particular micro, primarily because of its very deliberate policy of showing-up all the other over-charging manufacturers, and in spite of (incredibly) bad press regarding his company's failure to keep to delivery dates. If TI could learn anything from that, it should be that you cannot assume that your market will be filled only by what you project it to be. Uncle Clive is putting out another micro shortly – designed not for the home, but for the small businessman. And of course, only small businessmen will buy it, won't they? Will they hell! Every computer enthusiast with the cash at hand (and even those for whom it is not) will be flocking to buy the machine, regardless of what Clive aims it at.

The second point is about the quality of the modules. It is rumoured that V110 Extended BASIC (you know, the language that the 99s SHOULD have had first time round)

is being re-written, so buyers will be wary of experiencing the same fate as V100 owners. By the way, did any V100 owners get the module changed for the less-bugged update?

I sometimes wonder if ANY market research is carried out before these modules are put on the market (hands up all those retailers who have been overwhelmed with orders for the Physical Fitness module!), and if so, whether the research gets done on Joe Public (who isn't the one to ask) or on existing 99 owners (who are). I would have thought that the best way of assessing what the market wants now is to get as many responses from existing 99 owners as possible (different responses from each country, no doubt). Oh, look everybody, I've just had an idea! Isn't there a group of people like that, what do they call themselves... TIHOME or something, isn't it? Why not ask them? I'm sure they'd be happy to give a list of facilities they'd like, at PRICES they'd like to pay.

Right, that's got that off my chest. On to more interesting things.

Changing Times II

This is the second part of the personal (could it be anything else?) look at the next few years. Because of the broad effect of new technology on just about every aspect of our society, (work, leisure, education, health care, energy use, transport, etc.) it would be impossible to do justice to every topic in just these few pages. What I will do, therefore, is to pick some of the more general aspects and try to present an extrapolation from today (and the last few years) to some undetermined time in the near future. I have noticed over the past 5 years that the technological advances have outstripped all expectations, while the application of those advances has fallen woefully short of the predictions. If you disagree entirely/partly with anything that I may suggest, please write in with your criticisms/suggestions, together with your reasons for drawing your conclusions, and if there is sufficient response I will publish your ideas. This exercise is designed to set you thinking about the way in which you envisage the future (or the Future as some might have it), and also how you see your role in it.

At the top of the page I have given a short list of example topics, and that seems as good a place as any to begin. If we examine Work, we find that the pattern of work is changing quite rapidly in comparison to say a century or more ago, even though at that time great changes were being seen. I don't intend to get embroiled in lengthy discussions about the underlying causes of our present economic situation, or about the unemployment problem. What I will say though, is that I find it ironic that the aim of Trade Unions in this country (and presumably elsewhere) is to reduce the necessity for an individual to work in order to obtain the basic necessities (food, housing, etc.), and yet the ultimate in that condition, unemployment (as we understand it), is still something akin to cancer — you don't mention it in polite conversation, and anyone who has suffered it is isolated and treated differently. If we can't find a tolerant attitude to unemployment now, how could we hope to strive for it in the future? The late Dr. Christopher Evans said in his *Mighty Micro* (book and TV series) that if we were going to handle working conditions in the future, we would have to lose the 'work ethic' — the belief that an individual is somehow undignified unless he is working, that Man MUST work in order to retain his humanity. This stems from the historic need to work (for the basic necessities, and sometimes not even **them**), when non-working individuals were a burden on a society which could not afford to support

them. The signs now, though, are that we will experience a return to the 'slave society' which formed the basis of ancient Roman civilisation (and of some more recent cultures, in which Britain played an infamous part). No doubt the notion of a 'slave society' has filled you with misgivings and even immediate dislike; this is because the word 'slave' has become synonymous with human captivity. There are other kinds of slave, though, which you have all been using in increasing amounts over the last century or more, and it has never crossed your mind to think of them as such, I'll bet. There is one more aspect of this particular topic which would bear more scrutiny, and that is the replacement of humans by machines, often controlled by fewer humans.

I'm using a slave now, to produce this Babble. (The machine used to be called a scribe, and it was not an 'it', it was human). On Sunday I'll be using another slave to help me do my laundry — I don't own my own my own slave, I use a group facility called a Launderette. This lunch-time I'll be using yet another slave — this time me — to prepare my meal. There are umpteen different jobs which were formerly done by slaves (sometimes called 'domestics', 'servants', etc.), and no doubt you can think of many others. Don't miss out the animal slaves either — in particular the horse — when you are making your list.

'Ah, but' ... I hear you cry, .. 'they're not REAL slaves'. Oh, but they are. And machines have been replacing people in many different situations, just as they are going to do in the years to come, and while we think it disgraceful that a robot welder/sprayer should replace his human counterpart today, 60 years from now they will wonder how any self-respecting human could have undertaken such occupations and retained any kind of dignity. In ancient times, captured 'barbarians' were used as slaves and made to do tasks considered beneath their dignity of ordinary people. In the years to come, machines will take the place of the 'barbarians', more so than they have done to date.

I mentioned that work patterns are changing. There is a growth in work from home, especially among housewives and mothers, and this trend will continue. Mind you, it is only called 'work from home'; you don't always have to be at home in order to do it, and anyone who paints a gloomy picture of a house-bound future just hasn't thought things through, or doesn't have all the current advances to hand. Put together the new flat screen TVs, high power batteries, large capacity storage media (microflops), and the most recent addition, cellular radio, and it should be obvious that you could be cycling in the Lake District, mountaineering (within reason), lying on the beach at Blackpool or Benidorm, or lazing on deck in the South Pacific, and STILL be working 'from home'.

Likewise when it comes to shopping: 'interactive television' offers a massive range of opportunities for buying and selling, with cost advantages to both sides. Manufacturers will no longer have to provide heating, lighting, walking space, etc., in their sales sites (currently called shops or supermarkets) as no-one will need (or want) to trudge around from place to place looking for the best buys (call up your local Consumers Association Best Buy page on Shoptel or whatever), nor will they have to worry about packaging and placement on shelves (a science in itself!), and if this was a fair world, the shopper would feel the benefit by having lower prices — in fact, we will probably see a return to the 'delivery van' or its equivalent. Take things a stage further, with the use of hydroponics (soil-free gardening), and you may not even need Shoptel: your local community will be fully capable of providing just about everything you'd need.

This latter idea of self-sufficiency has political implications — while resources are distributed unevenly throughout a geographical area you need a central government in control (supposedly) of ensuring that distribution is according to need. Remove the need for distribution, and you remove a principle part of the administration required. This will tend to shift the emphasis away from central, and to local, government, and in the years to come, this local government could eventually be far more 'local' than it is at present — perhaps something along the lines of the Israeli kibbutzim. Each 'village' or 'estate' would then become a political entity separate from its neighbour, but only politically separate, not physically. The likelihood is that travel will fall off (while energy costs soar) until alternative technologies provide the kind of almost science-fiction transport systems which will enable the process of reducing nationalism and prejudice to properly get under way. Note also the trends evident even now — our requirement for energy (e.g. electricity) is reducing, while our volume of items using energy is actually increasing. Look at the rating for your colour TV, and it is probably less than a 150 watt living-room bulb. In two years time, that kind of energy use for flat-screen TVs will probably be halved. (Sinclair's new flat-screen unit uses far less energy and produces such a bright image that there is talk of it being used as a projection unit).

The general trend at present as far as work is concerned is not clear, until you look back a few years and see what has been happening. We are likely to see a reduction in the use of human labour in conditions which are either unhealthy or unsafe. Robot paint sprayers, welders, component assemblers, etc., will replace temporarily those jobs which are not really well suited to the human frame. I say temporarily because if anything is clear it is that many of those 'dirty' or dangerous jobs are going to disappear anyway, as the products they contribute towards will either not exist in their present form, or will cease to be required.

Does this mean that we will see a society of bored, cabbage-like, workless individuals? Only if that is what we want, and I think we'd have to work very hard to achieve such a state! What will happen is that we will see an increase in the numbers of people being involved in 'service' occupations — those where human contact is welcomed or preferred: leisure activities, health care (nursing), social care, and so on. There will also be an emphasis on the Arts, in fact the trend points to the major occupation of the future being self-education and 'expression'. Our descendants (provided we don't spoil it all by irradiating everyone!) will most likely be 'perpetual students', pursuing their own particular interests for as long as they have that interest. The idea that any study must result in the acquisition of skills useful to society will probably fade away. If your interest is in 12th century archery then you'll spend time using publicly-accessible data banks to follow that until something else catches your eye. You'll probably also be involved in group field-work (there will be others sharing your interests) which will no doubt involve archaeological work and recovery of archival materials; you won't be wasting your time!

When we look at the field of Leisure Activities, it is possible to see a trend towards hobbies which are more closely-linked to 'work' than play (take for example this particular area: microcomputers. Much of the 'hobbyist's energy is currently being directed at Artificial Intelligence, Robotics, Speech Recognition, (and Synthesis), Graphic Design, etc., etc. These are fields which up until recently belonged solely to research departments in Universities and computer companies), and it looks as

though the distinction between 'work' and 'play' will continue to blur. At the moment there is also an increase in 'health awareness', with more and more people taking up activities like jogging and swimming, in fact it seems as though a large section of society has decided to add a little spice to life by incorporating small amounts of sport in their recreational activities. The TV companies, of course, are doing their level best to reverse this trend by making everyone pig-sick of sport! There seems to be a need to 'balance' activities requiring high mental activity and those requiring little or none. If your daytime employment doesn't make a great demand intellectually upon you, you are likely to go for those leisure activities which do, and vice versa. This will probably become more pronounced as time goes by; I certainly don't see, as one gloomy prediction did a few years ago, a society in which lazy, obese, idiot humans have ALL their activity performed for them by robots!

When it comes to Education, things are a little different. This arises partly out of the blurring of borders between education for fun, and education for vocational purposes, and partly because our educational system looks set for a major upheaval. Just recently I was reading a report about the role of adrenalin in learning, and the suggestion seemed to be that raised adrenalin levels could ensure a better retention of information for longer periods of time. There have also been research projects which have investigated the use of certain gases in increasing an individual's ability to absorb and retain information. The increasing use of micros in schools, and their proliferation in the home, is going to pave the way for a return to the 'individual tutor' which used to be the privilege of the well-heeled few; in this case, however, the tutor will not be an ogre, but an electronic friend, who will pace his presentation of information to his pupil according to that pupil's ability to learn. This is one area in which games are likely to play a very great part indeed — the current presenter of the BBC Computer Programme (Making The Most Of Your Micro), one Ian McNaught-Davis, went on record in the first series as a detester of games on micros. This twit said that games were a waste of the processing power of the micro; either he was trying to be controversial, or he is an idiot of the first order. If you can take a chore like learning (and most kids DO see it that way) and turn it into an enjoyable series of what appear to be games, then more will be absorbed by the pupil, and a genuine enthusiasm for learning will be generated. Not only that, but in the medical field as well games are turning out to have some quite remarkable results: I have heard of cases recently where retarded youngsters have achieved remarkable rates of progress simply through playing the much-maligned Space Invaders. They were so absorbed in playing the game that they were exercising their weak abilities to make co-ordinated hand-eye movements far in excess of what their otherwise-unstimulated concentration would have allowed under normal physiotherapy. One young lad whose story caught my eye had been stealing money in order to play on the local Invaders machine. When he was caught there was uproar, and demands to have Invaders banned as dangerously-addictive increased, until someone made the association between the period of time in which the money had been stolen, and a sudden inexplicable increase in the lad's ability to eat unaided, to use the lavatory unaided, and to get dressed unaided. Until then, they had simply assumed that his improved abilities had come about as a result of some unidentifiable factor in his therapy. In fact, if memory serves me correctly, the long-term prognosis for this chap was that he would never learn to perform these simple activities unaided.

This doesn't automatically clear Invaders of any charges, as 'normal' youngsters have likewise been found spending huge amounts of money in order to play the game. (If they steal in order to play, that's obviously NOT the machine's fault, but the parents'.) But in no way can games be said to be a waste of a micro's power.

Health care is another field in which technology, especially in the form of micros, is making inroads. Last year I read of a micro application in an Accident department in which brain damage is averted. In the case of a skull fracture, for example as a result of a car accident, there is a risk that fluid can build up within the skull and begin to compress the brain and the blood vessels which supply it, causing damage. Under the old system, a nurse would check 'intra-cranial pressure' every 10 minutes, and if it was increasing, would inject a small amount of a drug to reduce the fluid build-up. Unfortunately with that system, sudden surges in pressure might not be picked up until it was too late. However, a new micro-controlled system which has been on trial, in parallel with the old system for safety I might add, is able to monitor the pressure every few fractions of a second (if necessary), and inject exactly the right amount of drug to keep the pressure not only within normal range, but constant, which is also of importance. This reduces the dependence of the subject on the vigilance of the nurse, and frees the nurse to perform other duties.

This kind of technology is being used in many disciplines, for example in cases of heart trouble. Just as you can buy a fuel-injection system which has chip-controlled metering of fuel for your car, tailored accurately to the performance of that engine, so you will be able to wear a form of pace-maker which performs a similar function for the heart (in fact, I believe such systems are already undergoing trials). As our knowledge increases in this field, it would not surprise me to learn that minor surgery will be undertaken by micro-controlled robots (until techniques utilising Nuclear Magnetic Resonance make surgery largely unnecessary) in super-clean conditions, with anaesthesia being undertaken by another micro. Look out also for genetically-engineered organisms replacing defective hormone-producing organs, making Diabetes a thing of the past for example.

As far as energy use is concerned, I find it a little surprising that few people seem to have realised that there is an overwhelming trend toward lower energy consumption in the years to come. This is nowhere more evident in the microchip world than in the new science of Photonics, which is the natural successor to Electronics. A new type of chip has been made whose power requirement is so low that there is sufficient energy in a beam of light to keep it going. Science-fiction scenarios in which light-guides will replace wires are possibly more accurate than we think. On top of that, two other major changes in this field will make differing contributions, whose outcome is not presently clearly defined. The first is the 'Biochip', a micro-chip whose components are not impurities in a silicon substrate, but are 'etched' onto a protein's surface. The processing abilities (and manufacturing costs) are sufficiently altered to make at least one company predict that it will launch its first product in two years time. Others claim that it can't be done with present technology — but then, that's what they said about Sinclair's products.

The second change is a move away from the two-dimensional structure of today's chips and towards a three-dimensional architecture. I remember a report two or three years ago in which (with typical journalistic sensationalism) it was claimed that the

first British 3D chip had been produced and it had astonished technicians by appearing to have 'human' qualities. What in fact had happened was that the technology had then been unable to produce the chip without flaws, with the result that signals crossed and gave unpredictable responses. It's funny that we can talk about a car 'sulking' when it won't start on a cold morning, but apply the same anthropomorphism to a micro-chip, and someone's stomach will get gripped by the dreaded cold chills of fear.

You can expect then that the advent of cheap 3D chips in home computers will really take the lid off things. So far I've only heard it discussed with regard to micro-processors, but if it can be applied to memory devices as well, then we could see a massive 64Mbit (64 megabit) chip where currently 256 Kbit leads the field. Stick eight of those in your micro and you'll have 65536K to play with onboard! All of it using so little power that the electrical potential of your skin would be enough to burn it out.

As far as transport is concerned, there are likely to be several different phases through which we will pass, before the uncovering of new technologies enable us to travel vast distances with little effort. There is an increasing use of micros in the auto industry, one avenue of which could lead to the 'driverless' car within a few years.

Apart from the research into cars steered by systems other than the standard steering wheel (begun with an eye to disabled drivers, and now undertaken with a view to reducing the injury risk in the event of an accident), most of the research appears to centre at present on anti-skid and anti-locking devices for heavy goods vehicles. These are beginning to filter down to the domestic car, as is the use of directional aids (tracking screens on the dashboard, and even satellite links to determine exact location) which have formerly been the prerogative of military warplanes and some commercial airlines. As radar systems begin to be incorporated into cars (to warn the driver if he is exceeding the safe proximity between himself and a vehicle in front, and to give warning of unlit hazards on dark roads — pedestrians, parked cars, fallen trees, etc.) together with road surface sensors to give warning of hazards like oil, ice, etc., it is likely that more and more of the vehicle's controls will come under the aegis of a controlling micro. At present, some heavy vehicles are fitted with a system for use on motorways. If an accident occurs, the police activate a small roadside transmitter which signals each cab as it passes, warning the driver that unless he begins to slow down within a certain time limit, the on-board micro will reduce speed for him, eventually bringing the vehicle to a halt unless over-ridden. This is an attempt to reduce the degree of motorway pile-ups due to 'motorway madness' where drivers consistently ignored all signs to reduce speed (whether it was poor visibility or actual road signs) and consequently produced horrific crashes. In addition, the on-board micro can be programmed to 'cruise' at a given speed, giving the best fuel economy and at the same time avoiding exceeding speed limits.

The logical extension of all this is a network of traffic computers, onto which you would log when embarking on a trip. For those wishing to retain control of their car, the local traffic computer could give you a route to your destination which fulfilled your requirements (much as the AA provide a 'direct' or 'scenic' route at one time) and which could be varied according to your whims. If you needed to refuel along the way, the on-board computer would warn you, and the local traffic computer could then be interrogated as to the nearest open service station and the quickest route

there. If you wanted to depart from the given route, an updated route could be readily provided. On the other hand, a 'trained' driver could sit in the driver's position, and let the local traffic and onboard computers handle the whole thing, avoiding stress and strain and more importantly the risk of accident due to fatigue, carelessness, ill-health, etc. As after 6 p.m. the number of accidents involving drunkenness is something like 4 in 6, this kind of control would be highly preferable. With both systems, any build-up of traffic would be sensed by the traffic computer, and cars entering the area would be redirected to less-congested routes. This system could also function for other vehicles; at present experimental bussing systems abroad are using the bus-stop terminal to obtain information about which potential passengers are waiting where, and wanting to travel to where, so that buses can be routed accordingly.

It is doubtful whether such systems, at least as far as the car is concerned, will be implemented in the near future: I had an argument, with a medic of all people, about the fact that computerised driverless cars remove the control from the human. The medic argued that no machine should take decisions for a human, and when I asked him about drink-drivers, he claimed that all drivers should have the right to drink and drive if they wished. When I pointed out that all victims of such driving had the right to not be victims, he claimed that that was irrelevant. What do you think?

I have noted lately that there is even a strong resistance to computer-aided diagnosis amongst the medical profession. The argument is that the machine might make a mistake and cause someone's death. The obvious answers to that are a) the machine is only an aid, not the final word, and b) fewer deaths would result from an increased efficiency and accuracy in diagnosis. A recent comparison between a computerised diagnostic system and various levels of medical experience (houseman, senior registrar, and consultant) showed that the computerised system was consistently much more accurate than even the consultant. (I don't have the exact figures to hand, but it goes something like this: accurate diagnosis by — houseman (40 - 50%), senior registrar (65%), consultant (75 - 85%), micro (95%). Bearing in mind that this form of computer use, known as Knowledge or Expert Systems, is still in its infancy, I would have thought that anything which improved the chances of being diagnosed correctly first time would be leaped upon by the medical profession, especially as it leaves the doctor free to give more time to his patient (the lack of which many of them lament). A study in which the diagnostic system was used in psychiatric cases showed that confirmed alcoholics were prepared to confide more in the machine than they were in doctors whom they may have known for many years. Part of the study showed that an alcoholic would admit to twice the consumption of alcohol to the machine — an intake which the standard system would have to guess existed (for example, if your doctor asks you how many cigarettes you smoke a day, and you say 10, and then he examines your tongue, he'll know that you smoke at least 20 - 30 a day; the suggestion is that if the machine had asked you, you would have answered 25). It seems that patients do not feel that they are being judged by the machine, or that the machine will think any less of them for what they have confided in it.

This seems as good a place as any to stop this rambling, as it will never end if I don't cease now! Let me know what you think, and what your alternatives (or further ideas) are. The address is given elsewhere.

Postscript

* SYNTAX ERROR
IN 980
IN ADDPIX
CALLED FROM DRAWER
CALLED FROM 300

True to form, things have been happening even as I produce the Babble. I mentioned in the Intro that Allen Burt had been having trouble with the Spriter program, and I had been trying to sort it out. On the left is a printout of the error message which I got eventually

after using successive BREAKs. Has anyone got any ideas? According to my Extended BASIC handbook, SYNTAX ERROR really means STRING-NUMBER MISMATCH, only I can't find one anywhere! Line 980 doesn't appear to have any such error, so what's happening?

I also now have a single disk, controller, and manager module, provided by TI through Paul Dicks, so that I can get on with cataloguing the software collection. (I shall not be reviewing the disk system, as it is not a current model, so comparisons would be of no value). Several things have become evident from the software I have looked at so far: firstly, most authors haven't put ANY details whatsoever with their programs. Not their name, the date, their address, not even whether any special peripherals are needed. I have had to list every single program in order to find out whether it runs under TI BASIC, Extended BASIC, Enhanced BASIC; whether it needs colour or can get by without; whether it needs the Speech Synthesiser, and if so, whether the Speech Editor has to be used or whatever; whether it can run on both a 4 and 4A, or whether it uses the daftly-named 'lower-case set', which doesn't give anything intelligible on a 4; whether the output is to disk, cassette, or thermal printer (or anything else for that matter); and so on; sometimes the programs don't do what they say they will (press 'Y' for continue, so you press 'Y' and the program ends!), or they leave you to contact a medium to try and understand what the program does and how it does it — there are often no instructions.

We have also had collections given us by other groups, and often programs are duplicated because each group keeps passing the same set of programs to new contacts. It won't be long before we start getting our own programs back at that rate! So a word to any new group who wants to swap collections: watch out for the duplicates!

I have also had a couple of articles sent to me which arrived too late to be included in this issue; they will appear next time. They are a report on the Which? Computer Show and Microchips and the Japanese, both by Nigel Clemons. Unfortunately I didn't allow sufficient time to type these up for inclusion, things being rather hectic just now. For future contributors, Tidings gets put together around the first week of the month of publication, so see if you can get your bits in before then. For those who want to take advantage of my offer to type up their contributions, please send me your items about the second or third week of the month prior to publication, so that I can fit everything in.

Changing Times I

Interestingly, while I was away over Christmas I picked up a copy of the

American magazine BYTE, and the article by Sol Libes contained much the same set of predictions that CT I had. Great minds think alike....?

I haven't been able to check the directly-available additional characters on the 4A, or to fully investigate the range of keywords in TI BASIC; no doubt someone will have something to add by next issue.

Do we have any teachers or educational users who would like to knock up a page or so of info to keep us all abreast of the times?

Next issue, with any luck, I will review the NEC 30 hour BASIC for those of you who are wondering whether to buy it.

Over the Christmas period I got hit by a hunk of inspiration, and although I have a feeling it won't really be of any use, if there are no takers for the This Is My Only Program In Whom I Am Well-pleased spot, I will present the outline of an idea for a 64/80/any size column word processor for the standard thermal printer. At present I don't have the time to develop it properly, and I have been advised that there are insufficient TPs around for it to be of any real commercial value. If anyone would like to contribute their ideas towards getting it actually up and running, you are welcome.

Well, that about wraps it up for the time being. There are no doubt thousands of things which I have forgotten to say, and even more typos which I haven't picked up, but at least it proves I'm human (but not sane!!).

Enjoy your programming,

Pete Brooks.

FORTH ON THE 99/4A

I have read advertisements from different companies selling installation manuals and source listings for the FORTH programming language on different processors, among them the TMS 9900. For example Micro Processor Engineering, Southampton, Personal Computer World, December 1982 p. 197 Source listing+ installation manual £19. Mountain View Press in California, Byte November 1982, p. 365. Fig-FORTH source listing+installation manual \$30 total.

Anyone who knows TMS 9900 assembly language – can FORTH be implemented this way on the 99/4A? Powertran is saying that they are going to implement FORTH on their Cortex computer, which is equipped with a TMS 9995 processor.

THE CORTEX COMPUTER

I have read some of the later issues of Electronics Today International (Nov.

1982-Feb. 1983 issues). They are running a construction project, called the Cortex computer. The interesting thing about it is that it is built almost entirely on TI components, as the TMS 9995 processor, the TMS 4164 64K dynamic RAM, 9929 Video Display Processor and so on. They sell it assembled for £395, kit £295. The price includes BASIC, called Power Basic, which is also from TI, including PLOT and DRAW commands. I have no idea about how this machine works, but it sounds interesting, especially when you compare the prices with TI's. Anybody who has seen this machine and can compare it with the 99/4A? I do not know anything about software for this machine.

Peter Brooks.

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by MIKE O REGAN

GETTING IT TAPED!

There seems to be quite a bit of discussion lately about the problems of saving and loading programs to/from cassettes, so I will add my own twopenn'orth for what it's worth. Let me say that, personally I have rarely experienced any difficulty either with my own tapes or with those written by other members. It seems that, if you have a decent tape-recorder (mine is a HITACHI TRQ 299 which was one of those originally recommended by TI), you should have no problem. One thing that hasn't been mentioned so far in the discussion is the fact that you can get away with murder if you only save and load your own tapes, as any variation in the tape speed (which is the usual source of problems) will be cancelled out. For instance I recently had a tape from another member and as soon as the leader tone sounded I knew that it wouldn't load because the machine which had saved the program was obviously running very slowly with the result that the playback speed on my machine was much too FAST. By the way, if there is anyone who would like to try a little experiment in the compatability of DATA TAPES of Music, written on the Music Maker Module I would like to exchange one or two tunes as a trial.

A WORD ABOUT PRINTOUT

For newcomers to these pages, I will give a short history of the various formats I have been using recently. First of all, in answer to critics, may I say that I have a good typewriter, but I am quite deliberately avoiding using it as I think that, where possible, I should make use of the facilities of the computer, and make it earn its keep, so to speak.

Last month I produced the tiny copy, (which was NOT reduced during the printing), on a SHARP PC 1500 and its plotter/printer, with varying degrees of success. The main reason for using the SHARP was that I had run out of TP Thermal Paper (why does it always take an age to get anything out of Texas???)

TIHOME FLOURISHING

With the recent price reductions, there has been (according to Paul) quite an increase in membership. And if the figures on sales quoted in PCS are anything to go by, there have been 20,000 99/4As sold in 1982. So far, TIHOME has attracted around 1/20th of these owners, so there is a long way to go. I suspect that many

people bought the 99/4 as a super-duper games machine and have restricted their activities so far to running games modules.

It must be only a question of time before these folks realise that there is much more to computing, then just watch membership rocket.

One effect of this has been that I have been having phone calls nearly every night from various parts of the country, usually asking for information. One chap was on the line for nearly 2 HOURS and that was from Huddersfield, (I think). I wouldn't like to pay some of the phone bills!!

Paul tells me that he is being inundated with calls also and some of the members who phone me say that Paul's line is very difficult to obtain. I am also getting quite a few letters, usually needing individual replies. I don't mind either the phone calls or letters, but with regard to the latter, I would be glad if at least a STAMP were included (some people do) preferably a stamped-addressed envelope. Also I must apologise for any delays in replying, but I am probably answering the PHONE! If any general queries arise, I will probably answer them through this column, rather than individually.

GAMES PEOPLE PLAY

I don't know about you but I am not much good at the fast-reaction games (INVADERS, MUNCHMAN, etc.) It must be ANNO DOMINI setting in. However, both my wife and son are becoming reasonably adept at these games and clocking up quite impressive scores (compared to the published scores in 99er and elsewhere). The trick appears to be to get used to the KEYS as quickly as possible and not use JOYSTICKS which are much too slow reacting for genuine officionadoes. Favourite at the moment is Tombstone City, closely followed by Munchman and a new game from 99er Mag. called BATTLESTAR which runs in ExBas. This game is remarkably simple in its concept, but, with one or two improvements, it becomes quite a challenging and frustrating game. For those interested and who have the original listing, I will print my "improvements" at the end of this article (if I remember)!

NUM & RES

I can never understand what makes people publish programs with odd line numbering — evidence of last minute alterations or de-bugging, especially on the 99/4. It is so easy to just press RES when you have finished editing (assuming you remember to change any REM Statements containing references to line numbers). This means that the published listing will start at Line 100 and be numbered in 10's (as if you didn't know!) and, of course, it is much easier to type in the prog. using the NUM command which numbers lines from 100 at intervals of 10. This may all sound like kids stuff to most of you but I assure you that not only are such listings appearing in the magazines but there are quite a few members who didn't know of either the RESequence or the NUMber Statements.

CHARACTER DESIGN

I am going to print this paragraph with the standard character set of the TP so that you can compare it with the rest of the article which was written using the set which I designed for this word-processor program.

Notice that the Standard Chars have no lower-case descenders (know what I'm on about?)

However, my custom characters are not exactly faultless. Maybe YOU would like to have a go at designing YOUR OWN set. There are no prizes, but I would be glad to have your ideas.

Use the CHAR DEFINITION Program from your Handbook, or, better still, get the amended version from the Group Library, which automatically restricts you to the required 5 x 7 Matrix.

Notice that the difficult letters to fit in are the lower-case e, s and a.

I will use the best char. set to produce the next RANDOM DOTS, so get cracking!!

MUSIC, MUSIC, MUSIC

The following point was raised by one of my correspondents. There are a couple of programs in the TIHOME software Library called Music Text Editor and Music File Player. These programs belong together, as although the Editor can be used on its own the File Player cannot – it was designed to PLAY music FILES written on the Editor. The only drawback is that neither program has any operating instructions. Now what you need to know is that the programs will only handle a maximum of TWO notes at once (TI BASIC can handle THREE as you are no doubt aware). Full instructions for using these programs are in 99er Magazine, Vol. 1 No. 1, which doesn't help if you haven't got a copy. The 99er also contains a demonstration FILE of a BACH 2 Part Invention, which is quite good, but of course cannot be LISTED from a DATA Cassette. All I can suggest is that anyone who has these progs. and no instructions had better borrow a copy of the above-mentioned 99er! (or alternatively, send me a s.a.e. and 50p. of stamps to cover the stationery.

BATTLESTAR IMPROVEMENTS

Replace (or insert) the following lines:

```
730 CALL HCHAR(2,16,115):: SA1=1
   :: IF L<80 AND SB1=0 THEN CALL
SPRITE(#1,116,12,17,120,12-(L/10
),0):: SB1=1

760 CALL HCHAR(12,9,112):: SA2=1
   :: IF L<80 AND SB2=0 THEN CALL
SPRITE(#2,116,12,88,17,0,13-(L/1
0)):: SB2=1

790 CALL HCHAR(23,16,113):: SA3=
1 :: IF L<80 AND SB3=0 THEN CALL
SPRITE(#3,116,12,175,120,-12+(L
/10),0):: SB3=1

820 CALL HCHAR(12,30,114):: SA4=
1 :: IF L<80 AND SB4=0 THEN CALL
SPRITE(#4,116,12,88,216,0,-13+(
L/10)):: SB4=1

845 CALL SCREEN(7)
846 CALL SOUND(1000,440,0,-5,0):
: CALL MAGNIFY(2)

895 IF SC>HSC THEN HSC=SC
896 DISPLAY AT(5,8):"BEST SO FAR
IS:";TAB(12);HSC
897 DISPLAY AT(15,8):"1000 IS GO
OD";TAB(8);"1500 IS EXCELLENT"

900 DISPLAY AT(22,1):"DO YOU WIS
H TO PLAY AGAIN? (N FOR
NO)"
910 CALL KEY(0,K,S)
911 IF S=0 THEN 910
912 IF K=78 THEN 950 ELSE 920
```

GETTING INTO PRINT 2

I recently realised that one of the reasons why so few 99/4 programs appear in the Micro Press may be due to the insistence of magazines (at least the better ones) on Computer Generated Listings. Now unless you have a printer (and I suspect that not many members have) this could be difficult to manage so I am making the offer that I will produce a printout (from CASSETTE only I'm afraid — I don't have discs) for any member for the nominal sum of £1.50 (including return postage of both cassette and listing). Let's hope that this might help someone to get into print.

UNCONNECTED DOTS

Congrats to STEPHEN on being the first to have TWO 99/4 programs in the SAME issue of a magazine — I like PETE BROOKS' run-down of the magazines in the last TIdings — watch out for some more programs in the magazines — still not sure whether I like the 4A — working on some SPEECH progs using the Terminal Emulator II — heard a rumour that Texas have a NEW MICRO about ready for launch (at about £70!!!, but don't know how true this is — ARGOS are now listing the 99/4A at £149 in their catalogue. Don't say that the £50 off offer has been consolidated into a genuine price reduction... surprise, surprise.

THE CAPS/LOWER CASE SWOP

You owners of a 99/4A don't know how lucky you are when it comes to the printed word. Let me explain. First, I have a 99/4 (without the 'A') which means that I only have one set of alpha characters to play with, so to speak, CAPITALS. Now, as you know, the 4A boasts another (small cap) set available on the SHIFT key. My word-processor, as published in PCW (Personal Computer World) in December uses a "custom" character set, which allows the 99/4 to produce lower case characters on screen and printer. Only recently did I have the opportunity to try out my program on a 4A and my joy at seeing the lower-case set on screen during the WRITING stage was more than out-weighed by my dismay at seeing what happened on Readback or Printout! Anyone who has tried this will know that the effect is to reverse the characters — upper case becoming lower and vice-versa.

To make the program run properly, delete the following lines:

```
2720 to 2790,      2900 to 2940
3150 to 3170,      3180 to 3200
4270 to 4320,      4390 to 4430
4640 to 4660
```

and amend the following lines to read:

```
2870 IF P <> 62 THEN 2950
4360 IF P <> 62 THEN 4440
```

STOP PRESS — PARSEC will NOT run on a 99/4!!!

RAMBLES

by
Stephen Shaw

Welcome to another edition of RAMBLES. You have a lot of topics to consider this month – something for everyone.

The good news is I now have a 99/4A – 2nd hand, from a dissatisfied owner who got fed up waiting for the RS232 interface to appear, and moved up to a BBC with which he is very happy. Having both a 99/4 and a 99/4A I can see a lot of differences not yet made public – so as our first item, especially for members from the early days with 99/4's, here we go...

99/4 and 99/4A

Apart from the obviously different keyboard there are other not obvious changes. The keyboard change means that for programs to run on BOTH consoles, when using the split keyboard (CALL KEY 1 & 2) you cannot use keys which return the codes 13, 16, and 17. When using a split keyboard on the 'A' the key value 0 (zero) does NOT equate to zero – you must use indirect means such as IF A+1 = 1. Now – non obvious: The 99/4A has a different character set – not only are small characters made available (with some clever internal routines) but the big letters are BIGGER by one pixel. The result: A fairly crowded screen AND – if you are fortunate and have a thermal printer – TP.U.S.E. does NOT work. (It works, but badly, with no space between letters, vertically).

Mike O'Regans recent list of character codes was for the 99/4 – a list for the 4A follows later.

The luminance of the various colours is different on the 4A – there are especially large changes in Dark Yellow (much lighter on the 4A) and LIGHT RED and DARK GREEN (both much darker on the 4A). Thus colour combinations which look good on a 99/4 may not look so good on a 4A. (& vv) and probably there are different colours on US NTSC consoles too....

The 4A is slightly less likely to crash through static corruption, and seems better able to handle the modules – but crashes due to non-communication with a module are not unknown. (To correct, swith off. Remove module. Swith on (except Mini Mem!!!) and insert module. For Mini Mem, insert module THEN switch on and keep trying...

CASSETTES

and cassette players – two complaints to hand. Several regarding the SANYO SLIM LINE which seems to be a bit variable. The BOOTS 225 is NOT a good buy, although if you can find it the BOOTS 325 is the BEST buy. Cassette players without tone controls are a headache, but finding a player WITH a tone control is getting harder as there is a move now for audio use to MICRO cassettes. The use of audio cassette players for computers may not last many more years.

One nationwide chain is charging over a pound for a C12 cassette for computer use. DO NOT BUY. You can purchase very good C12 or C15 cassettes from W.H.Smith for 50p – there is no reason to pay over 60p. However be suspicious of much cheaper

tapes: computers do need good quality tape.

SALES NEWS:

Here in the North West there was hardly any stock of Consoles from early December. From a small consignment arriving in the UK Mid-December, only two dealers out of 19 received anything – and one of them only received 4 consoles. Next delivery appears to be February. That's a very large number of potential sales lost to the SPECTRUM or the BBC, which both appeared to maintain deliveries. ATARI and VIC both in very short supply before Christmas.

CASSETTE CABLES continue to be worth their weight in gold. Why don't TI pack a set with every console?

The 99/4A MANUAL is much emasculated. From having the BEST manuals TI (moving towards a less sophisticated market) have DOWNGRADED the manual. No longer is there a BEGINNERS BASIC. This is PARTLY incorporated into the only manual. NO proper index is to be found. Lots of useful information has been discarded.

NOTE TO 99/4A OWNERS

Both 99/4A manuals (original and shortform) are in error (at least, misleading) in the section on SAVING DATA IN TI BASIC. This refers ONLY to saving PROGRAMS. To save DATA as such, see the command OPEN. When you wish to save DATA to tape (or disk) you must open a FILE, and the data is saved in records – on tape the OPEN command will run some blank tape on, and each PRINT to the open file will record a short section of tape. By recording in sections like this, a great deal of time is taken up with the pilot tone every time. Also the only way to VERIFY tape data is to load it – unlike PROGRAM data there is no verify option (but see TIDINGS Aug 82, page 42 for a VERIFY option available with the PRK & STATS Modules in TI BASIC.)

SAVING DATA TO TAPE

YOU MUST OPEN A FILE TO TAPE – the following format is recommended as a start. When the program executes the OPEN command, a blank header will be written to the tape – e.g. the computer will move the tape a predetermined distance, with nothing on it. To load data from tape:

```
OPEN# 1 :“CS1”,INPUT,INTERNAL,FIXED
```

To save data to tape:

```
OPEN# 2:“CS1”,OUTPUT,INTERNAL,FIXED
```

Thus, having opened the file, you have to use it – if you have opened an OUTPUT file, to save data, you save it with A MODIFIED PRINT COMMAND:

```
PRINT# 2: VARIABLE (or value).
```

CLOSE the file when you no longer need it with CLOSE # 2 if you have opened a file to READ data from tape, you use a modified INPUT command:

INPUT # 1: VARIABLE

Do not forget to close the file when you no longer need it. After you have saved data to tape, you must rewind the tape, and then when you OPEN the input file the data will be where it should be on the tape.

VARIATIONS:

The above is a gross simplification. For each record on the file the VARIABLE you input must be in the same form as the variable you have printed — e.g. if you have printed a string variable you MUST input a string variable. If you have printed more than one variable —

e.g. PRINT # 2: A,B,C,D

you MUST input this record in this form — e.g. in this case 4 numeric variables:

INPUT # 1: A,B,C,D

The LENGTH OF THE RECORD WHEN FILES ARE OPENED AS ABOVE IS 64 BYTES — a NUMBER takes up 9 bytes (whether it is 1 or 12345!) and a STRING takes up one more byte than the string has characters. Thus if you PRINT four numbers to one record, you have used 36 bytes of the available 64. If you need longer records this IS possible. You may add to the OPEN definition a number after the word FIXED — either 128 or 192. If you use any other number, the computer will use the next largest available number (64,128, or 192). You CAN use DISPLAY type files — but don't worry about those yet — that can come later! Note that you CANNOT use tape files unless you have a working remote control. The FILE NUMBERS 1 & 2 have been used in the examples, but you can use any number up to 255. You may only INPUT or PRINT from/to a file which is actually open. For simplicity only keep one file open at a time.

DEFINITIONS:

FILE: Think of this as a box — you need to open it to put data in or get it out.

A file is opened with the key command OPEN, and the combination lock is the FILE DEFINITION which tells the computer either how to store the information, or how it is stored.

RECORD: Think of each PRINT to a file as comprising a single record. A record MAY contain more than one value — but you must INPUT the correct TYPE of value and the correct NUMBER of values, or an error message will occur.

You CANNOT verify data in normal TI BASIC except by reading it in the usual manner. Storing data on tape takes time and can take a long time, as each record is recorded twice AND preceded by a pilot tone.

The PRK, STATS, and certain other modules, store data on tape in PROGRAM format — which takes less time and can be verified. To do this in TI BASIC you must have the PRK or STATS modules and use the procedures detailed in TIDINGS of August 1982.

RIP OFF 1: We have heard of one dealer who sold a DEMONSTRATION 99/4A at FULL PRICE. The purchaser was informed, but still has received a pretty bad deal. DEMO consoles take a fair beating.

RIP OFF 2: My US\$18 to the International Home Computer Users as has so far resulted in ONE 8 page newsletter. Hmmmmm.

BOUQUET: Received the November newsletter from the International 99/4 Users Group (Oklahoma) – nice. pto for more details...

If you have the Mini Mem and want to see A SPRITE – try this: it's from the Nov. 99/4 User Group newsletter –

```
100 CALL CLEAR
110 CALL PEEKV(768,98,128,161,1,208)
120 CALL POKEV(1920,50,50)
130 CALL LOAD(-31878,1)
140 GOTO 140
```

After use you may need to key in, in command mode, CALL LOAD(-31878,0) then (ENTER).

EXTRACTS

International 99/4 Users-Group NEWSLETTER November 15th 1982.

(Subscription: US\$ 12 p.a.)

(P.O. Box 67, Bethany, OK, USA, 73008. US FUNDS ONLY: STERLING NOT ACCEPTED).

Points out that Extended Basic will permit RUN "CS1". Gives short programs to read TE2 data in Extended Basic, and to right-justify numbers. Has an interesting article on Assembly language (there ARE errors in both the article and listings, but they are still of interest). Shows how to use a SPRITE in TI BASIC using the MINI MEMORY MODULE – see above for listing. In detail:

Line 110 – starting at VDP memory address 768, puts 5 values in
98=pixel row 128=pixel column
161=character (ASCII code plus 96)
1= colour code plus 1 208=end marker/binary switches etc. etc.

Line 120 – puts in the VELOCITIES for the sprite in memory location 1920 and 1921.

Line 130 enables ONE sprite to move.

Note that the memory location amended by line 120 is in the STACK area, and if there is any use of stack in your program, you can't do this, 'cos the location changes – and strange things happen... However, if you are satisfied with a non-moving sprite (and they are useful!) then all you need is line 110.

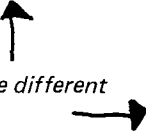
Here are a couple of extra programs for you to try (if you experiment yourself, please DON'T ask me why what happens happens – at the moment its strictly by experiment!).

News that DISK MANAGER 2 is coming (for double sided disks), also FORTH (format unknown). A possible extra is a disk manager for DOUBLE DENSITY DISKS. (Disk Manager 3?)

PARSEC requires the speech synth for speech, and again it won't work on a 99/4.
WATCH OUT FOR THIS GAME !!!!!

Extra progrs for MMM in TI BASIC:

100 CALL CLEAR	100 CALL CLEAR
110 MEM=768	110 FOR T=1 to 150
120 FOR I=0 TO 15	120 CALL POKEV(768,30+T,
130 CALL POKEV(MEM+I*4,20+I*3,	40+T/2,1 61+T/12,(T/1)/10+1,
140 NEXT I	208)
150 CALL POKEV(832,208)	130 NEXT T
160 GOTO 160	140 GOTO 100

 *Note the different results!*

100 CALL CLEAR
110 MEM=768
120 FOR I=0 to 15
130 CALL POKEV(MEM+I*4,40+I,40+I*9,
161+I,15)
140 NEXT I
150 CALL POKEV(832,208)
160 GOTO 160

99'er Magazine

Although we hope that by now TIHOME has brought you good news about 99er Magazine for 1983, you may not find it easy to find the first of the monthly copies – November 1982. Back Issues ARE available from the publisher as follows:

Funds must be in US Dollars on the USA (Buy a draft from your Bank – Barclays can issue a cheap International Money Order on the spot (about £1 charge).

Vol. 1, Issue 1 is **out of print. Also, 2,3,4 & 5!!**

Vol 1, Issue 6, and Nov. 82 and Dec. 82 are available for US\$ 5.50 by surface mail or US\$7.50 by airmail. (Prices are PER ISSUE).

Write: 99'er Magazine, P.O. Box 5537, Eugene, OR, 97405. Allow 6 weeks for processing.

NOVEMBER 82 issue – Discussion of 99/4A Languages. Overview of Extended Basic. An Assembly language program to dump screen contents to the TI 80col printer. Introduction to the p-Code Card. New language—ASPIC—listing. 3 simple games listings.

TI LOGO

TI helped in the development of LOGO – not strictly a language, rather a philosophy. Not surprisingly they had the first available LOGO, and not surprisingly it was imperfect. Hence LOGO 2. Coming soon at the same price. Much improved. LOGO 2 could be delayed though – as it was announced, several bugs were found

in LOGO which had not been corrected in LOGO 2. It may be subject to a re-write — or be issued with the bugs.

The story of LOGO is told by its inventor Seymour Papert in his book 'Mindstorms'. Now out of print in the USA, it is printed in the UK — the 1982 reprint costs £4.50 — details:

ISBN 0-71080-472-5 (paperback).
 'Harvester Studies in Cognitive Science No. 14'
 Harvester Press Ltd.,
 16 Ship Street,
 BRIGHTON, Sussex.

This 230pp book makes interesting reading even if you have no intention of buying LOGO (NB: LOGO and LOGO 2 both require the 32K RAM). Ask your bookseller for a copy or write to the publisher.

Here is a short excerpt from the book:
From MINDSTORMS by Seymour Papert (c)1980:

'Logo is the name of a philosophy of education in a growing family of computer languages that goes with it...

LOGO is not a "toy", a language only for children

... it is designed to provide very early and easy entry routes into programming for beginners with no prior mathematical knowledge.

... LOGO is never conceived as a final product or offered as "the definitive language." Precisely because LOGO is not a toy, but a powerful computer language, it requires considerably larger memory than less powerful languages such as BASIC."

99/4A Character Definitions:

60	000C10E040E01000
61	00000007C007C00000 =
62	0020100804081020 >
63	0038440408100010 ?
64	0038445C545C4038 @
65	003844447C444444 A
66	0078242438242478 B
67	0038444040404438 C
68	0078242424242478 D
69	007C40407840407C E
70	007C404078404040 F
71	003C40405C444438 G
72	004444447C444444 H
73	0038101010101038 I
74	0004040404044438 J
75	0044485060504844 K
76	004040404040407C L
77	00446C5454444444 M
78	00446464544C4C44 N
79	007C44444444447C O
80	0078444478404040 P
81	00384444444544834 Q
82	0078444478504844 R
83	0038444038044438 S
84	007C101010101010 T
85	0044444444444438 U
86	0044444428281010 V
87	0044444454545428 W
88	0044442810284444 X
89	0044442810101010 Y
90	007C04081020407C Z
91	0038202020202038 [

Compare with p.45 of Tidings, August '82.

The item at the bottom of the page isn't an ad (honest) its an Editorial (contributorial ????) commendation. If you like thinking, recreational maths can be good fun – you can always find inspiration for a computer program... note the address is different from that given in these pages previously.

I have advertised elsewhere a program in Extended Basic called SMASH. So few have disk drives, I can't rely on anyone to review it, which is a good excuse for a bit more info here – I smashed two programs of the same length – one took 90 minutes, the other 30 minutes! The memory savings were 160 and 260 bytes – the programs were already quite compact. Interesting to see the creation of program lines extending over 7 screen lines. Not everyone's cup of tea perhaps, but another reason to consider selling your spare shoes and buying a disk drive.....?

(NOT AN AD)



CUBIC CIRCULAR

A quarterly newsletter for Rubik Cube addicts

The CUBIC CIRCULAR was established last year as a newsletter for Rubik's Cube and other puzzle enthusiasts. In the first year, three issues (No. 1, No. 2 and No. 3/4 (Double Issue)) appeared, totalling 68 pages – nearly 50% more than planned! A major feature of the Circular is the coverage of new puzzles. Puzzles discussed include cube variations, Pyraminx, the 4³ or Rubik's Revenge, Crossover, Bloxbox, Varikon Boxes, Puzzle Box, Mad Marbles, Whippit, Tower of Babel, Missing Diogenes, VIP Sphere, Rubik's Range, Magic Domino, Magic Dodecahedron, Trajber's Octahedron, Pyraminx Star, Pyraminx Cube (= Skewb), Magic Octahedron, the 5³, the 3⁴, Alexander's Star and the Magic Disc.

All the major competitions and Cubathons have been reported, as well as one-handed solving, behind the back solving, underwater solving, cube divorces, cube songs, new cube patterns, Rubik robots, cube medical problems, etc., etc.

Circular 5/6 (Another Double Issue) is now being mailed. It covers Pyraminx patterns, some 4³ strategies, IncrediBall, Tsukuda's Square, the Shinsei Mystery and related geometric puzzles, results on God's Algorithm, Cubism and religion!

If you want to keep up with what's happening, you should subscribe to the CUBIC CIRCULAR now!! Subscriptions are £4.00 (\$8.00) for the second year. Back issues of the first year are available for £3.00 (\$6.00). A superb Christmas gift! Send your name, mailing address and payment (payable to David Singmaster or UK Giro account 55 103 9205) to:

DAVID SINGMASTER, 87 RODENHURST ROAD, LONDON SW4 8AF,
UK.

If you have seen a copy of 99er Magazine by now, you may have seen a continuing mystery 'Who is REGENA' – a mystery contributor – well, the cover has been blown in another American mag – not famous for covering the 99/4A.

In the FIRST contribution for the 99/4A, "COMPUTE!" has an article by... C. REGENA of CEDAR CITY, Utah! There are eight sorting routines for the 99/4A – report later if time permits. The relevant issue is DECEMBER 1982. I was interested to see that COMPUTE! has incorporated RECREATIONAL COMPUTING MAGAZINE and is normally for the APPLE, COMMODORE & ATARI computers.

PARSEC has arrived !!!! and at a quite reasonable price too – at time of writing £25. You need the speech synth for the voice, but when did you last see a computer program which put a NAME to the voice? (see inside front cover of PARSEC manual...) It IS female – and for micros, VERY 'state of the art'. (e.g. staggeringly good). Nice game – look out for it... (WON'T work on 99/4) . (Also a rumour of possible price reductions, probably known by the time you read this – e.g. of disk system etc.)

The program 'Target' in Computer & Video Games January 1982 is in EXTENDED BASIC VERSION 100. It will not run in TI BASIC. To convert to Version 110, amend the Definition of A7\$ by adding &RPT\$ ("OO",22) and it should work OK.

COMPUTE! (more...)

Nice to see the 99/4A has 256 Sprites ... these computer mags almost make the daily press look truthful...

There is a regular column on LOGO from FRIENDS OF THE TURTLE. The current (Dec 82) issue: the article deals with FRACTALS and gives various LOGO procedures. Listed in APPLE LOGO but the conversion notes.

– and that is a feature of this magazine I have not seen elsewhere – programs are listed in several versions, with conversion notes as well. The versions used are: PET, OSI (?), ATARI, VIC 20, and APPLE II. Now – this gives you some good material to work on in translating other programs to 99/4A. APPLE is very similar to EXTENDED BASIC too – from all the versions you should be able to make up a 99/4A version (and could pick up some programming tips too...)

Those sorting routines mentioned above – for 100 random numbers, the four TI BASIC programs took: 138 secs, 67 secs, 55 secs, and 56 secs. The first 3 EXTENDED BASIC programs took: 169 secs, 80 secs and 73 secs. (Times may vary on different systems).

-) By comparison – TIHOME published a quicksort routine in TIDINGS,
-) Volume 1, Issue 6 (Back issue £1.50).
-) Converted to Extended Basic, this routine took ONLY 21 SECONDS to
-) sort the same 100 random numbers!!!
-)
-) TIHOME BRINGS YOU THE FASTEST SORTS.....

MORE MINI MEMORY MUMBLES....

APPEND

If you have problems opening APPEND files (this is for those of you quite advanced into file operations....) just try dropping the file definitions and open as
OPEN# 1:"MINIMEM",APPEND.

This can be used with files opened previously as OPEN # 1:"MINIMEM", OUTPUT etc. The default values apply – e.g. SEQUENTIAL, DISPLAY, VARIABLE 80. APPEND can ONLY be used with VARIABLE records, but you can specify a different length e.g. VARIABLE 100 etc. N.B. This length is the MAXIMUM length of the VARIABLE file.

DISPLAY is OK if you are only putting single values into each record, but as you will see becomes obscure for multi-value records. You should therefore specify INTERNAL. Because APPEND can only be used with VARIABLE records, you are also stuck with SEQUENTIAL records – you cannot specify a RELATIVE file.

so– OPEN #1:"MINIMEM", SEQUENTIAL, INTERNAL, VARIABLE 100, APPEND is OK. (The restrictions on the use of APPEND appear in the Extended Basic Manual, which also indicates the default values – MINIMEM appears to be treated in the same way as a disk drive).

CURSOR / CHARACTER DEFINITION WITH MMM:

Characters are defined (according to the MMM Manual) in VDP Memory 1024 to 1535. This actually covers Chars. 32 to 96.

Chars 97 up only occupy memory when defined (clever – the small letters are normally derived from the definitions of the larger ones – they don't usually take up memory!!) – in which case VDP memory 1536 up. is used.

Now – courtesy of P Brooks Esq. Characters 30 and 31 are ALSO defined in VDP ram – 1008 up. Each character definition takes up 8 bytes, each byte defines one row of pixels – the value stored is the decimal form of the 8 number binary number formed by whether the pixels in the row are ON (1) or OFF (0).

Thus a full row is 11111111, or in decimal form:

$$128 + 64 + 32 + 16 + 8 + 4 + 2 + 1 (=255).$$

To define a box-cursor, use CALL POKEV(1008,255,129,129,129,129,129,129, 255). Try it. (Normal cursor is restored by the system on reset/switch on/etc. This is the age of the personalised cursor (with Mini Mem only).

```
FOR MINI-MEM      100  CALL INIT
(sample)          110  OPEN #1:"MINIMEM",OUTPUT,VARIABLE
                  120  PRINT #1:AAA
                  130  CLOSE #1
                  140  OPEN #1: "MINIMEM",APPEND
                  150  PRINT #1:1234
                  160  CLOSE #1
                  170  OPEN #1:"MINIMEM", INPUT
```

```

180 INPUT #1:A
190 INPUT #1:B
200 PRINT A,B
210 CLOSE #1
220 END

```

Over New Year I played with a couple of other 'minority' computers — a Sharp (OK but not what I want) and a HEWLETT PACKARD Micro, with built in screen, printer and tape cartridge mechanism. With separate flat bed plotter and hi-res two level digitiser tablet. Mouth watering. Much easier moving a cursor over the screen using a stylus and digitiser. (Cost: A great deal more than a TI!!!!) The EPSON has now arrived in Manchester too — very neat.

As DECEMBER TIHOME TIDINGS did not MENTION 99'er — here is more news —

The JANUARY issue has arrived — by airmail — January 8th — but NO December issue — I think they forgot? — so one airmail letter duly going out. In the January 83 issue is some bad news — issues 1 to 5 out of print — and some good news — "The Best of 99er Volume 1" is due to be published shortly.

There are two games programs — one a variation on YAHTZEE and the other a variation of SIMON.

A very useful article on using the Mini Memory to write Assembly language programs —

e.g. With Mini Memory:

- i. LABELS may not exceed 2 bytes (6 with Ed/ass)
- ii. Only 7 directives available (28 with Ed/ass)
— e.g. NO DEF, REF, EVEN, or BYTE — and others!
- iii. YOU have to decide where in memory the program starts — using AORG. The default 7DOO allows the use of 9 labels only.

All the usual departments.

EXTENDED BASIC : THE DEFINITIVE ANSWER:

You may sometimes find mention of the following line:

```
CALL INIT :: CALL LOAD(-31878,0)
```

This line causes VERSION 100 of Extended Basic to work much more quickly when the memory expansion is connected. If you have VERSION 110, you do not need this line, but you will obtain a small increase in speed by adding the 32k ram expansion.

Here are timings for one sample benchtest program:

Version 100 + speed up line	73 seconds
Version 110, NO 32k ram.....	74.5 seconds
Version 110 + 32k ram.....	72 seconds

As Mike pointed out in last TIdings, the speed only becomes apparent in long programs, and there may be a wider divergence of timings in longer programs, where line transfers and screen displays are used.

BUG: The version 110 I was supplied with has a bug in the sprite subroutine. This has caused some suppliers problems, as programs written on machines without the bug sometimes don't work on machines with it.



Try this:

```
10 CALL CLEAR :: CALL CHAR(40,RPT$( "F",16))
20 CALL SPRITE(#1,40,2,200,100,#2,40,2,240,100)
30 CALL SPRITE(#3,40,2,100,150,#4,40,2,140,150)
40 CALL MOTION(#1,1,0,#3,1,0,#3,1,0,#4,1,0)
50 GOTO 50
```

On UNBUGGED ExBas there are 4 sprites moving down screen. With the bug Sprites 1 & 2 become joined together. This bug involves sprites defined off screen and then moved onto the screen. They do not appear quite as they should.

A comment from TI would be nice.

What has happened is that Vn110 has been rewritten to automatically count how many sprites are active and place that number in -31878. When you define a sprite off screen it is not considered active until it is moved onto screen — and the small time delay while -31878 is amended is sufficient to cause this problem.

The problem is a little more complicated because there are different operating speeds (see previous page) which means that sometimes the two sprites in the sample program may be separated by a pixel or two — they should be separated by 40 pixels.

If you HAVE the bugged ExBas and also the 32k RAM, you can see how the unbugged ex bas works by adding this line:

```
5 CALL INIT :: CALL LOAD(-31878,4)
```

We are here cheating and telling the computer there are 4 sprites, and there appears to be no delay in updating this value when the sprites appear on screen. This is not very useful in a fast program with sprites being defined off screen all the time.

COMPUTE, DEC.82

Surrealism rules O K

The Crabs have taken to the air, armed with bricks and bombs, to drive out friend, DEADLY DUCK out of his pond. But Deadly's gonna fight back, with a gun tucked into his bill. Lots of fun and action, 6 levels of play. Requires joystick. *NOT for TI!*



What do YOU think of Pornography on Computers? We don't have any on the 99/4A (yet) — but we have heard of: 'Interludes' — a sort of computerised 'sex maniacs diary' with Manual. This sold enough to generate a satirical copy (Apple/TRS80).

–Strip Poker – with hi res colour graphics.....
–and for the Atari an ‘Adventure’ with explicit animated graphics....
Well, what do YOU think?

FT: 14.1.83:

Private placing values Sinclair at £136m

Sinclair Research, the personal computer company, has been valued at £136m by a private placement of 10 per cent of its equity with City institutions, N.M. Rothschild, the merchant banker, has priced the 400,000 shares on sale at £34. Final allocation of the shares is not expected until next week. Mr. Clive Sinclair, who owned 95 per cent of Sinclair Research is expected to raise nearly £13m from the sale of the shares. Mr. Ian Henry, who owned the remaining 5 per cent of the company is also selling 10 per cent of his shares. Sinclair Research was founded in July 1979 and sold its first product in February 1980. Investors have been told the company expects to make a profit of £14m on sales of £50m in the year ending March 31, 1983. Last year the company made a profit of nearly £9m on sales of just over £27m. The finance raised by the share sale will largely be used by Mr. Sinclair for one of his pet projects to produce a low-cost, battery-driven town car. Sinclair Research is expected to seek a public quotation in about one year's time.

→ Sinclair Research has sold over 900,000 computers since it was founded. It is expected to launch a pocket-sized black and white television later this year which will sell at about £50. Most of its products are made by Timex at Dundee. Earlier this week Mr. Sinclair threatened to move production away from Timex, if the workforce went on strike over redundancies involving other products.

Would YOU like to write a piece for TIDINGS? Review some software perhaps? Share your discoveries – or problems. Do let me know if you want any type of program in short supply – I'll pass on such requests to U.S. programmers and we MAY have a result!

*I am S. Shaw at
10 Alstone Road,
STOCKPORT Ches. SK4 5AH.
S.A.E. for a reply please!*

←.....British Leyland
Watch Out!

N.B. Editorial address on last page of TIDINGS. Only send material for RAMBLES direct to me.

CURIOS — Computer & Video Games have asked me to invoice them in respect of programs of mine they publish...

In retribution for Pete's comments in last TIDINGS they published my program POMPEII illegibly... black print on black paper is awfully hard to read... February issue, page 45. The blocked off portions are as follows:

970-1140

1210-1280

```
970 ON ERROR GOTO 1000
980 OPEN #1:"POMPEII.B" FOR OUTPUT :
FOR IN=1 TO 300 : READ A$ : IF
A$="END" THEN 1020
990 PRINT #1:A$ : NEXT IN : CL
LL CLEAR
1000 REM NO MORE
1010 REM
1020 CLOSE #1 : CALL CLEAR : O
N ERROR GOTO 200 : GOTO 1080
1030 CALL SOUND(200,440,0): PRINT
"CAN'T ACCESS PRINTER" : FO
R IN=1 TO 800 : NEXT IN : RETU
RN 920
1040 CALL CLEAR : FOR IN=1 TO 3
00 : READ A$ : IF A$="END" THE
N 1070
1050 IF IN/19=INT(IN/19) THEN PRI
NT "PRESS ENTER TO CONTINUE" :
INPUT A$ : CALL CLEAR
1060 PRINT A$ : NEXT IN
1070 REM
1080 REM INPUT NAMES
1090 PRINT "PLAYERS NAMES:MAX 3
CHARS:"
1100 INPUT "PLAYER ONE:"P$(1):
IF LEN(P$(1))>3 THEN 1100
1110 INPUT "PLAYER TWO:"P$(2):
IF LEN(P$(2))>3 THEN 1110
1115 IF P=0 THEN P=1
1120 GOTO 230
1130 FOR COUNT=1 TO 200 : NEXT
COUNT : RETURN
1140 END
```

```
1010 DATA THE VALUE OF ONE COUNT
ER MAY BE USED TO "FILL" ONE COM
PARTMENT OF THE SUM OR DIFFERENC
E OF TWO COUNTERS MAY BE USED.
1020 DATA WHEN(OF) ALL FACEUP CO
UNTERS ARE USED UP THOSE WHICH I
NITIALY FELL,BLANK UP ARE RETAR
D AND PLAYER ONE CONTINUES
1030 DATA UNTIL HE CANNOT USE A
COUNTER OR NO COUNTER,FALLS FACE
DOWN.
1040 DATA WHEN THE FIRST PLAYER
CANNOT CONTINUE THE TOTAL VALUE
OF ALL FACEUP COUNTERS AND ALL
UNROLLED COMPARTMENTS IS ADDED
TO HIS
1050 DATA SCORE. A LOW SCORE WIN
S. PLAY TERMINATES IN THIS VERS
ION WHEN AFTER THE SECOND PLAYER
FINISHES A ROUND ONE PLAYER GOO
RES
1060 DATA OVER 100,....
1070 DATA IN COMPUTER PLAY THE C
OUNTERS WILL APPEAR ON THE LEFT
SIDE OF THE SCREEN,THE COMPARTM
ENTS ON THE RIGHT
1080 DATA THE PLAYER PLAYING IS
INDICATED,AND BOTH SCORES,AT TH
E END OF A PLAYERS TURN,THE SCOR
E FOR THAT TURN IS FIRST SHOWN
```

A TIHOME member recently sent me a program from the library, accidentally destroyed by our Librarian when he added the program details. When stack and program are close together (either cos its a big program or a full stack), editing can result in the line index being overwritten — result a destroyed program which won't run. Usually such a destroyed program results in a system lock out in TI BASIC, with memory contents being printed out if you have tried to LIST. With VERSION 110 it appears that trying to LIST does NOT cause a lock out. Interesting. But strange.

I have not seen any reviews of the CASIO computer — full size keyboard with LCD display & printer (NOT the tiny hand held one). Price is £350. Looks too expensive but no technical details known. Fiendish japanese — they are calling it a PROGRAMMABLE CALCULATOR (the size of a BBC 'A' ????) It has single key BASIC keywords.

LANGUAGES

I am hearing a lot recently from owners (including members) who are very confused with TI's range of languages, so here is a summary to help out a little:

TI BASIC is what you have in the console when you buy it.

Sometimes referred to as Console Basic.

EXTENDED BASIC is a more powerful basic. You need to buy the Extended Basic Module.

Other modules also extend console basic – for instance, the Personal Record Keeping & Stats modules add some very useful commands – details 50p from T|HOME – and this is referred to sometimes as Enhanced Basic.

The Mini Memory Module adds commands, the Editor Assembly module adds different commands – these may be referred to as MMM Basic or EDAs Basic respectively.

Note that you can use only ONE module at a time. Extended Basic allows you to use the 32k ram expansion but it is NOT required.

LOGO & LOGO 2 require the 32k ram expansion.

PILOT requires the P System card, the Box, and a disk drive + controller + 32k ram.

Assembly Language comes in several formats – watch out for the system requirements specified with the program, the formats need not be compatible.

Please note: Extended Basic programs DO NOT RUN in TI (BASIC).

EVAL function – In response to my earlier 'feeler' the postman came up the path reeling under the weight of ONE letter, so this is going to be short.

With the MINI MEMORY you have the power to write a program line BY a program – using CALL POKEV to place the various codes which make up the line into the correct memory locations.

To see a program line, type NEW, then enter one line of program. Now add:

```
For T= 16360 TO 16383  
CALL PEEKV(T,A)  
PRINT T;A;CHR$(A)  
NEXT T
```

Now RUN and the computer will print on the screen the internal coding for your program line!

Each line of program is separated by a value of ZERO.

For full details of the codes used for commands, numbers and strings, see TIDINGS Volume 1 Number 3, pages 38 & 39 (Back issues £1.50 from Paul).

It is possible as your first program line to use a 'dummy' line such as:

```
DEF A=AAAAAAAAAAAA+AAAAAAAAAAAA+AAAAAAAAAAAA
```

You can now amend the line using CALL POKEV. For an EVAL function you must write a subroutine which inspects your input string and takes it apart, breaking it into proper commands, variables, numbers and so on. Your subroutine then

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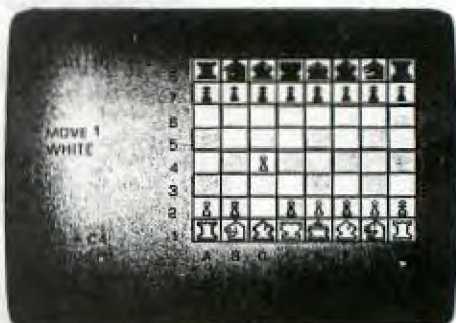
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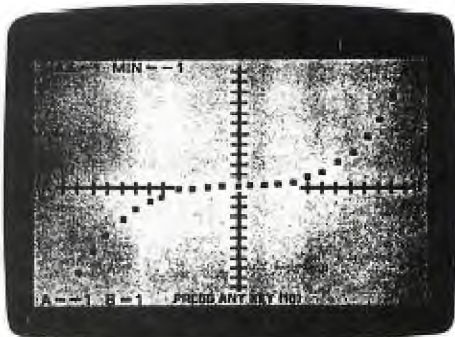
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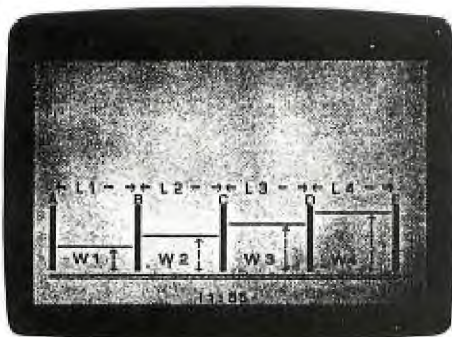
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has to POKEV the correct codes into that dummy line, so you could end up with:

```
DEF X=SIN(X-Y)*5+AAAA+AAAAAAAAAA+AAAAAAAAAA
+AAAAAAAAAA
```

Those 'AAA' variables have a value of zero so don't worry about them.

Now whenever your program meets X, reference is made to this line and X takes an appropriate value depending on the current values of X & Y.

NOTE You MUST NOT edit this dummy line, otherwise it takes a new location in memory. In the PEEKV sample above, to see another line you should type NEW, or look at lower memory locations.

(This procedure will not work if a disk controller is connected and switched on, as programs are then stored differently).

Hmmm...

In the Nov 15th issue of the Newsletter from the International 99/4 User-Group (Oklahoma) it is stated (p.2):
'The statement CALL LOAD(-31878,0) DOES NOT disable the sprite motion in Version 110 of TI's Extended Basic'

Sorry to disagree, but it DOES in MY copy of Version 110. (32k ram required)

99/4A Mark 2?

Would you like to have a computer with which:

You could change in mid program from 32 columns to 40 columns?— (and back again)

You could scroll from the top down?

You could scroll part of the screen and keep the rest still?

You could display a whole page of text INSTANTLY?

You could pass up to 15k of data between programs without using files?

You could access up to 15k of data INSTANTLY?

All this and sacrificing a maximum of 4k program space (for 4k data)

You could use ACCEPT AT with left, right or decimal point justification?

A full input field AUTOMATICALLY enters itself?

You could GCHAR a WHOLE STRING instead of a single character...

All this and more you have already. Honest — all you need is the program to make it available — then the 99/4A is VERY impressive indeed. (See ad section for a program to do this!).

Which only goes to show that the 99/4A CAN perform very well indeed — you only have to show it how...

(Interesting note on the advertised program — it was supplied for use with either the Extended Basic module or the Editor Assembler Module ONLY. When I tried the MIMMEM two interesting things happened —

a) It works with MINIMEM (& 32k ram)

b) In original format, MMM threw at me 'Duplicate Definition' as an error message — suggesting there are some DEFs you can't use.)

Letter just in from Oak Tree Systems today saying they are trying to put the program onto tape (32k still required) and are considering a reduced version for minimum only (present program is 10k so quite a lot would have to be dropped).

CASSETTE RECORDERS

It is rapidly becoming clear that many of the cassette players formerly recommended for use with the 99/4A are being modified (or withdrawn) by their manufacturers, and it is VERY hard to find a REALLY GOOD cassette player.

Your intrepid reporter has therefore been exploring the deepest recesses of shops in the North West, looking for a reliable and easily available tape player. The BOOTS CR325 is without doubt a best buy, but seems to have been withdrawn. (The 225 is hopeless!).

A brand new recorder has just appeared, especially designed for use with the Sinclair computers — which use the same system as ours. By the time you read this it should be easily available. It is the W H SMITH Computer Compatible Tape Recorder CCR800. Available from — yes — W H SMITH & SON for £30 — a bit pricey, BUT when I brought a sample model home, set the volume control at random and tried to load a really bad recording — it loaded FIRST TIME with no problems. Also you will not need the remote control polarity reverser.

VERY STRONGLY RECOMMENDED FOR THE TI99/4A.

The W H SMITH Computer Compatible Tape Recorder CCR800 comes with a NORMAL/COMPUTE switch, which you should set to the COMPUTE position. In the back of the instruction booklet are tips on using cassette recorders with computers:—

CLEAN the tape recorder!!! For normal use every 5 hours use — for computer use before you record!! (probably a bit excessive — but we know many owners who never think of cleaning their recorders....).

The AZIMUTH ALIGNMENT is critical (Our dealers tell us this is probably the number one reason tapes are returned to them — not faulty tapes, but owners with misaligned recorders).

Purchased tapes will load at different volume levels than your own recordings.

It is important to be aware that a recorder will almost always play back YOUR programs. Loading programs from another machine is a different thing completely, and it is unlikely that any difficulty you experience comes from the recording. (One dealer told me that of tapes returned as 'faulty' less than 10% were actually faulty — and of these many were damaged by the purchasers recorder. Sadly, dealers do not like telling customers their tape recorder is faulty).

Only one weakness in this recorder — the sockets are not the strongest seen, and you should avoid repeatedly plugging/unplugging the leads, or placing any strain on the plugs.

..... and by the time you read this the TI PROGRAM RECORDER may well be available from your dealer.

I do not know if Mr. Frowd will be telling us about the new TI Computers in his letter — or even if he will be writing in this issue — so apologies for any duplication in what follows: Two new TI computers now/shortly available —

***** TI 99/2 — similar to ZX81 at similar price BUT with 4k ram expandable to 36k (how???) Similar basic to 99/4A but only B&W tv o/p.

Probably a faster chip — 9995. Different 'bus' system — for a new (cheap?) series of peripherals — 'wafer cartridge' 48k storage system, RS232, and a 4 colour 36 col printer.

Many 99/4A owners would give their back teeth for these peripherals, but there is no indication of a conversion unit for them to run with the 99/4A — indeed, TI seem to be insisting 99/4A owners buy the BOX system.

***** CC-40 — similar to EPSON, probably attacking the lower end of the Epson market — battery operated and very portable, 6k ram on board expandable to 18k by (small) solid state module. 8b CPU — not in 9900 family — with 'enhanced basic' and assembly language supported. Will work with same peripherals as 99/2 — also battery. How about a complete computer system in a brief-case and room to spare? Price about same as 99/4A? Single line LCD display-tv output is to follow, also bar code reader.

!! I shall not be offering programs for these machines — the market is open to anyone who cares !! (Unless my suppliers talk me into it.....)

(The TI program recorder is a black cassette recorder with the TI logo — watch for it).

NO confirmation on the (99/7?) due end '83/early '84 and said to be compatible with 99/4A software and peripherals.

TI are at last making a very aggressive attack on the computer market, on all fronts. I wish them every success.

There are two common 'unfriendly' touches I've seen used too often —

- 1 — The instruction to keep the alpha lock key down to operate a program — all the programmer has to do is insert a dummy line CALL KEY(3,1,1).

Although TI have been good enough to give us this, I haven't actually seen it used — but it is useful.

- 2 — The query 'is the 32k expansion connected' (in Extended Basic programs) — there is no need to trouble the user with this, the computer can answer this question itself —

```
CALL PEEK(-45,A,B,C)
```

```
IF A+B+C > 0 THEN (the 32k ram is attached!)
```

In the last issue Pete mentioned levitating trains — as a patriotic gesture may I mention that the Linear Electric Motor was pioneered by Prof. Eric Laithwaite, a citizen of the UK.

I was happy to see a demonstration by him in the late sixties, of an unsupported levitating plate — no guide walls or wires — not as easy as you may at first imagine. The plate was quite steady, but could at will be made to 'dance'. A test track was built in this country but due to lack of funds the U.S.A. as usual benefitted as Prof. Laithwaite was forced to move there.

SPEED FREAK

In EXTENDED BASIC many of the CALLS can handle many items at a time, so you can save memory with ONE CALL instead of several. The memory savings can be quite huge — but there is also a small time saving. In a sample program to define ten characters, the time taken per character can be reduced from 0.081 seconds to 0.076 seconds - the savings are greater if you cram more into the CALL. For example: CALL CHAR(32,A\$, 33,A\$, 34,A\$, 35,A\$,36,A\$,37,A\$,38,A\$) or CALL COLOR(1,6,3,2,8,5,3,7,4,4,8,2) — for clarity the set number is underlined.

or

you can use similar techniques with the following calls as well:

CHARPAT, LOAD, LOCATE, MOTION, PATTERN, PEEK, POSITION, SPRITE

I have received a number of complaints recently — one, that magazines make too many mistakes (and the TIHOME listings are also bugged)— the programs concerned were fine — the owners failed to appreciate the problems of keying programs in, and lacked the experience to de-bug their own errors.

two — a number of owners have been able to load third party tapes but not their own — a reversal of the usual complaint. It appears that modifications have been made to tape input circuits, possibly involving the ALC. VERY frustrating — but perhaps TI will have their program recorder out by now — or there is the SMITHS recorder mentioned earlier.

The 99/2 sells for US\$100 (at 1.57=£63, add 7% customs and 15% VAT and this comes to £78) — so it was nice to see Robin in POPULAR COMPUTING WEEKLY quoting a price level of £70-80, probably lower end. It's a pity about VAT — and of course there is a lot more competition in this price bracket in the UK than in the USA.

FINAL PAGE!

In April '82 BYTE there was an article on using CASSETTE ports to feed a printer. The hardware is simple — an op-amp to change the voltage levels — what is needed is a machine code utility to provide the proper signals. It has been done a TRS80 — now:

Who can connect a 99/4A to a printer via the cassette port?

The program should fit into 4k, for the Mini Mem.

Home computer sales

In 1982 an astonishing 509,000 people bought home computers in Britain. It was the year the home computer really arrived.

What's more, home computing seems to be one area where Britain is taking a lead.

A set of startling figures come from micro-analyst Robin Bradbeer who's just completed a report on the subject.

"Per head of population we have twice as many machines in the UK as the US and one and half times as many as Japan," said Bradbeer.

"Over two-thirds of all pcs sold in Europe are sold in the UK. We also have more manufacturing than anybody else and are producing more machines. And our distribution chain is more efficient than those in the US and Japan."

Pundits have noticed a distinct change in the type of people buying home computers over the last year. "The people who bought pcs changed completely during 1982," said Irfan Salim, marketing manager of the consumer division at Texas Instruments. "During the first part of the year the market was still being driven by school pupils who knew Basic existed, roughly what it could do, and wanted to write programs."

"But by Christmas people were not buying through computer awareness or because they had necessarily understood anything about the machines."

"Channels in the consumer market are opening up, and some of them are very successful. Over-the-counter sales of computers are in no way related to computer expertise on the part of the buyer or the sales person who may have virtually no understanding of the machine."

TI's 99/4A is expected to continue as the company's main pc throughout 1983. The machine, formerly priced at £199, has recently been on special offer at £149. "The policy will be reviewed at the end of January but there is general pressure in the marketplace for prices to go down," said Salim.

TI aims product at Sinclair computers

TEXAS Instruments has announced details of a new low-cost microcomputer and high-speed 'microdrive' data storage unit.

The new 16-bit micro, the TI 992 will go on sale in the UK in July. "It has 4K user Ram and will sell for well under £100 — nearer £70 than £80" according to TI's product marketing engineer, Robin Frowd.

The machine is without colour and sound but is expandable in 16K units to 36K. Based on the TMS 9995 16-bit processor it is heralded as being considerably faster than the TI 994A machine which uses the TMS 9900 chip.

The new machine has a Rom cartridge slot and is fitted with an RS232 interface. Most software in Basic for the 994A will run on the 992, but without sound and colour routines. Unlike the earlier

machine, the 992 also has a full assembly-language programming capacity.

At the time of launch the new computer will have about 20 programs available for it on cassette. Two Rom cartridges will also be available — *Learn to Program*, for languages such as Fortran, and *Learn to Program in Basic*.

Two new peripherals have also been announced to accompany the new computer.

A super high-speed 'wafer-tape' drive has been announced. This unit has a capacity of 50K with a data transfer rate of 8,000 baud, and connects to the computer via the RS232 interface. It is expected to cost £150.

A four-colour printer/plotter will also be released. Although the TI 992 is a monochrome machine, the colours of the printer can be addressed from the computer.

Home Computers sold in the UK in 1982

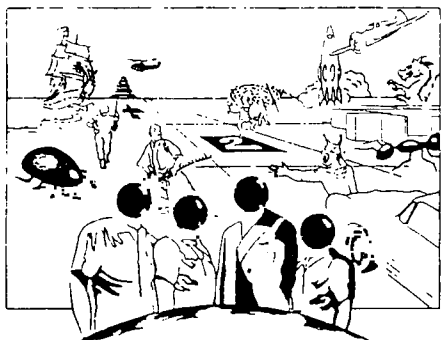
Sinclair ZX81	220,000
Commodore VIC-20	100,000
Sinclair Spectrum	75,000
BBC Computer	40,000
Dragon 32	25,000
TI 99/4A	20,000
Atari 400	12,000
Video Genie	10,000
Colour Genie	2,000
Others	5,000

TOTAL 509,000

P.C. World
Feb '83

* ALL AVAILABLE cost call from: J Shaw, 10 Alstone Road, STOCKPORT, Ches, SK4 5AH *

NEW: **SUPER PROVER** by Norton Software in EXTENDED BASIC £9.00
 ---Hop across a road and a river to safety. Several levels. (Joysticks optional).
 ---Watch out for crocs & snakes. Super version of this popular arcade game.
 ---There are **LOTS** of PROG programs - THIS one is **VERY GOOD**.



NOT POLYOPTICS

Twelve great games for the TI 99/4(A). Specifically designed to take full advantage of the graphics and sound capabilities of TI BASIC.

- (1) **Advantage.** Combines the best features of popular board games and then adds the action and unpredictability of the arcade. **1 TO 3 PLAYERS £8**
 - (2) **Ant Wars.** A war simulation based on the insect world. An optional spider adds a third party to reckon with. **£10**
 - (3) **Cars & Carcasses II.** Your city has been invaded by draculæ, frankensteins, and space monsters, and you must run them down. **SOLO PLAY £6**
 - (4) **Crosses.** Markers are alternately placed on a grid, and the center piece of a cross captures it. Chain reactions sweep the board. **FOR 2 PLAYERS £6**
 - (5) **Hordes.** The ultimate game of world domination. **TWO PLAYERS ONLY £11**
 - (6) **Khe Sanh.** Command a military base in Viet Nam during the Tet Offensive. Search and destroy, defoliate jungles, defend convoys. **SOLO PLAY £10**
 - (7) **Maze of Ariel.** A maze game with a difference. Use lantern and grenades to negotiate a continuously changing, dragon-infested maze. **SOLO PLAY £7**
 - (8) **Sengoku Jidai.** War game based on the period of the Shogun. From your castle stronghold reach out to conquer a world. **2 OR 3 PLAYERS £10**
 - (9) **Ships!** Take three men-of-war and sail them into battle. With weather changes complicating the action, you must broadside the enemy. **TWO PLAYERS £8**
 - (10) **Starship Pegasus.** Contact extra-terrestrial intelligence as you explore and conquer the stars. Complete with name and descriptions of the alien life forms. But watch out for Hyper-O Marauders! **SOLO PLAY. £11**
 - (11) **Tickworld.** Eight hungry giant ticks are after you. You must capture them and put them in cages. **1 Player. £8**
 - (12) **Winging It.** Flight simulator for the TI 99/4(A). Once you've mastered flying, three different games test your skill. **£9**
- OK. These games are all keyboard actuated, and you need no peripherals other than a cassette recorder.



↑ ALL N-P ARE TI BASIC ↓

KUHL SOFTWARE PRESENTS.

FISH

FOR THE TEXAS INSTRUMENTS
99/4 and 99/4A COMPUTERS

"Fish" simulates fishing for three popular freshwater species in a fishing contest between "Joe Fisherman" and you. Animated color graphics and sound are used in the fun-filled game.

KUHL SOFTWARE **£6**

This program requires only a cassette recorder and cobbles

TI BASIC. Price - Only **£6**

Sorry about the small print - too many programs!

PRICES VALID TO 30TH APR '83
 U.K. Supply Only



- 100% 9900 assembly language program
 - OUTLAND - extremely fast, astroid-type game
 - far surpasses basic or extended basic versions
 - requires mini memory module
- tape - **£10.**
- ROACH SOFTWARE**

FFF Software Presents... **EXTENDED BASIC**

SHUTTLE COMMAND

Earth is threatened by thousands of Russian Attack Military Satellites (RAMS). The United States readies the space shuttle Enterprise to combat the menace and selects you as its commander.

Your view is from the cockpit and you see the RAMS approach (in 3-D) from deep space. Your mission is to destroy them before they destroy Earth - or you!

The producers of the now-classic TI-ASTEROIDS bring you a new and challenging space game. Joysticks are optional, but recommended, for this exciting Extended BASIC program which features 1 or 2 player capability, 12 skill levels and great graphic effects.

Available for only **£11.** on cassette

Also Available... **EXTENDED BASIC**

TI-ASTEROIDS

See what the Experts are saying:

"TI-ASTEROIDS is by far the best space game we have seen programmed for the 99/4 in an [Extended] BASIC Language."

Charles LaFare, President
International 99/4(A) Users Group
Newsletter (Vol. 1, No. 7)

"I was impressed to see what could be done in Extended BASIC... by such firms as FFF Software (Trenton, NJ) with their TI-ASTEROIDS game."

Gary M. Kaplan, Editor
99'er Magazine (Vol. 1, No. 4)

Available for **£11.** on cassette

The following programs are available post paid by MAIL ORDER ONLY

From:
Stephen Shaw, 10 Alstone Road, SPOCKPORT, Chesnre, SK4 5AH

A large catalogue (11 A4 pages!) of imported & home produced programs is available - please send either a 9x6" SAE or 50p (refunded on first order).

Some new programs from a new Canadian Supplier:

These are a little more costly than usual but they are very interesting & well written programs. The Hang Gliding simulation makes particularly good use of Sprites, and you are not likely to find it too slow. It does require skill. Simple to play, easy to crash-land. **BOTH IN EXTENDED BASIC** (Now get out your magnifying glass.....):-



Maple Leaf
Micro Ware

HANG-GLIDER PILOT

Feel that sea breeze - is a perfect day for ridge soaring. Just take a deep breath and jump - you're ready for it - - - YAHOO!!!

Follow the ridge to gain some altitude. Hey! Don't climb so steeply - you might stall and not recover in time. Phew, that was close.

OK, head out cross-country now. Try to work the thermals over rocky fields, but avoid lakes and forests - they usually have heavy downdrifts over them. Look at that eagle circling, he sure knows where the thermals are.

It's getting late, time to be heading back. The thermals are gone and there is no more ridge lift, so you had better pick your spot to land. Push the bar forward slowly and stall it on. Slow down or you'll break your neck! That's it.

Nice landing for a beginner. Who's next?

On cassette tape. Extended Basic module required. Shipping and handling are free.



Maple Leaf
Micro Ware

£13

£13 each.

inc p&p

Original!

Well written!

EXTENDED

BASIC

MODULE

REQUIRED!!!

SKY-DIVER

Climb on board the jump plane with up to three buddies. You direct the plane to the desired altitude and position over the jump zone. There it is. Now drop a streamer to check for changes in wind due to altitude and Coriolis effect. This looks like the spot here we go - GERONIMO

You're drifting too far to the left, but not to worry, you can manoeuvre while free-falling at speeds of up to 125 mph. Don't delay pulling the rip-cord for too long though - there's a 10% chance you will have to use your reserve chute!

Ah, it worked. Now, pull the right toggle to turn to the right a bit. Oops! You're over shooting - pull both toggles to cut the glide - not for too long or you'll have a hard landing and be out of the competition. Things sure happen fast as you get close to the ground!

Perfect - A Bull's Eye touch-down for 100 points. That clinches the championship. Congratulatory!

On cassette tape. Extended Basic module required.

shipping and handling are free



Maple Leaf
Micro Ware

£13

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SOFTWARE FOR THE TI 99/4(A)
COMPUTER

Featuring
Two Arcade Speed, Extended Basic Games

ATTACK-MAN

This game is similar to the pursuit games that you find in the arcade except that this one is more of a challenge. Collect points while running through a maze being pursued by a gang ofovable hungry eaters. Can you make it to the energy pellet most likely NOT so you can turn on them. YOU CAN FIND OUT FOR

£9

CROSS COUNTRY CAR RALLY

Inspired by the Lamborghini race across the country avoiding police, outwits your rivals and a few surprises. This high resolution graphic road adventure can be yours for less than a speeding ticket fine.


£9

* £9. EACH *
BOTH EXTENDED BASIC

All Programs on THIS page require Extended Basic.


PS SOFTWARE

DOUBLE PACK #1



OCTAL 1

Can you save your system from the insidious Octung Spyderys?



Keys of the CASTLE

An adventurous, graphic game of fast action and quick thinking.

16K Extended BASIC tape. Both for £9

PS PESTERIODS (Extended BASIC) - Has features like changing characters and special options that put it ahead of the Space-Rock Pack! on tape. £9

SPACE RESCUE 2.0 (Extended BASIC) - Evade the Xyolian Hordes and rescue the power pods in PS SOFTWARE's most popular game on tape. £9

Prices inc p&h. See other ads too!!!

S.Shaw.

SAVE A SKETCH/MM

A program in TI BASIC requiring the Mini Memory Module. This program enables you to draw a high resolution picture, using 8 direction keys, with choice of INK ON, INK OFF, and ERASE.

When you have finished your picture, press a key and the computer will REWRITE the program. When next you run the program your hi-res picture will appear in only a couple of minutes.

You can remove the drawing routines and incorporate the picture into another program.

NB: Always keep an unaltered copy! Will not work with a disk controller attached and switched on.

All this for just..... £5.00

SMASH

A powerful utility in EXTENDED BASIC on DISK only.

This utility will automatically and intelligently clean your programs up, as follows: You may select any (or all) of these options:

- a. Remove REM and ! remarks. (REMS which have a GOTO &c will remain but the text will be deleted).
- b. Lines will be compacted to maximum depth - eg multi-statement lines will be produced.
- c. Variable and user-sub-program names will be shortened (with an optional cross reference table produced).

Write your program with single statement lines and long rems - then SMASH it. The end result will be very slightly faster, take up less memory (and disk or tape space!). From Oak Tree Systems.

DISK ONLY....£15 { MENTION TIDINGS BEFORE 29-3-83 AND DEDUCT £2-00.

CROSSUMS In EXTENDED BASIC from OAK TREE SYSTEMS.

A number game with several levels of difficulty, making it suitable for young children and adults. Similar to SCRABBLE, but the players select numbers (from a randomly picked rack) which ADD UP to form a multiple of a preselected number (say 3 for young children- 9 for adults).

Up to 5 players - 5 human, 5 computer, or any combination. For play between two adults, the extra computer player(s) add a new dimension!

Board size: 20x20 Multipliers: 2 to 16 Rack size: 5 numbers
Maximum number of digits which count in scoring: Between 5 & 9 digits.

A well written game program on cassette for £10.00

ALL OF THESE (& MANY MORE) AVAILABLE ONLY BY MAIL ORDER (UK ONLY) FROM:

Stephen Shaw, 10, Alstone Road, STOCKPORT, Cheshire, SK4 5AH

Send 9x5" SAE OR 50p (refundable on order) for large catalogue.

KEYS OF THE CASTLE:

First purchaser made it to the treasure on 17.12.82
Second success: 20/12/92.
WELL DONE!

*** Please- mention TIDINGS when ordering- and ask for a free catalogue if you don't already have one.

NB: Name & address in BLOCK CAPITALS ! OK!!!

An Extended Basic game from Canada:

DEVIL CRAZE for £11.00

All you have to do is press the key (or fire button) on the same side as that which contains a colour panel matching the colour of the panel in the centre of the screen. EXCEPT when four crazy red devils appear. UNLESS they are imposter devils. From Maple Leaf Micro Ware.

£11.00

Mr. & Mrs. S. Shaw
10 Alstone Road
STOCKPORT
Cheshire SK4 5AH

ADVERT

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Cheshire SK4 5AH

MORE NEW programs...

All programs on this page are available in the UK only, by mail order only, from:
Stephen Shaw, 10 Alstone Road, STOCKPORT, Cheshire, SK4 5AH

The LARGEST program ever offered - a FULL disk (not an empty sector) -
thats what you get with Oak Tree Systems

DISPLAY ENHANCEMENT PACKAGE

Requires 32k RAM, Disk System and either Extended Basic or Editor/Assembler
or Mini Memory.

40 CHARACTER SCREEN!!!

Only uses 4k of Extended Basic program space and NO program space from
TI BASIC using Editor/Assembler, or MiniMem.

40x24 display format with CALL HCHAR, VCHAR, GCHAR, DISPLAY/ACCEPT equivalent s.

Multi screen memory (and a full screen can appear IMMEDIATELY)

Forward and backward scrolling - Split screen (part only scrolls)

All the improvements you've ever wanted. In FAST Assembler language.

Easily incorporated into your own programs - a program can switch between
28 & 40 characters very quickly.

12 A4 pp documentation in advance: £1 (Refundable on purchase).

(supplied reduced)

FULL DISK for a mere £16

(MiniMem still needs 32k ram)

ADVANCE NEWS

- a. Due to holidays, orders in JUNE '83 may be subject to considerable delay.
- b. I shall not be offering software for the 99/2 nor for the CC-40. (At present anyway)

Send either large (9x6) sae OR 50p (refundable on order) for large catalogue

By request: VIDEO TITLES in Extended Basic. Can be used for video titling or
just for a cycling display. Files can be saved to tape or disk if you
wish, for reuse. Several display and clear options. Very friendly-
full use made of JN ERROR to permit you to make as many errors as you
want.....(!) On cassette for £10

PRICES

Prices are based on an exchange rate of 1.65 - if the rate falls below
1.50, please add a flat surcharge of £1.00 per order. Rate is quoted in
your daily paper. Otherwise prices valid to 30th April 1983.

Two programs in TI BASIC from PS SOFTWARE at £6 each:

NONKAPILLAR: Guide a crazy caterpillar(?) out of an enclosed maze,
using time bombs to blow the walls away. DONT blow the head portion
up though, and dont try going through unexploded walls (or through
unexploded body segments). Fast fun & quite habit forming.
Will run on just the console - nothing else required (except a cassette
player!) £6

CRAZY CAVER:- The SCROLL function is used to move a cave system up the
screen to simulate your descent. You must guide your burrowing machine
left and right, and use a laser to remove obstacles. You will need as
much fuel as you can find - and dont bump into the cave walls.
Can you make it past 800feet? Dont take too long- fuel is scarce.

£6

Stephen Shaw 10, Alstone Road JIGMEPORT Wiltshire SN4 5AH
Mail order only - G.B. only - Prices include p.p.

NEW for 1983:

From Norton Software-

I receive lots of letters saying how good Cross Country Car Rally is. Well, here is another good one from Norton - FROG. Hop across a road, across a river, and onto a lily pad. In EXTENDED BASIC, joysticks optional. (The game is easy to start with - but gets harder....). Price £9.00

MINI MEMORY OWNERS: Here's one for you...

From ROATH SOFTWARE comes OUTLAND in Assembly Language, on cassette for the Mini Memory module.

This is a VERY fast version of Asteroids, fully utilising the available memory (there's about 50 bytes free...).

Spinning rocks come at you and you must blast them out of the sky. Your ship has spin, lasers and thrust - and the shields are very necessary! Keyboard control only. Extremely fast action. Due to memory shortage the rocks don't divide - eg your laser is powerful enough to pound them to dust in one shot! Price £10.00

And while we're on asteroid programs...

ASTEROIDS from FFF Software in EXTENDED BASIC-

Four skill levels, each with its own hi score register. You may input previous high scores. Keyboard control only. Ship rotate - canon fire - activate engines or hyperspace drive 2-player action is possible (one ship at a time). Price £11.00

SHUTTLE COMMAND - FFF Software - EXTENDED BASIC-

Screen centre; cross hairs. Zoning at you; things. Use keyboard or joysticks (2 modes) to centre the Things and Zap them. Several skill levels. For 1 or 2 players. Well thought out program. Price £11.00

From KUHL SOFTWARE: DATA RESCUE

An EXTENDED BASIC program for the 99/4A only (NOT for 99/4) Requires the use of Joysticks.

A 'simple' program with three scenarios and three difficulty levels, making it suitable for all ages. First- zap the approaching enemy craft. Second- Zap the aliens coming down the corridor towards you. Third - Knock out the aliens in the control room. The graphics are 'simple' but extremely clever - can you work out how the sliding door was done? Not a complex game, but an amusing and enjoyable game to play. Price £7.00

Have fun - for only £7.00

STOP PRESS: The Norton game described above is now to be known as SUPER FROGGER.

HAPPY NEW YEAR!

ROUTINE PROGRAMMING

Between us we could save a lot of duplicated effort by getting TIDINGS to publish short programs or subroutines which may be of interest to other readers.

To start the ball rolling the following routine will generate 52 playing cards. The cards are displayed in 4 rows of 13 in what is hopefully a random sequence. This is the starting position for a number of card games.

Explanation of program

100–140

ASCII characters 47,62,63, and 33 are redefined as my version of the clubs, diamonds, hearts and spade symbols and the screen is cleared.

150–160

To generate a pack of cards you need A,2,3,4,5,6,7,8,9,10,J,Q,K. The standard character set contains most of what you need but you cannot have the standard characters in two colours simultaneously. You must therefore redefine some characters in order to get red and black symbols and a single character for 10. To redefine a character using Call Char you need to know the string representing the character you wish to define. Y\$ is the 13 strings needed to define A,2,3, etc. all joined together.

170–220

Line 170 is the start of a loop which is repeated 13 times. The first time round the loop in line 180 L\$ is made equal to the 16 character string which defines A. The second time round the loop L\$ is made equal to the string representing 2 etc. Line 190 defines the set of characters which will be black and line 200 defines exactly the same character but they will be red. Line 210 does a number of things. It takes the redefined characters and adds a club, diamond heart or spade symbol to them depending upon what their final colour is to be. Each time round the loop the characters generated on previous trips are added to the characters just generated. If C,D,H,S represented clubs, diamonds, hearts and spades then when the loop has been completed F\$ is the string...
"ACADAHAS2C2D2H2S3C3D3H3S....." the final string being 104 characters long.

230–280

These lines are an unnecessarily complicated way of defining the foreground and background colours of the character sets 1–4. This can be done more readily by using Call Color four times.

290–360

This is the shuffling routine hence the use of Randomize at the start. Each card is made up of a string of 2 characters, the 52 cards added together gives you the string F\$. This part of the program takes two adjacent characters from F\$ at random. The position of the card taken at random is determined by B which is defined in line 310. The card is Z\$.
If Z\$ is for example 2H then to obtain a display which the eye can readily accept we need a string which is H2. By combining them on consecutive lines you

get 2 H
H 2.

This may not be a perfect representation of the 2 of hearts but it is adequate.

Line 320 selects the top half of a card, line 330 generates the bottom half of the same card and adds all the bottom halves together. Line 340 adds all the top halves of the cards together. ZF\$ is the top half of a shuffled pack of cards in a random order. ZR\$ is the bottom half of the same pack in the same order.

Line 350 reduces the length of F\$ each time a card is taken from it. It starts life as string of length 104 and finishes up as "".

370-440

Line 380 takes the first 13 tops and bottoms and joins them together with two spaces. This is done to make the distance between the top and bottom of a card exactly 28 characters, one Print line.

Lines 390,400,410 do the same thing for the remaining 39 cards. Line 430 prints the display.

End.

The routine was originally written in Ex Bas as part of a larger program which remains uncompleted. Comments on how to significantly improve the running time and or presentation will be gratefully received.

I have noted the frequent requests for inputs by the regular contributors and the apparent lack of response that it brings with some dismay. A number of people I know have borrowed my copies of TIDINGS and then decided not to join TIHOME. They felt that for absolute beginners the magazine had little or nothing to offer in that it was too complicated. Further regular use of EX BAS, MMM, EDITOR ASSEMBLER and other items which are difficult or impossible to obtain detracted from the usefulness of certain articles. If you are not happy with the contents of TIDINGS write and say what you would like.

A survey of who has what would be interesting. Is Stephen Shaw the only person in England with Editor Assembler? If not can somebody tell me where it is available in the U.K.? My interest in Editor Assembler was created by the seductive advertising for the MMM only to find that to make full use of it you need the Editor Assembler manual which I have so far failed to locate.

Les Watson.

29 Bramley Road,
Cheam, Surrey. 20.2.83.

Dear Mr. Dicks,

I have just scored 85,770 on my TI Munchman, using the keys instead of joysticks, and I should be interested to know whether this is a record?

Yours sincerely,

Karen Warner (age 13).

```

00100 CALL CHAF (47 , "183C187EFFFDB1818" )
00110 CALL CHAR (62 , "00188D7E7E3C1800" )
00120 CALL CHAR (63 , "0042E7FF7E3C1800" )
00130 CALL CHAR (63 , "183C7EFFFFF1818" )
00140 CALL CLEAR
00150 Y$="003844447C4444440038444040810207C003844041804443800081828487C0308007C40
78040444380018204078444438007C0408102020200038444438414438003844443C040830"
00160 Y$=Y$&"009F9191919191919F000404040404443800384141445443840044485060504844"
00170 FOR N=1 TO 13
00180 L$=SEG$ (Y$, (N-1 ) *16 +1 , 16 )
00190 CALL CHAR (33 +N, L$)
00200 CALL CHAR (48 +N, L$)
00210 F$=F$&CHR$ (33 +N)&CHR$ (47 )&CHR$ (48 +N)&CHR$ (62 )&CHR$ (48 +N)&CHR$ (3
3 )&CHR$ (33 +N)&CHR$ (33 )
00220 NEXT N
00230 DATA 1 , 2 , 12 , 2 , 2 , 12 , 3 , 7 , 16 , 4 , 7 , 16 ,
00240 RESTORE 00230
00250 FOR I=1 TO 4
00260 READ A1, A2, A3
00270 CALL COLOR (A1, A2, A3)
00280 NEXT I
00290 RANDOMIZE
00300 FOR FLAG=1 TO 52
00310 B=INT (LEN (F$)/2 *RND ) *2 +1
00320 Z$=SEG$ (F$, B, 2 )
00330 ZR$=ZR$&SEG$ (Z$, 2 , 1 )&SEG$ (Z$, 1 , 1 )
00340 ZF$=ZF$&Z$
00350 F$=SEG$ (F$, 1 , B-1 )&SEG$ (F$, B+2 , LEN (F$ -B+2 )
00360 NEXT FLAG
00370 CALL CLEAR
00380 F1$=SEG$ (ZF$, 1 , 26 )&" " &SEG$ (ZR$, 1 , 26 )
00390 F2$=SEG$ (ZF$, 27 , 26 )&" " &SEG$ (ZR$, 27 , 26 )
00400 F3$=SEG$ (ZF$, 53 , 26 )&" " &SEG$ (ZF$, 53 , 26 )
00410 F4$=SEG$ (ZF$, 79 , 26 )&" " &SEG$ (ZR$, 79 , 26 )
00420 CALL SCREEN (6 )
00430 PRINT :;:;:;:; " &F1$;:;:; " &F2$;:;:; " &F3$;:;:; " &F4$;:;:;:
00440 GOTO 00440

```

AFTERTHOUGHTS

by: Roger Culshaw 84 Meadow Way Walton Stone Staffs 0785-812016

I was so glad to receive my first copy of 'Tidings'. I am not the only person in the UK who has been silly enough to buy this TI computer made by such an obscure company. I've read it cover to cover about three times now. Having played Dungeons and Dragons for nearly 4 years now, your magazine seems somewhat similar to the early pioneering spirit in the fist role-playing 'zines'.

My basic interest in computing stems from work where for my sins I now tell other people what to do rather than get my fingers onto a keyboard. So I filled this serious gap in my life by getting my own machine. I selected the TI for several reasons, it was available, cheap (I got the £50 handback), its colour and sound were far superior to others (Dragon and Spectrum) and more importantly my financial manager (the wife) thought that the version of 'Pacman' was good and gave me permission to buy it.

As I mentioned before my other passion is for role-playing games and I am now actively combining the two. This gave me the germ of an idea for a series of articles where I might outline the various game structures involved in role-playing games and discuss the computing problems they pose. I must confess that my programming background is in ALGOL, PL1 and Z80 based machine code so I do not profess to be an expert in Basic. But as far as D&D is concerned then I think I could hold up my own in a learned discussion about the merits of a 'throwing star' or a 'sleep spell'!

I hope to explore the basic fundamental structure of role-playing games and present some ideas on how to translate these onto the computer. Perhaps those of you with an interest in Adventure games might also write in especially if you disagree with anything.

In this article I will outline the basic idea of role-playing games and try to describe the essence of some of the more commonly played games.

Role Playing Games A Basic Description

The first requirement of a role-playing game is a setting. Be it in fantasy with magic and mahem or in Science fiction with computers and mahem. (Mahem seems to be an important component). The next component are some imaginary characters controlled by the players and finally a referee/games master/dungeon master to design a scenario based in the setting and control the game.

The characters normally have randomly determined attributes such as strength, intelligence, dexterity, charisma etc. Their subsequent skills in the game are then dependent on these characteristics. For example characters with above average strength fight well whereas characters with good dexterity are better at activities needing stealth (like picking pockets). The players must first determine the attributes of their characters and equip them for an adventure. They then play through a scenario designed by the referee using rules laid down for combat, magic, movement etc.

Many people ask me how do you win? Well in a well designed role-playing game you don't actually win, nor do you really finish a game. In essence your characters live and exist in another world and life goes on for them as it does for you. Most

games have a system of character improvement where the gaining of experience leads to the improvement in character abilities.

Typical Role-Playing Games

Dungeons and Dragons

The father of role-playing games and still regarded by many as the best. Set in a 'Lord of the Rings' type world complete with magic monsters and of course mahem. However it is quite expensive to buy all the books and supplements. If you just want an idea about role-playing games for the computer and don't want to actually play then this may be the wrong one to buy.

Runequest

Similar setting to D&D but with different philosophy of combat and character class. In Runequest a character has the ability to fight cast magic or a whole host of other skills as the game develops the player may well specialise on a few. In D&D the characters become specialists from the start. The Runequest combat system is also quite realistic but involved. The basic Runequest rule book will cost you £5.95.

Traveller

Again a bit expensive to buy all the material but unlike the others detailed here this is the land of the future with Laser Pistols, spaceships and computers (Oh yes mahem as well).

Tunnels and Trolls

Probably the best buy just to see the basic game mechanics of a role-playing game. The rule-book is only £3.95 and I found it fairly easy to follow. This game also has the advantage of something like 15 solo adventures for you to try your hand at. I don't think it is the best game to play but to get ideas for a computer type adventure game its ideal.

Others

Those of you who watched Shogun might like Bushido or you can get a game based on the wild west or even based on Dallas (No you don't get a real live Victoria Principal). There is a legion of games to suit all tastes.

Problems of Computerisation

It is first of all important to establish that a solo role-playing game moderated by a computer will be a game of a different nature to a multi-player game with a human being as a moderator. Much of the fun in the 'live' situation is the social interaction between players and of course the arguments with the Dungeon Master. "Of course my Dwarf can hit a Goblin with a Flail when he is 7' away" (This little discussion resulted in an enactment of the situation to resolve the issue) The computer will not respond to impassioned cries or threats. So from the start we will establish the principle that our computer moderated game is different and our aim should not be to mimic the 'live' games.

Having said that we don't want to lose all the components of these games. Somehow we must still capture the players imagination and develop his attachment to his character. Our problem therefore is to design the framework for the game based on 'live' role playing rules and provide a substitute for the lack of other human players.

Text and Graphics on the computer seems to be the solution adopted by most adventure program writers to convey the world and environment that a character exists in. One thing we know about Text and Graphics is that they gobble up memory and with our 16k machine needing a second mortgage to extend its memory this is a very important consideration.

To be fair to our machine, memory usage is a generally recognised problem of adventure programs. In most cases some compromise is achieved and in my mind the end results often leave a lot to be desired.

The next problem to be faced, is the problem of giving the player enough flexibility of action, so that he does not feel that he is being constrained into a course of action not of his choosing. More options mean more program and even more important more and more checks to ensure that the program will not allow inconsistencies to happen such as going through a door that does not exist or fighting a dead wolf etc. Simplicity is the key to success in avoiding these problems but at the same time it leads to restrictions that can detract from the game. (Why can't I pick up the chair and bash the sleeping Giant over the head with it? ... Because my program sees a chair as an object not as a weapon!)

OK what else? Well the base data for our adventure setting will change as our player works through it. Monsters will be killed, objects taken secret doors found etc. The program must be able to update the current status of the 'Dungeon' so that a previously killed wolf isn't suddenly alive again when we re-enter the room we killed it in. This problem is normally solved by creating arrays which hold all the information about the dungeon and updating these as the character interacts with the situation. Once again arrays use memory especially on our machine that has this obsessive desire to please us with its 14 digit accuracy.

Next...How does the player communicate with the machine to control his character. The most common method used is the two word instruction eg OPEN DOOR. DROP CHEST FIGHT WOLF etc. This can be elaborated to the sentence input where the program looks for key words to interpret your instructions. In both cases the player can get frustrated when the computer fails to recognise a command.

All in all adventure/role playing programs are not easy to write. My own experiences have shown that much thought and flow charting is needed to achieve the best compromise between playability and memory usage. I hope to discuss these problems in more depth in later articles together with such topics as character generation, handling magic, traps and combat etc. I don't promise to solve all the problems but I think I've a few novel ideas.

In the next article I will look at the sort of data we need to hold the status of the dungeon and discuss ways of optimising the use of arrays. In the meantime, see if you can get hold of any of the rule books mentioned or better still play a 'live' game.

Program Hints

Memory Left... As you can gather from the above I have quite an interest in how much memory my program has used. I believe that in extended Basic there is a command that allows you to do this but I've not saved enough money yet. One way round

this is to find the largest array size that the TI will allow you to dimension and still run the program. The largest array size with no program seems to be 1812.

eg 10 DIM M(1812)..... will run

but 10 DIM M(1812)

20 PRINT "I LOVE TEXAS".... will not.

As your program grows in length then the maximum array size will decrease. I find that on average a line of basic program reduces the array size by 3–3.5 depending on the type of program.

Assuming that we have 14½ K available to us this indicates that a numerical array element uses roughly 8 bytes. This seems about right to me as it means 7 bytes to store a 14 digit number (eg using 4 bits per digit) and one byte for sign and exponent (max 127).

Anyway the technicalities don't matter since to use this method all you have to do is find the largest array you can dimension subtract this from 1812 and divide the answer by 3.5. This is approximately how many more lines you can add to your program.

Example 10 DIM M(900)
REST OF THE PROGRAM
Runs OK

Memory left = 1812–900 912

Lines left = 912/3.5=260.

REVIEWS

Winging-it (From Stephen Shaw). A great game which has kept me occupied for hours. Your task is to fly a mono-plane by instruments. You have air-speed, altitude, revs, course ground map and bad weather indicators to help you. Very well presented graphics and the sound of the engines changes tone to meet the situation. More importantly once you have mastered basic flying then there are three games to play involving hunting a meteorite, chasing a flying saucer and running from an enemy plane. The instructions with the game are very good. Highly addictive and frustrating (Thank goodness it's not for real).

Forbidden City (APEX Trading). So far the one and only firm I have seen selling TI games and advertising in the 'big' mags. A fairly standard adventure game set in a futuristic city. On the whole I found it enjoyable and free from bugs. A little too much on the side of POW!! you're dead but fun. The input uses the standard two word command and the game is a text only presentation. I would suggest that you try to map as you go on a piece of paper so you can avoid the death traps next time! One final comment if the brains behind APEX Trading reads Tidings. Then there is something really special I would like to do with your 'GREEN MIST'!!!! *Are you that sadistic in real life?*

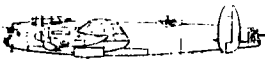
Comments Conclusions and a Cry for Help

Printers.... Would it be possible for TIHOME to approach someone like AMBER printers to see if they could provide an interface to our machine. From the copy of Tidings I have just read it would seem that some of our members could supply the technical details.

Machine-code... Is anyone interested in writing some articles on the 9900 machine code. I was going to buy the mini-memory until I found that it did not explain the machine code commands. Is there a book available or do you have to buy the Editor/Assembler to find out.

New Software Companies.... I must agree with the comments made by others about the lack of enthusiasm by some dealers over the TI. One of the problems seems to be an apparent lack of cassette based software. A prospective buyer gets his copy of 'Your Computer' and finds it full of software for 'Spectrum' 'BBC' etc. but no TI. Talking to my local dealer this seems to be the biggest putoff. Anyway I thought if no-one else is doing it why shouldn't I. This saw the birth of 'Time Travels Inc' and eventually the first game (see below). My cry for help is for a small number of TI users to play test future games. Your fee will be a free game and a view of some of the rubbish I don't end up selling. If you fancy the game described below and would also like to playtest future games write me a small note when you send off for 'Squadron Leader'. I would like to know what Tape Recorder you use and little about your interest in computing so that I can select a broad spectrum of users. If I choose you I will return your money together with a free copy of the game and a short questionnaire to complete when you have played it. (Needless to say the next game will be an adventure game once I've fitted it into my Memory).....Bye.

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BITS AND BYTES AND BITS AND BYTES AND BITS AND BYTES

The past few months have been good ones for the publication of programs for our computer — so I thought a quick run-down of all recent listings would be useful...

Computer and Video Games

October Issue	Hugarian Squares Puzzle	by Stephen Shaw
November Issue	Space Lasar	by GM Programs
December Issue	Hungarian Hex	by Stephen Shaw
January Issue	Target	by R. Matthews

Personal Computing Today

October Issue	Blind Maze	by Mike O'Regan
January Issue	Earth Attack	by Peter Clisby

Personal Computer World

December Issue	Teepee Textpro	by Mike O'Regan
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All the listings are games programs with the exception of Teepee Textpro which is a word processor which works with the TI Thermal Printer, but can be adapted for use with other printers.

All the programs are in TI Basic needing only the standard console with the exception of Target which is in Extended Basic.

As you can see, the pace of publication of new programs is sure hotting up, and I am reliably informed that in February's issue of C & VG there are going to be more programs for the 99/4A including one about Manchester's sewers?!!!

Of course the publication of these programs depends on YOU — so all you budding programmers get out there and get published!

*_**

It might not have escaped the attention of many new owners that there is a sorry lack of software floating around for our machine in comparison to some others like the Spectrum, Vic, etc. Well, now good news! For some time now Stephen Shaw, one of our longest standing members, has been encouraging people to write programs for him to distribute as well as importing some very good examples of what is available in the U.S. Stephen now has numerous programs on offer, so write to him for a list at 10 Alstone Road, Stockport, Cheshire SK4 5AH.

Thankfully a few other software houses are now marketing programs for our machine and three that have recently come to my attention are TX Software of Harlow, Essex, Apex Trading of Brighton and Titan Programs of Corsham, Wiltshire. Also Gemini Marketing of Exmouth, Devon do an excellent range of software for businesses and are promising to expand into educational software.

Meanwhile, back in Texas, TI have brought out three new command modules Parsec, Chisholm Trail and Alpiner, all priced around \$30 in the States but not yet available over here. They all sound pretty exciting, particularly Parsec which I understand has digitised speech (whatever that is!). TI say that they don't know when

these will be available over here or what the price will be – so I have ordered Parsec from a dealer in the States – my first attempt at a personal import!

*_**

You have to watch TI very closely at times... at least in this country. Available now is the LOGO language which is a beautiful, child appropriate computer language which is soon going to take over as the major computer language in our schools... BUT... over in the U.S. LOGO 2 has come out which is a HUGE improvement on the original, but TI in this country are keeping quiet about it. When I enquired about LOGO 2, TI told me that this was still being tested out in the States – come off it! Don't try to unload your obsolete LOGOs on us – we weren't born yesterday! Give us the REAL THING!

*_**

Fanfare of trumpets::::: 99'ER Magazine have at last gone monthly! The latest edition I have (November 1982) is up to the usual high standard with good programs for you to type into your machine together with helpful tips and news. One particularly fascinating article was how TI Extended Basic handles SUBPROGRAMS – that's right, not sub-routines, but actually subprograms within a program together with some entertaining examples. It is pointed out that this is a unique system which is not available on other micros – and apparently the next cheapest system that uses subprograms is one that costs \$40,000!

For all those of you who have not yet bought the Extended Basic command module, this is the most highly recommended expansion of your system. The price has dropped from £100 in the summer to £69 which is the price advertised by AB & C Computers in TIdings' last edition – by this edition it might even have come down further!

*_**

Software Review Time ---- Software Review Time ---- Software Review Time ----

- 1. PS Pesteroids (PS Software)
- 2. Outland (Roach Software)

Both programs available from Stephen Shaw, 10 Alstone Road, Stockport, Cheshire, SH4 5AH.

Both these games are the familiar 'asteroids' type games – but there the similarity ends. 'Pesteroids' is written in Extended Basic whilst 'Outland' is written in assembly code for the new Mini-Memory Module.

First, Pesteroids:

This is graphically a very exciting game with excellent use of sprites and colour. At first rather boring rocks come hurtling at you – but these are easy to dispose of and once you do, you meet some familiar shapes which are not very friendly! It was, nevertheless a brilliant idea of the programmer to give the TI user the opportunity of shooting up other computer companys' logos – grinning Apples, menacing IBM's are all trying to crash into your ship – and when you shoot them up they turn into attacking Ataris and even vicious Vics! Although the action does not seem to get any faster with each successive screen, the objects appear to get bigger and more deadly each time.

You fight back with your ship's lasars — but their range is limited, so be careful. If you do seem in danger of colliding then you have one of two possible courses which you have already chosen before the game started. The first are your shields (which gives you temporary protection) and the hyperspace option which moves your ship randomly to another place on the screen (rather hazardous)!

Your score is continuously displayed and when the game is over you can select either 'Redo' or 'Back' which will give you the opportunity to reselect your options. In either case the best score is retained and displayed. Oh — I nearly forgot — there is the chance to score extra points in between screens, again with nice use of graphics and sounds — but I will let you find out for yourself (There has to be some surprises left!)

Yacobi Ratings:

Presentation On-Screen *****	Value for Money *****
Program Quality *****	Ease of Use ****
Supplied Instructions *****	Interest-Holding *****

Conclusion: At £9 this has got to be one of the best programs around!

Second, Outland:

This is the first program that has become available in this country for the new Mini-Memory Module and is written entirely in assembly code which accounts for its relatively high price of £10.

The graphics are poor and look like a very childish drawing of a triangular ship and distorted asteroids (but then again, I don't suppose that asteroids are REALLY shaped like Apples, etc!!) Nevertheless, this program does have some saving graces, mainly the speed of action which is vastly superior to Pesteroids. You have only one defence option (besides your lasar, that is) which is your shields — which are not of a temporary nature but last until you release your shields to take some other action. If you are hit by an asteroid while your shields are up you go shooting around the screen like a billiard ball and the only way to slow down is to use your thrust option — but beware of letting your shields down at the wrong moment. An interesting effect of your ship being hurtled around the screen is if you try to fire your lasar, your lasar beam seems to bend back on itself and it appears as though you have just shot yourself.... but this cannot happen! Score is continuously displayed, but there is no facility for 'highest score to date'.

Yacobi Ratings:

Presentation On-Screen **	Value for Money ****
Program Quality ****	Ease of Use ****
Supplied Instructions ****	Interest-Holding *****

I must add that despite the superior graphics of Pesteroids my five-year-old son prefers Outland every time!

Conclusion: Poor graphic quality adequately made up for in speed and excitement.

Happy computing,

Arieh Yacobi.

* _ * _ * _ * _ * _ * _ * _ * _ * _ * _ * _ * _ * _ * _ * _ *

L E T T E R S

2 Harlestone Road, Swindon SN3 4ED.

Dear Pete (Brooks),

I have recently become a TI/994A user and must say how pleased I am with the computer. However I am more than a little disappointed with the after-sales organisation, software availability and 99'er magazine problems (I am still trying to get one from the U.S.A.) On the positive side, things can only improve!

A couple of observations which may help other users:—

When using Number Scramble (OLDIES BUT GOODIES by Texas) on my 4A, I found that the X key did not move the numbers as it should have done. It now works O.K. after changing:

```
3200 IF KEY=3 THEN 3270
3210 MROW=-1
3270 MCOL=-1
```

A very cheap cassette recorder which works well with the 99/4A is the JONES CT 5101. I use the Sanyo Slim 3G which I am very pleased with but I know some recorders (regardless of price/quality) just refuse to work with the computer. I believe it has a lot to do with the response time of the Auto Level Control.

HELP PLEASE — I have just received my first batch of programs from the software library (Paul Dicks must spend most of his spare time copying programs!) I have some problems which others may have solved:

```
015 STARFIGHTER — No control
009 LUNAR LANDER — Metering doesn't seem to do anything
058 BOMB RUN — Doesn't run, Extended Basic? Not indicated on software
      library list as E/B, so beware.
```

Finally, I am willing to help any beginners in my area (Swindon) if I can but would add that I still have my 'L' plates up myself! Anyway, if you can't seem to get off the ground, ring me on Swindon 822639.

Bruce Merrett.

* * * * *

18 Huthwaite Road, Sutton-in-Ashfield, Notts.

Dear Mr. Dicks,

On receiving my copy of Tidings (Vol.2 No.6), I flicked through the pages reading articles which caught my eye. Among these was the 'Hints from the U.S.A.' section. On reading this I rushed to my console and started to experiment with the "one key entry" of commands. Within five minutes, I had discovered a further 10 items to add to the list given in the article, and I list these below.

KEYS PRESSED	CODE OBTAINED
fctn /	OR
fctn H	<
fctn J	>

<i>fcn K</i>	+
<i>fcn L</i>	-
<i>fcn ;</i>	NOT
<i>fcn B</i>	=
<i>fcn N</i>	/
<i>fcn M</i>	*
<i>fcn ,</i>	&

These should be entered as the article says. Note that these are accessed by the "fcn" key, not the "ctrl" key. Being easier to enter normally, they are not of great value but I thought that they would be of interest to readers.

Yours faithfully,

J. Davies.

P.S. I would like to become one of the county contacts. If possible, put me on the list as NORTH NOTTINGHAMSHIRE. (There is about 15 miles between myself and Mike O'Regan – the Nottinghamshire representative). Thank you.

* * * * *

"OHM", 15 South View Road, Sedgley, Dudley, W. Midlands.

Dear Paul,

First of all, congratulations on 'Tidings'

I have found all of them interesting. I have only had a 99/4a since October and have not been able to spend much time using it. I note that there is some uncertainty in the nature of the 99/4A hardware. Whilst not having taken my 99/4A to pieces yet, to sort it all out, I may be able to offer some interesting information on the TMS9900, as I have been designing hardware and writing software for it for the past 5 years.

The TMS9900 is a 64 pin integrated circuit. It has 16 data input and output lines and 15 address lines. There are also memory control and interrupt lines. The address range available is 32K words, limited by the 15 address lines. The processor always generates word addresses, bytes are selected internally. There are no general purpose registers in the micro-processor. It has only three registers. These are:—

- i. Program counter (PC) — used to address the program instruction. The PC is incremented each time an instruction is executed, to the next instruction. An instruction may occupy 1, 2 or 3 words of memory, the processor always steps on the correct amount.
- ii. Status register (ST) this carries the results of arithmetic and logical operations. Bits in this register are set or reset to indicated arithmetic or logical comparisons. This register also carries the interrupt priority. If an interrupt of lower priority than set occurs, it is ignored. If an interrupt of higher priority occurs, it is serviced and the interrupt mask priority is set equal to this higher value.
- iii. Workspace pointer (WP). As the chip has no general purpose registers, a block of 16 words in memory is pointed to by the workspace pointer. These 16 words are then treated as 16 registers.

Example. If workspace pointer = >F800 (> means hexadecimal) and instruction MOV R0, R1 was executed, then this would write the contents of address >F800 into >F802 . (Note all addresses are word addresses and thus even). The most significant byte of a word lives at the even address, the least significant byte lives at an odd address. So R0 is the byte at >F800 and the byte at >F801 , making R1 carry on at >F802 .

This WP system means that a new set of 16 registers can be obtained at any time by changing the workspace pointer. If an interrupt occurs, then there is no need to save any registers. The PC, WP and ST are stored in registers 13, 14, and 15 of the new workspace, so that they can be restored at the end of the interrupt.

The 9900 has all its 16 interrupt vectors (WP + PC addresses) stored in memory, locations 0000 - >003E . After that come the 16 software interrupt XOP (Ext. Operations) resides at >FFFC , >FFFE . Thus it is normal to place ROM in locations 0 - >3E , so that RESET (level 0 interrupt, usually derived from power up) causes a trap to locations 0000 (for WP) and 0002 (for PC). The other way of getting the processor running is to put ROM at the top of memory and use the LOAD signal (RESET inhibited). The programme can then set up the interrupt vectors in RAM at the bottom of memory. So, the 99/4A must have ROM in main memory to enable the system to run from cold. I assume the BASIC interpreter also lives there. There must also be some RAM for workspace use (the 1/4K I suppose). The 16K RAM is said to be connected to the VDP. I don't have a full data sheet on the 9918 so do not know much about it.

The next question is how the CPU communicates with the VDP. It could be that the VDP is mapped into main memory or it could be done through the CRU.

The CRU is the Communications Register Unit. This grand sounding facility is actually a bit serial I/O method. It works by setting an address on the address lines A4 to A14. The address is obtained from Register 12 of the current workspace. To do an input, the CPU samples the CRUIN line. For an output, the CRUOUT line is set to 0 or 1, and required, followed by a pulse on the CRUCLK line. This can be done for single bit inputs and outputs or multiple (1-16) inputs and outputs. For multiple bit transfers, the address is changed for each bit. This system need not be used only for I/O. RAM can be connected to the CRU address space and then written and read via CRU instructions. The advantage of CRU I/O is the simplicity of the hardware. The disadvantage is the speed. An output of 16 bits (LDCR R1, 0) takes 52 clock cycles ($17.3\mu\text{s}$ at 3MHz clock). An input of 16 bits (STCR R1, 0) takes 60 clock cycles ($20\mu\text{s}$). So if the VDP is CRU addressed, transfers to the RAM will be slow. (A memory mapped I/O, MOV R1, @PORT is 22 clock cycles - $7\mu\text{s}$).

Well, that's a brief tour of the TMS9900.

In the TI 99/4A free glossy, under specifications it says "System memory and address signals available at peripheral connector. They may be, but if TI don't say what is on which pin, what use is it? Even if it cannot be included in the price, a hardware manual for a few pounds would be useful.

Best wishes, CHRIS JOHNSON.

P.S. I don't have mini memory but if anyone has a question on 9900 assembly language, drop me a line.

I think it is a real break-through. I want to report an objective method of evaluating games for micros. Something that Software Houses all over the world have been looking for. Yet, like most scientific discoveries, my discovery was accidental, so I claim no credit for it.

Imagine!! You wake at 7 a.m. one morning. There is a dull ache in your chest, your arms feel heavy as lead, your hands are tingling. You know you have a digestion like a horse, you've never had indigestion before, but the ache goes on and on and you cannot get back to sleep. You take a deep breath but the ache gets neither better nor worse. You feel as if you will never move again, heavy, washed out.

Suddenly you realise what is happening to you. All the lectures you have attended, all the folks you have talked to in hospital, all the books you have read come flooding back to you.

It is a heart attack!

"Jen? You awake?" She turns over and groans. "I'm having a heart attack."

She wakes up. Now there are advantages and disadvantages in having a nurse as a wife. They have a way of dismissing aches and pains as malingering. But this time in one minute flat she had run through the traditional list of symptoms. In one minute ten seconds you are sitting up at a forty five degree angle supported by pillows. One minute twenty and she is on the telephone to the G.P. Two minutes and she is packing 'a few things' into a case ready for when the ambulance comes after her diagnosis has been confirmed by the doctor.

That is how my break through started. A few weeks in hospital which were busy and interesting and then home. Then I began to realise just how long a day really was. And the days stretched away in one long unbroken chain. What was I going to do with all that time?

I had been enjoying a full and satisfying life style. I had been a Methodist Minister for 26 years. I was looking after five churches with all the fun and sadness that goes with being involved in the devotional and social life of so many people. I had been doing a bit of teaching, just Psychology and Religious Studies at the local District College. I was Free Church Chaplain to a local Psychiatric Hospital. I was studying part time for a Masters degree with Sheffield University, and keeping up with my favourite hobby of astronomy.

How long before I could begin picking up my life again? Six months, they said, at least. Nothing intellectually demanding, they said. You'll have to give something up, they said, and get some weight off.

About this time, among the other magazines, someone sent me a copy of PRINT-OUT. It was full of a jargon I didn't understand, though I'd done a bit of computing with an Open University course back in 1973. I found I only understood one word in ten. So I got them to bring me more computing magazines and soon I had decided I was going to buy a micro.

I listed all the attributes of my ideal micro. The two real one's which came anywhere near my ideal were the BBC 'B' and the TI 99/4A. But I found I would

have to wait at least six months for a BBC so I ordered a Texas from Computer Supermarket in Corby with an Extended Basic Module. Within a week it came.

Up till now I have spent my days reading. I'd always intended to read the vet books by James Herriott, now I read them one a day. I discovered the Covenant books by Stephen Donaldson: they took a little longer to read. I read the only one of Richard Adam's books I hadn't already read, "Plague Dogs" But suddenly I had no time for reading, the days sped by. I had found a new type of therapy.

My wife named it TEXAS THERAPY. I new way to recover from a coronary. But there is still my break through to tell you about.

One of the after effects of my heart attack is a new kind of pain in my chest. I get it under two sets of conditions (i) when I get excited (ii) when the wind blows in my face. The pain is called ANGINA.

I can play a lot of TI-INVADERS before the excitement brings on my chest pain. But I first noticed that computer games do bring on angina after buying OCTAL from Stephen Shaw. Then I found that when I reached the third floor of KEYS TO THE CASTLE (also obtainable from Stephen) I began to suffer. But the game which has given me the worst bout of angina is THE ATTACK. After about one minute at level two I feel the ache begin and after five minutes I can stand it no longer and have to give up.

They say PARSEC is even more exciting. Well, I will tell you. I have ordered it and we will see how it does on my new rating scale, how long it takes to give me angina.

These are my ratings so far:

TI Invaders	20+
Keys to the Castle	15
Octal	10
Cross Country Car Rally	7
Winging it	4 (It comes on as a crash, and I always do).
The Attack	1

The smaller the number, the quicker my angina starts and therefore the more exciting the game is. And that gives me an idea. There might be a way of raising enough money to buy myself a disc system in this heart of mine.

So Software House please note: If you want an independent objective assessment of how exciting your new game is why not try it out on my heart?

Say £5 a time? Let me see..... that will be about 100 evaluations! I wonder if my heart will stand it?

H O L D

by Cyril D. Blount.

Workspace 1. Does your micro produce numbers which are consistently random when you call RND and tell it to RANDOMIZE or does it give you numbers whose distribution contain an inherent pattern? Why not check it out?

Let us set our computer to generate pairs of digits in the range 0 to 9. If the

two numbers generated are the same we score a 'hit'. In a run of 10,000 pairs we would expect a random number generator to produce 1,000 hits in theory, but on my 99/4A I scored 113 hits too many.

Superficially this shows that the TI Pseudo Random Number Generator does not produce random numbers, but if such results are obtained consistently with different computers using different methods of random number generation, and also when using such random natural events as radioactive decay to generate random numbers, then you need to ask what randomness is.

So I recommend a book to set you thinking and to stimulate you to perform experiments in randomness on your TI 99/4A. "On Time" by Michael Shallis (sub-titled, "In investigation into Scientific Knowledge and Human Experience"). Published by Burnett Books Ltd., 1982.

Workspace 2. I too wasted my day by going to the Northern Computer Fair at Belle Vue last December. Why doesn't TI exhibit at these do's? However I came away with one thing worth passing on. I had always kept my console covered with a piece of cloth thinking to keep dust and dog's hairs out of it. But while I was at the Fair I ordered a cover for my console. It cost me £4 and I am very satisfied with it. It fits very neatly and is well finished. I got it from Micro Aids, 2 Boston Close, Culcheth, Warrington, WA3 4LW. Their telephone number is 092 576 2804.

Workspace 3. I have just received the NEWSLETTER of the International 99/4 Users Group dated November 15, 1982. For those who have bought themselves a MINI MEMORY module there is an excellent article in it on the Assembly Language blues, and a report promising TI's version of FORTH in the first quarter of 1983. Some time ago I bought an Assembly Source Listing for Fig FORTH 9900 from Microprocessor Engineering Ltd. of Southampton with the thought I would adapt it for the 99/4A. But it was beyond me, so I look forward to TI's own module.

The annual subscription for the International User's NEWSLETTER is \$12 and membership offers a number of discounts on TI products. The address of the Group is PO Box 67, Bethany, OK 73008, USA.

Workspace 4. Oaktree Systems of 3922 Valentine Road, Whitmore Lake, MI 48189, USA have a package on offer for \$24.95 for display enhancement. They offer a 40 character wide display mode instead of the 28 character standard display, plus forward and backward scrolling of 96 lines and the ability to split the screen into two parts so that one is scrolled while the other is stationary.

However you will need memory expansion, extended BASIC and Disc Drive to run it. It works by using 6 by 8 pixels to define the characters instead of 8 by 8 pixels and it occupies 3842 bytes of memory space.

Workspace 5. If you are a Minister or Member of a Church you may be thinking about how you can use your micro for the benefit of your parish or circuit. You are not alone. The CCUG (Church Computer User's Group) has been set up by a group of enthusiasts to "gather and share ideas and information about the use of Computers in Church".

The Rev. R.S. Wilson of Greenside Vicarage, Ryton, Tyne & Wear is the editor of the magazine "CHURCH COMPUTER" and the Rev. Nigel Hardcastle of 112 Rotherfield Road, Garretts Green, Birmingham deals with everything else.

In the December edition of the magazine there are articles on filing, computers and privacy, finance, religious education, computerisation of diocesan offices and a report of the Church of England working party on computers.

Workspace 6. Finally a little program for you to play with. It uses a simple FOR – NEXT loop as a clock.

```
100 INPUT "WHAT IS THE PRESENT TIME, IN HOURS,  
MINUTES?":Z,Y  
110 X=0  
120 FOR TIME=1 TO 309  
130 NEXT TIME  
140 X=X+1  
150 IF X=60 THEN 120  
160 Y=Y+1  
170 CALL CLEAR  
180 PRINT Z;"HOURS",Y;"MINUTES"  
190 IF Y=60 THEN 200 ELSE 230  
200 Y=0  
210 Z=Z+1  
220 IF Z=24 THEN Z=0  
230 IF X=60 THEN 110
```

If you are using Extended BASIC then the loop runs at a different rate and line 120 needs to be changed to:

```
120 FOR TIME=1 TO 227.
```

HOLD over: resume processing.

Work Address:
Coatbridge Child Guidance Centre,
109 - 111 Dunbeth Road,
Coatbridge. Tel. 0236 - 33371

MARGARET NOBBS
66 Lomond Road,
Coatbridge, Lanarkshire
(Strathclye) ML5 2JR.
Tel: 0236-25712.

Dear Paul,

I would be very pleased to have my name published in Tidings for anyone who is interested in educational software for Primary Remedial or Special Education. I am still pursuing my research into the possibility of acquiring LOGO without an exhorbitant expenditure. I was discouraged at one point, by a contact who told me that it would be very difficult and would require a lot of effort on my part without any back-up available. At that point I almost decided to trade in my TI for a micro with a cheaper expansion system. However, a fortnight ago in the Times Educational Supplement (12.11.82.) there was an article giving a reference to a Rhys Gwyn in Didsbury School of Education, Manchester Polytechnic who has been experimenting with TI LOGO in Primary Schools. I 'phoned him, and he reassured me about the possibility of using the module without difficulty. He is also going to send me details

of a summer school on LOGO, which I may decide to attend. So, with new enthusiasm I may indeed acquire the expansion system, 32k card and module, all to be able to key in TELL SPRITE – CARRY:TRUCK – SET COLOUR:RED – SET HEADING: EAST–SETSPEED 100, and see a little truck dash across the monitor, on which I will previously have drawn a suitable background.

If it ever comes about, I will write you an article for Tidings!

Many thanks for all the effort you put into TIHOME, and happy computing.

Margaret.

Haldane Mill,
Althorne, Essex.

Dear Paul,
County Contacts (Essex)

I am delighted to report contacts have been made, to date three telephone calls have been received, three meetings arranged, two meetings have taken place.

There has been some swapping of programs on tape and difficulties have been encountered in loading programs recorded on “away” recorders.

Some comment has been received concerning my telephone number, which was published as 06.217-40189, the number as it stands contains the correct numbers but should of course read as 0621 740 189. Perhaps Paul will be good enough to publish my telephone number in its more usual form.

Alarm! Alarm! an incident has taken place, which had me rushing for my, I hope, worthwhile guarantee. My Alpha Lock key has taken leave of its senses, in spite of the snow outside, it thinks it is spring and has sprung up into the air. I now have a spare part and its mobile and does not wish to return to home base. Can anyone help, have you suffered a similar experience and what did you do about the problem? does this key fit back or is it a guarantee job?

I hope TI read this.

By the way I had a letter published in the January 1983 issue of Computer and Video Games Magazine under, Thanks From A Texan! does this constitute an article and qualify for a module of my choice up to a price of £50? I think it should

I have written to 99'er Magazine and offered to help them distribute their Mag. in this country if they require the help, am awaiting their reply, I sent the letter Airmail on the 9th February 1983 let us see how long it takes to receive a reply.

Bye for Now, County Contacts (Essex). 0621 740 189.

Bernard E. Bailey, G3MAH RSGB.

NOTES FROM THE NORTH

Price Watch

The following table shows that it is well worth shopping around for TI modules etc. Price lists as current as possible.

	A(£)	B(£)	C(£)	D(£)
Soccer, Wumpus, Attack, Amazing, etc.	21.00	21.55	21.90	17.50
Munchman	24.99	25.55	21.90	17.50
Mind Challengers	21.00	13.35	12.50	14.00
Black Jack/Poker	21.00	34.55	21.90	17.50
Personal Record Keeping	40.00	43.05	42.90	35.00
Extended Basic, Logo	75.00	70.20	67.90	N/A
Terminal Emulator	39.99	42.85	42.90	N/A
Adventure and Pirate	29.99	34.55	33.90	N/A
Statistics, Personal Report Generator	40.00	43.05	42.90	N/A
Teach Yourself Basic Cassette	40.00!	9.05	8.90	N/A

A = Computer Supermarket, Corby, Northants.

B = AB and C Computers, including postage.

C = Comet Discount Warehouses.

D = Kays Mail Order Catalogue, after deducting commission, but making no allowance for 20 weeks free credit.

Many organisations do not seem sure which price bracket each item falls into. Mail Order catalogues, most of whom stock a limited range, are a surprisingly cheap source but you must be getting the commission yourself to achieve the above prices. (If not add 14.3%). AB and C Computers are by far the cheapest for hardware, peripherals etc.

Cassette Operation

A further gremlin I have discovered is that, after playing a chromium oxide music tape in my portable, as I occasionally do, it refuses to read programs until a proprietary head cleaner (Boots) has been passed through, after which it returns to the normal high reliability.

Typing

My wife would like to learn to type on the 99/4A but I was worried that, even if Commodore's claim that our keyboard was 'half size' was untrue, it may still be less than full size, making her new skill not easily transferable. After measuring the distance between the Q and P key centres (17 cm) I had a walk round the office block at work and measured a large number of different computer terminals and typewriters (mostly electric) and discovered that our keyboard is exactly full size. This makes Commodore's claim even more incredible. TI do a touch typing tutor in the States but, in its absence over here, my wife is trying to write one.

Product Availability

Standing in the sales queue at Comet Warehouse in Stockton (to buy a TI module) I was delighted to hear TWO people in front of me ask for a 99/4A. TIDINGS regulars

will know what followed – “Sorry sir, out of stock.” One of them even left with a VIC 20 + 8K memory expansion for about £160. Imagine how pleased he would have been to buy a 99/4A for £179 less £50 from TI (although staff at Comet had not heard of the handback offer!). Comet are one of the country’s biggest electrical distributors and only sell the VIC 20 and 99/4A, but for how long? Ah well, we don’t want TI HOME to get too big and unfriendly do we?

Speech Synthesiser Price

Consider the following prices of TI products (Computer Supermarket):

Speak and Maths	£34.95
Speak and Spell	£34.95
Speak and Write	£23.95
99/4A Speech Synthesiser	£49.95

- Given – 1. TI admit that the technology is the same;
2. all the “toys” possess touch sensitive keyboards (over 30 keys on Spell and Write) and are pre-programmed to prompt children, test answers etc.;
 3. profit margins on toys are high at anything up to 100%;

why does the Speech Synthesiser cost so much? Perhaps one of the electronic Wizards could pick up a discarded game and construct a DIY add on!

Programs from the Library

I think I was a little unlucky with the first four programs I received from the library.

- Whitehall (079) turned out to be in Enhanced Basic which I do not yet have. (Alter your library lists).
- Music Editor (214) was absolutely incomprehensible and, despite an hour and a half studying the listing, I could not get past the 3rd prompt. Mike O’Regan, after pleading not guilty to writing the program (and telling me that he had written a better one!) was able to help with some notes from ‘99er’ who were the original publishers, and the program is actually quite good.
- Battle at Sea (065) while on the face of it a very good “battleships” type game – you versus the computer, contains some bugs. Line 5180 has a zero instead of an 0 which causes the program to perversely stop when you request a new game. My 7 year-old quickly spotted another flaw in that the computer always puts its ships in the same place! This was cured by moving line 2320 to 2325 and entering

2320 RANDOMIZE

I do not really understand the cure as RANDOMIZE is already in at the start. A clue might be that RANDOMIZE appears twice. Does the second one cancel the first? Perhaps someone who is able could have a PEEK?

The final and most worrying bug is that when your ships are heavily grouped in the first two rows the game just ceases about half way through with an

infinite loop around line 4110. When this is amended a further one occurs around 4340 followed by another around 3800. At this point I stopped as I couldn't quickly see how to get round the last and was also a bit worried that the computer now seemed to be a bit less logical in its play. i.e. it didn't always move in for the kill after hitting a ship. If the author is out there somewhere try RUNNING with your ships in A0 and B0 to B6 and let us know.

Paint Palette

Searching for a colour that Texas doesn't provide (like brown)? Wish you'd bought an Atari instead? Well, enter this listing to take a look at the 120 colours you can get by the simple device of mixing alternate pixels of two colours. Press any key to look at next set with one colour numbered at the bottom being constant and that colour being mixed with the others in order from 2 to 16 across the screen. Believe me they are all different!

```
100 CALL CLEAR
110 FOR N=40 TO 152 STEP 8
120 CALL CHAR(N,"55AA55AA55AA55AA")
130 NEXT N
140 FOR A=2 TO 16
150 CALL CLEAR
160 PRINT TAB(13);A
170 FOR B=2 TO 16
180 CALL COLOR(B,B,A)
190 CALL VCHAR(1,(2*B)-2,24+(8*B),22)
200 CALL VCHAR(1,(2*B)-1,24+(8*B),22)
210 NEXT B
220 CALL KEY(0,K,S)
230 IF S<1 THEN 220
240 NEXT A
```

Because you are using a user defined character for this effect there are naturally some limitations in application but you can paint parts of the screen or the whole screen in unusual colours. If one of the colours is also the screen colour then other user defined characters are possible, e.g.:-

```
100 CALL CLEAR
110 CALL COLOR(9,10,16)
120 CALL SCREEN(16)
130 CALL CHAR(100,"55AA54A850A04080")
140 CALL HCHAR(1,1,100,768)
150 GOTO 150
```

fills the screen with PINK triangles.

I have been able to use the technique on an IDENTIKIT program that I am submitting to the library in which realistic(?) skin and hair colours are possible.

Tips for Beginners

1. Use DATA statements to cut down on the number of CALL's.
e.g. Identify the following nursery rhyme:

```
100 FOR N=1 TO 16
110 READ X,Y
120 CALL SOUND(100*X,Y,2)
130 NEXT N
140 DATA 4,208,4,208,4,311,4,311,2,349,2,392,2,415,2,349,8,311,
      4,277,4,277,4,262
150 DATA 4,262,4,233,4,233,5,208
```

If DATA needs to be read more than once you must use RESTORE.
(see manual)

2. Mirror images

Where the left half of the screen is a mirror image of the right in games layouts, mazes, designs etc., you can save effort by only defining on half and relating it to the other with the general forms:—

LEFT

RIGHT

CALL VCHAR(X,Y,CHAR,Z)

CALL VCHAR(X,33-Y,CHAR,Z)

CALL HCHAR(X,Y,CHAR,Z)

CALL HCHAR(X,34-Y-Z,CHAR,Z)

e.g. The following prints two large symbols on the screen with only the left one being defined:

```
100 CALL CLEAR
110 CALL COLOR(2,9,9)
120 FOR N=1 TO 9
130 READ(X,Y,Z)
140 CALL HCHAR(X,Y,42,Z)
150 CALL HCHAR(X,34-Y-Z,42,Z)
160 NEXT N
170 DATA 5,9,2,6,10,2,7,10,3,8,1,14,9,5,11,10,1,14,11,10,3,12,10,
      2,13,9,2
180 GOTO 180
```

Two things for you to try. In the above list it is possible to reduce the data even further by relating one of X,Y or Z to N. Secondly, can you write similar pairs of CALLS to give mirror images on the top and bottom halves of the screen? This thinking can, of course, be taken a lot further.

Ian Swales,
39 Coast Road,
Redcar, Cleveland.

TI Repairs

My thanks to Robin Frowd of TI for his investigations regarding the repair of my computer. Dixons sat on my 4A for twenty eight days before sending it to TI. Let that be a lesson to all of us.

A,B and C Computers, Cornwall

What a super firm! My enquiries have been carefully, politely and above all correctly dealt with and ordered software has arrived quickly and well packaged. I recommend them as a mail order service.

ExBas to TIBasic : Print statements

I have been writing a program in TIBasic but using Exbas to continually check SIZE. When finished each session, this has been SAVED using CS1 via Exbas.

However, on reloading into TIBasic rather than Exbas, many PRINT statements have been changed to include what can only be described as gobbledegook. These are print statements that have included colons typed together to indicate print separators (for TIBasic) rather than line separators (for Exbas).

Hence:

```
10  REM TEST PROG
20  REM
30  PRINT "THIS TEST PROG":::
40  PRINT "TESTS THE PROG."
50  END
```

is entered in Exbas and then saved using CS1. When reloaded in to TIBasic using OLD CS1 and then LISTed, the following appears:

```
10  REM TEST PROG
20  REM
30  PRINT "THIS TEST PROG" V1 (,M/ (<*Vq (>V V1 (,M/ (<
    *Vq (>V1 (,m/ (< *Vq (>V
40  PRINT "TESTS THE PROG."
50  END
```

Equally, if in Exbas line 30 is changed to read

```
30  PRINT "THIS TEST PROG": : :
```

it reappears in TIBasic complete with gobbledegook.

However, if line 30 is changed to

```
30  PRINT "THIS TEST PROG": : : :
```

then all is well – especially as when RUN in Exbas, the colons act as print separators!

There is a pattern to the gobbledegook which is a repeated set of symbols (N.B. standard lower case for l and q).

Saving Space with Arrays – Don't Use 'Em (TIBasic)

I offer this as an example of 'tidier' programming. Whilst I suppose I subscribe to the school of thought that states "forget the shape of the programme – so long as it works" I do fiddle with my programmes (once they are written) to improve my own style and, on occasions when MEMORY FULL appears, to save space. Of course, only a pervert like me would have written such a crazy programme in the first place. Normal people would have gone straight to the simplest route – or would they?

EXPLANATION

The aim of this programme is to place a list of two figure codes into an array of 100 elements and then to randomly choose one of the array elements and use its code to assign Q.

```
10  REM EXAMPLE A
20  OPTION BASE 1
30  DIM Z(100)
40  FOR R=1 TO 100
50  READ Z(R)
60  NEXT R
70  RANDOMIZE
80  CHOICE= INT(100*RND)+1
90  Q=Z(CHOICE)
100 PRINT Q
200 DATA /100 two figure codes/
```

30 sets up a 1–D array of 100 elements

40 starts loop to read data

50 reads data into array Z, element R

60 repeats loop

70 sets random number generator

80 chooses a random number between 1 and 100

90 assigns chosen code to Q

100 prints the value of Q

The more experienced of you will see that this is really very poor programming. It does eat up 1.517 kbytes when RUN. Of course, space can be saved by combining lines 80 and 90.

```
80  Q=Z(INT(100*RND)+1)
```

That saves 33 bytes!

The real saving comes when the array is removed and we simply choose randomly from the data statement itself:

EXPLANATION

The aim of this programme is to choose a random number, access the two figure code that is in the position of that random number within the data statement and assign that code to Q.

```
10  REM EXAMPLE "B"
20  RANDOMIZE
30  FOR R=1 TO INT(100*RND)+1
```

```

40  READ Q
50  NEXT R
60  PRINT Q

200 DATA /100 two figure codes/

20 sets random number generator
30 starts loop R from 1 to a random number between 1 and 100
40 reads into Q the current .data
50 repeats loop

```

In this way, Q is continually re-assigned upto the random number chosen. The last value assigned is printed as Q. This shorter programme is only 886 bytes and does exactly the same job as example A. It can probably still be improved upon.

The array Z(100) uses 831 bytes when RUN.

SOFTWARE REVIEWS

Adventure and Pirate (TI SSS, £33.75)

I had little idea what to expect when I purchased this SSS module. A somewhat one sided conversation with a tutee of mine about Dungeons and Dragons and a read of an article or two had me believing that adventuring was fun if not frustrating. A sort of pan-dimensional lateral thinking electronic crossword puzzle.

In order to play the Adventure programmes produced by Adventure International and sold through TI on tape or disk, it is necessary to purchase the SSS module which, with true marketing genius, comes with a "free" adventure called PIRATES. The module operates like any other — simply plugging into the console via the front loading port. Press any key to gain the menu and press 2 for Adventure and immediately you are given the instructions for loading the tape data which varies from game to game though all using the same Adventure SSS. Once the data is loaded, and after a few introductory remarks, the adventure suddenly begins.

One of the fun parts is that you literally have no idea what to type in! The booklet that comes with the module, gives a few clues but part of the adventure is discovering the word combinations that will be accepted. These orders are two word commands (verb + noun) that, apart from fouling the English language, allow you to move from place to place and to manipulate the objects. Statements such as "GO SHIP" or "TAKE RUG" or "KILL PIRATE" — though the latter returns the message "Sorry I can't. I'm not feeling destructive."

But behind all this is the need for an ability to think logically. The game has earned my respect for the power of its structure. It *is* clever! Every so often, any statement input is found to reveal or achieve nothing. You feel stuck and somewhat frustrated. There is a temptation (as there was one week-end) to actually *hit* the computer. But eventually the thunderbolt strikes you and you realise the logic of it all and progress is made.

Far more infuriating and very humbling is when you think you have it all worked out. You can relate objects and events that are separate — you start to predict what will happen after a certain combination of moves is made. You spend an hour happily making great strides when suddenly — wham — dead end in a maze of logic and reasoning.

And do not think this game is over in one hour's quick finger tapping: then think again. This type of adventure takes weeks. You will be awake at night trying to work out the moves for the next day's session. It is possible to SAVE your current status from one session to another.

I am pleased with the purchase — and I shall buy more. It teaches clear rational thinking and above all it is exciting. My only worry is the suspicion that once I have completed the adventure and collected my two treasures that will be that. For once done, Pirates will not be done again. It will be too easy.

Now where is that second treasure, matey?....

GAMES BY NOT POLYOPTICS (TIBasic, Stainless Software, S.Shaw et al.)

Steve Shaw, in his software catalogue of imported American software, has typed the word 'difficult' by the description of a game of dark corridors "Maze of Ariel". He is right to do so. Following a closed maze backwards and forwards five times with a Dragon after you calls for skill enough but when the maze itself is continually changing as well... A lantern and grenades are available to blast down walls in this challenging game of trogladite manoeuvre. A first rate game.

The rather splendid graphics in **Hords** is worth the wait for it to set itself up. On a world map, up to four players can wage war against each other to obtain global domination. The map is continually updated and there is recognition of the possibility of the slightly weaker party winning. Troops can be moved between countries overland or by ship. The winner is he with all the countries his colour — there is a nostalgic desire to win with colour red!

This is a good game which lasts for some time. It can get complex, with convoys of troop ships or battle cruisers each coded with status information — you must remember which ship is which. Strategy can be developed and flanking movements are useful. The programme is recommended.

One I cannot recommend (sorry Steve) is **Starship Pegasus**. To be honest, apart from doing what it asks, I cannot see the point of it. As you may have gathered, I prefer games in which there is some intellectual challenge. Starship Pegasus is a game which straightforwardly asks you to survive by collecting points — a purpose which is weighted in favour of the computer. There are good graphics some of which last so short a time that you hardly see them. It is really a text game with some graphics thrown in. The aim is to gain for the Emperor mineral wealth, energy and technology points. If you do well enough he will award you a gong. You travel to a star system, maybe fight a space marauder (not difficult) and then go through each planet exploiting it and the random population generated for it. Everything from gaseous herbivours to giant but incredibly thick kangaroid petrovours.

For myself, I should have liked to have seen better use made of graphics — for example a slower and more realistic travel between planets rather than a quick flash of an approaching world and a bland statement of the orbit attained.

Having effectively destroyed the game as adult entertainment, I can see it being a hit with the children who will adore the different types of beings that are created. The idea of zapping some inferior being that won't sign a treaty would certainly appeal to them.

Lastly, and addictively, **Winging It** (ver 1) is a competent attempt at a flight simulator. You have to work out how to fly, firstly with no weather (that took three weeks and fifteen planes) and then with weather and mountains etc. (another twenty planes and still learning!) The update of the screen instruments whilst not slow is ponderous. Keyboard activated, it takes a lot of mastering and this challenge alone makes it worth buying. Once you have completely learnt the techniques and are capable of landing where you want then there are two games to be played. I think it will be some time before I attempt any aerobatics of any sort – voluntarily that is!!!

BiBi C12 Computer Tapes

So 35p was a bit cheap? Too right!! The R.R.P. of these tapes which I recommended in the October '82 edition of TIdings is 65p which whilst making me very lucky, is still cheap compared to some unknown 'blank' brands. I have had trouble getting these tapes through my usual supplier but BiBi assure me that they are definitely around and selling well. I still recommend them. More anon I hope....

Endpiece

I spent a miserable day in London a few months ago. The supposed center of the electronic Universe is Tottenham Court Road which, if you have never trod its littered pavements, is full of shops selling everything electronic. Everything that is except TI 99 supplies. You can buy any of the Vic range of computers and their modules. Look in the windows and there are our rivals decked out in promotional material. But as for TI? The shop assistants are not interested and their stock is pathetic. If I see another Addition + Subtraction module I shall go nuts. As for the peripherals? From what I have seen – WHAT PERIPHERALS? Do they actually exist? Are they set up and running? Can I walk in to a shop and say – 'can I see the disk system working in a box?' 'What software have you got?' 'None' comes the reply or 'What you can see!' You look, and when you find it is stuffed in some counter cupboard and – yes there it is – Addition + Subtraction. AHGGGGGGG!!!

Are these shops simply not interested? Is it at all conceivable that they might actually KNOW what they are talking about and might actually KNOW how to use the TI 99/4A?

Dear TI, (Yes, its me again!), did you know that your distribution in the West End of London is a farce? Is there no shop in London I can go to when 'up in town' where I can be sure that there will be most if not ALL the software TI produce together with set up and running computers? with working peripheral box etc.?????

DORSET

Any TI 99/4A owners in the Dorset and Yeovil areas??? Or are there only two of us??? I may not always be in (being term time and all that) but please write or give me a ring

Dr. JEFF FREEMAN 0935 813439 Sherborne

P.S. Something tells me that hidden away in the 99/4A is an ACCEPT AT sub-routine together with a PRINT AT. Now we are not allowed to know it is there

until we get ExBas. But when recording data onto tape, we are asked if we want to check the data has been recorded properly. Press Y and there is a Y on the screen. A free MARS bar to anyone who can unlock the mystery of how it gets there.

Keep speaking the dialect,

Jeff.

MAIDSTONE TI USER'S NEWSLETTER - January 1983.

Well, I hope most of you enjoyed the last issue of my newsletter. Things seem to be taking off this year for the TI machine. Thorn EMI should hopefully be releasing Submarine Commander and Jumbo Jet Pilot at the end of this month. A number of other software houses are hoping to produce games for the 99/4A once negotiations with Texas are complete.

A number of magazines have been printing programs recently (they have either seen the light or Stephen Shaw bribed them). This months 'Computer & Video Games' have two for us, one in TI Basic called 'Victorian Sewers' and 'Pompeii' (ExBas) both have been written by Stephen Shaw.

This newsletter is going to be brief this month due to the lack of contributions mainly. Nobody has come up with higher scores for Invaders, Attack, Tombstone City yet. I will type the current high scores on the last page.

For those of you who received the last issue I must point out that L.P. Enterprises are no longer doing subscriptions for 99'er so don't send your money off to them. If anyone has programs, letters, reviews, hi-scores or any TI related articles for the next issue, would you please send them to me by the 20th February. Thank you.

Graham Tapp,
48 Mangravet Avenue,
Maidstone, Kent ME15 9BG. (Tel. 674070).

'Earth Attack' Bugs

The January edition of 'Personal Computing Today' did not bring us 'Patscram' as promised. Instead a program called 'Earth Attack' was published and contained a number of bugs. If you make the following alterations and additions it should run O.K.

1. Alter: 910 to read CALL HCHAR(7,5,33,4)
780 to read CALL HCHAR(1,26,C+1)
1000 to read GOTO 10
2. Add: 995 FOR A=1 TO 2000
997 NEXT A

Software

Apex Trading Ltd. (Dept CVG), 115 Crescent Drive South, Brighton BN2 6SB. —
sae for complete list.

2. TX Software, 109 Abbotsweld, Harlow, Essex. – Standard machine.
Four in a row, Golf, Chess File, 3D Maze – Supplied as a package on 3 cassettes. £10.00 inclusive.
–Extended Basic – Battlefront, Freeway, Target – Arcade Game Tape. £6.00 inclusive.
3. Titan Programs, 83 Ashwood Road, Rudloe, Corsham, Wiltshire SN13 0LG.
– Standard Machine.
Mission 99 – Supplied on cassette. £6.00 (24 hour despatch on all mail order).

Programs

Here is a small program supplied by Peter Mann (aged 14) called 'Pattern Maker' it prints random blocks of colour to make patterns (similar to the patterns produced on 'Multi-Coloured Swap Shop's' monitors). I have already keyed it in and find it very soothing to just sit and watch. To freeze the pattern press the space bar and to re-start it press any key. I would just like to thank Peter for submitting the very first program to this newsletter. I hope more of you will follow his example.

```

100 CALL CLEAR
110 FOR X=1 TO 25
120 FOR J= 1 TO 28
130 RANDOMIZE
140 A=INT(RND*93)+33           determines a random character in ASCII
150 PRINT CHR$( A);           prints that random character
160 NEXT J                     repeats until one row is full
170 NEXT X                     repeats until screen is full
180 CALL KEY(O,K,S)           keyboard scan
190 IF K=ASC(" ") THEN 1000   if space bar is pressed then 1000
200 RANDOMIZE
210 F=INT(RND*16)+1           determines a random colour
220 B=INT(RND*16)+1           determines a random character group
230 CALL COLOR(B,F,F)
240 GOTO 180
1000 CALL KEY(O,K,S)           keyboard scan
1010 IF S=O THEN 1000        if no key pressed then 1000
1020 GOTO 180                 if a key is pressed then 180

```

Peter informs me there will be a game in February's edition of 'Computer and Video Games' called 'Victorian Sewers'. The object is to keep the traffic flowing while the sewers beneath are collapsing.

This program is for those who like curves.

```

10 CALL CLEAR
20 X=0
30 N=10
40 PRINT TAB(INT((SIN(X) + 1)*n));"*"
50 X=X+0.5
60 CALL SCREEN(2)
70 CALL COLOR(2,16,1)
80 GOTO 40.
92

```

TI CLUBS

1. TIHOME, Paul M. Dicks, 157 Bishopsford Road, Morden, Surrey SM4 6BH.
Annual Sub. £12.00.
2. NATIONAL TEXAS INSTRUMENTS CLUB
Mr. R.M. Murphy, Department of Electronics Engineering, University College,
Swansea, S. Wales. Annual Sub: £5.00.

HI-SCORES

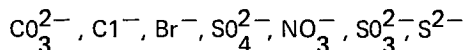
Name	Module	Level	Previous Score	New Score
G. Tapp	TI Invaders	Merely aggressive	15,336	26,313
G. Tapp	"	Downright Nasty	—	12,337
A. Frampton	The Attack	Pro	—	220,000
R. Ashton	Tombstone			
	City	Master	—	187,950 (day 18)

G.C.E. 'O' LEVEL TUTORIAL PROGRAMME CHEMISTRY

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- * Allows you to run an analysis on a given salt
- * Or test your knowledge by letting the computer choose an "unknown" from 44 salts.
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Ions available include: Na^+ , K^+ , Mg^{2+} , Ca^{2+} , Zn^{2+} , Al^{3+} , Pb^{2+} , Cu^{2+} , Fe^{2+} , Fe^{3+} .



- * Complete with full instructions and
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Available only on cassette in TI Basic at £10.

By post from and cheques/P.O. made out to:

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THE FOLLOWING PROGRAMMES IN TI BASIC ARE AVAILABLE FROM:
A & E STANLEY, 4 VICTORIA COURT, 38 VICTORIA ROAD, LONDON E18 1LH.

SUBMARINE. Sink the SUB before he sinks you. Select course, speed and drop DEPTH CHARGES. Avoid the torpedoes, listen to the SONAR (very realistic).

ASANTE. Defeat the COMPUTER in this version of an old AFRICAN game of skill.

BABY SNATCHER. Save the BABIES before the SNATCHER gets them,
but mind he doesn't get you.*

* needs speech and joysticks.

£6.00 for each recording (tape) inc. P.and P.

TCHS TIHOME TCHS TIHOME TCHS TIHOME TCHS TIHOME TCHS TIHOME

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PATCHAM,
BRIGHTON, SUSSEX.
BN1 8UF.

Do not forget to advise your requirements – what you have for Exchange, and
enclose S.A.E.

Welcome once again. This issue I would like to concentrate on some exciting new products coming from Texas Instruments in the near future. Firstly there is a new computer called the TI 99/2. Here is a copy of the press release that has recently been sent out:

NICE, JANUARY 18 1983. At the Texas Instruments European Annual Retailer Conference in Monte Carlo a new computer console, believed to be the first 16-bit computer for around £70 was announced. Unlike most computers in this price range, the TI 99/2 basic computer can use software on solid state cartridges as well as on cassettes. In addition, Texas Instruments is introducing new low cost peripherals and software for the TI 99/2 that will also work with the TI 99/4A family computer.

“The TI 99/2 is designed to allow computer novices to learn to program a computer in TI Basic - and BASIC supported assembly language”, said William Turner, president of the consumer group. “The combination of the £70 computer and the new low-cost peripherals make this the lowest cost computer system on the market. The TI 99/2 will be targeted primarily at the technical enthusiast, engineer or student in the home. Additionally, we expect the computer to be purchased as the first computer in the home for those who are just beginning their experience with a computer system, or as a second computer in the home after the purchase of a TI 99/4A family computer”. The TI 99/2 console has an elastomeric typewriter-like keyboard with raised keys in a staggered querty arrangement similar to the TI 99/4A. The computer has 4.2K bytes of built-in random access memory (RAM) and can be expanded to a total of 36.2K bytes of RAM.

Most peripherals for the new system will plug into a hex-bus peripheral-interface connector in the rear of the console. The hex-bus port allows users to connect any peripheral developed for the compact computer family (refer to press release on CC-40) currently, these consist of the RS232 interface, HX-3000, the Wafertape digital tape drive unit, HX-2000; and the HX-1000 four colour printer/plotter.

Two solid state software cartridges “Learn to Program” and “Learn to Program Basic”, will be available initially for the unit. Other cartridges will be available on cassettes at initial launch. Educational programs include: Ricomath-80, Math I and II, Statistics I and II, Sunrise Time, Datetimer, and Civil Engineering. Programs for Personal Management are: Household Formulas, Checkbook Manager, Purchase Decisions, and General Finance. Entertainment cassettes include: Lunar Landing Bioplot, The Minotaur, TI Trek, and Mind Games I, II, III, and IV. These programs as well as all user-written programs, can also be run on the TI 99/4A family computer.

The TI 99/2 features monochrome display capability and contains a built-in RF Modulator. The included video cable and antenna switch are used to connect the computer to any television set. A Cassette Interface Cable is also included to interface directly to the new TI Program Recorder or another cassette tape player. In addition, the TI 99/2 comes with an AC adapter, a user’s manual and a demonstration cassette. Availability in Europe is planned for 3Q 1983.

Product dimensions are 24 cm x 26 cm x 35 cm.

I think you will agree that the TI 99/2 is a very exciting new product. I will leave this computer with just one parting comment. On a standard bench test that lists numbers on the TV screen, the TI 99/2 proved to be 48 times faster than the Sinclair ZX 81!

Now some software news, as you will see there are quite a few new software packages about to be released, again using the PR the details are as follows:

Eleven new educational software cartridges from Texas Instruments for use with the TI 99/4A family computer will be available during the first half of 1983. The new software features Mathematics, Learning Exercises for Children in kindergarden through Grade 9. The new software cartridges include six titles from Developmental Learning Material (DLM), three from Addison-Wesley and two from Scott Foresman.

The six titles from DLM feature practice for speed and accuracy through an exciting new concept of combining games and learning. The games will be available in the second quarter of 1983 and, should sell for about \$50.

Alligator Mix. Hungry alligators lurk in a colourful swamp in prey of apples that contain correct answers to addition and subtraction problems appearing on their stomachs. Children open the alligator's mouth when an apple with the correct answer on it appears and close it rapidly when the answers and the problems do not match. Hits and misses are recorded at the bottom of the screen for addition and subtraction problems with number 0 through 9. As with the other DLM games either a joystick or the keyboard controls the action.

Alien Addition. Children must answer addition questions correctly before their missile bases will fire on waves of alien invaders trying to attack the earth. Quick reflexes, in both recognizing answers and firing on attackers, help children defend their missile bases while practicing addition with numbers 0 through 9. Players can use either a joystick or the keyboard to answer questions and to fire on aliens.

Minus Mission. A robot fights to defend his territory from the creeping slime, as children work to solve subtraction problems contained in the blobs of slime. Correct answers to problems with numbers 0 through 9 enable the robot to shoot and destroy the blobs.

Meteor Multiplication. The inhabitants of a star station must defend themselves against meteors containing multiplication problems by firing a cannon with the correct answers. Quick multiplication skills and rapid firing help children battle this threat from space while practicing multiplication problems with numbers 0 through 9.

Demolition Division. Four tanks advance simultaneously, each with a division problem. The player's only defence is the correct answer to each problem the tanks carry as he moves from one tank to the next to solve problems and fire before the foremost tank reaches its goal. Quick division skills and rapid fire save children from advancing tanks as they practice division with numbers 0 through 9.

Dragon Mix. The vigilant dragon stands guard over the city, but can defend the city only if children provide him with the correct answers to multiplication and division problems the invaders carry. Match the correct answer and aim the dragon's mouth at the enemy to fire. Miss and watch the enemy advance to bomb the city. Children

practice multiplication and division problems with numbers through 0 to 9 as they help the vigilant dragon.

During the second quarter of 1983, Texas Instruments will add three Addison-Wesley computer math games to the previously announced games II and VI. The games which include colour graphics and are designed with progressive levels of difficulty.

Computer Math Games 1. This module, with progressive skill levels for children in grades 1 through 9, have five different games to help children learn math skills. One game features basic math facts drill and practice and problems with percentages. Two additional games feature plotting numbers and ordered pair of numbers; another game features addition, subtraction, multiplication and division; while the last game features practice with place values.

Computer Math Games III. Children in grades 1 through 9 can learn by using seven different card type games with progressive skill levels to practice basic math facts, find squares of sums, reduce fractions, and practice counting and the concept of betweenness on a number line.

Computer Math Games IV. Five games in this module for children in Grades 1 through 9 feature progressive skill levels to provide drill and practice with basic math facts, whole numbers, and compact and expanded forms of numbers. This module also includes a strategy game called NIM 25 where players take turns answering questions to remove 1 to 3 pieces from the total of 25 on the board. The object of the game is to be the one who removes the last piece. Timed response periods in this module challenge children to answer questions quickly.

Educational publishers Scott Foresman, which already has collaborated with Texas Instruments to produce six software packages, adds two additional packages to the list, with first quarter availability.

Numeration I. Designed for children aged 5 to 7, this cartridge introduces basic number concepts including grouping, greater than, less than, and place value through the use of some tutorial examples.

Numeration II. Children aged 7 to 9 can use this cartridge to learn more about basic math facts introduced in Numeration I. The addition of number rounding and the expansion of some of the basic concepts learned in the previous package. This program also includes some tutorial examples.

As if the TI 99/2 and software wasn't enough, here is even more —

New Cassette Program Recorder announced by Texas Instruments.

A new compact cassette program recorder designed for use with the TI 99/4A family computer and the new TI 99/2 basic computer will be available from Texas Instruments in the first quarter of 1983. The program recorder is optimized for use with the TI 99/4A and 99/2 computers as a program and data storage/retrieval system.

With its slim design, the program recorder is a perfect desktop complement to either system. The recorder package includes a computer interface cable for the 99/4A. (while an interface cable for the TI 99/2 will be included with that console.

systems and we have found it more reliable'.

Texas' new portable micro-computer has similar interfaces for RS232, Wafer Tape and a £50 colour printer/plotter. Called the Compact Computer (CC) 40, the machine has 6K bytes of ram, expandable to 18K bytes, and an 8-bit TI processor. The CC40 will cost about £199.

Salim said: 'The CC40 is really an Epson-like machine, aimed at business men who need a "briefcase" computer. We've 18 software programs for the product — such as mathematical and financial applications. We've about 1,000 outlets for the TI 99/2.'

MICRO NEWS

TI micro follows the IBM trail

TEXAS Instruments has accepted the inevitable and built its latest microcomputer offering around a processor chip from rival semiconductor house Intel. The TI Professional Computer breaks away from the line of multi-user micros and minis using TI's 9900/99000 family of microprocessors, moving instead to the Intel...

"The independent software world has selected a particular architecture as standard," says Dave Monk, programme manager for the TI Professional Computer outside the US, "and it is not really sensible to go to this sort of market with a different architecture. It is driven by the available software."

TI is sticking to its own processor in its other micro ranges. It has just introduced its Business System 20, and is moving by putting in the faster 9900 processor in place of the 9900 in its new home computer, the TI 99/2.

The home company has one of two new offerings from 798 consumer electronics side to be unveiled in the US recently, and is essentially aimed at the Sinclair Spectrum market. The other is an Epson-like portable machine, the CC40, which will appear in the UK in April for below £200. The

99/2 will not arrive until late summer, and will sell for about £300.

But for the professional part of the personal computer market, TI feels it has been forced to follow IBM, which fixed the 8088 as the most popular chip for single user business micros.

TI's micro looks pretty much like the IBM PC at first glance, admits Monk, and has most of the IBM-lookalike features. The floppy disc drives are IBM-compatible, expansion boards are compatible with those for the IBM PC, and it uses the MS-DOS 1.0/2.0 and UCSD p-system operating systems.

"There is a huge marketplace, which we cannot afford to ignore," Monk says. "The way to capitalise is to implement a machine which fits the general trends. We have the broadest super-set of the best things."

In terms of application software available, these "best things" include all the major independent software houses putting out packages for this market. Peachtree, VisiCorp, Micropro and Microsoft are all there now, along with many other US companies.

But software written for the UK market is not in place yet, says Monk, which is why TI will not be pushing the machine here

seriously until May or June, and only then to large customers and OEMs. A full dealer programme will be set in motion later.

Although TI's Professional Computer is very much set in the hardware moulds IBM made, Monk says it has some "easy" aspects. Monochrome or colour displays are available, software compatible with each other so programs do not have to be tinkered with when moving from one to the other, and which give 720 by 300 pixels resolution.

The most interesting thing that will tie up expansion slots is a speech analyser option. This will come along some time in the middle of the year, says Monk, and will use TI's TMS 320 32-bit signal processing chip. It will allow 16 words to be at once, though other sets of words can be switched in from memory as and when wanted.

A basic single floppy 64K machine will start at £2,000. The price rises to about £5,000 for a colour machine with 256K RAM and a five Mbyte hard disc.

All Sorts Of BASIC Sorts

C. Regena
Cedar City, UT

One of the functions of a computer is to organize data. There are all kinds of sort routines or algorithms to arrange your data. You may want to alphabetize lists or arrange events by date or list a class in order by test scores. You'll need a sort routine to take your raw data and arrange it in ascending or descending order (from A to Z or Z to A).

Computer programmers and analysts often enjoy looking at sort routines and comparing speed and efficiency. Usually the amount of time it takes a computer to sort depends on how many items are in the list and how out-of-order the items are. Different computers vary in speed also. (*Note:* Although the TI-99/4A computer is slower than other microcomputers in PRINTing or LISTing, it is just as fast or faster in calculations and comparisons. The sort routines presented here were not significantly slower on any particular microcomputer.)

Here are four different sort routines written in BASIC for you to try, and to implement in your own programs. The computers and languages used are TI-99/4A (or TI-99/4), TI-99/4A Extended BASIC, VIC-20, and TRS-80 Color Computer with 16K Extended BASIC. Only BASIC programs are presented here; machine language routines are also available for some computers and are, of course, faster.

In the listings, Line 100 tells which computer and which sort is used. Lines 100-190 randomly choose 50 integers from 1 to 100. Ordinarily, you would INPUT, READ, or calculate the numbers used. The actual sorting starts at Line 200. Lines 500 to the end print the final sorted list of numbers in the example.

Bubble Sort

The Bubble Sort (or simple interchange sort) is probably the most common and easy to understand sort. It is fine for small numbers of items or for a list of items that is not much out of order. The program compares each number to the next number and exchanges numbers where necessary.

If one switch has been made during a pass through all the numbers, the loop of comparisons starts over. In this example, if the 50 numbers happened to be in exact opposite order, the maximum number of passes would be necessary, and the process would take longer than if only a few numbers were out of place. For larger numbers of items, this sort can seem to take forever.

Shell Sort

The Shell Sort is considerably faster than the Bubble Sort. In general, for a random order of 50 numbers, the shell sort is about two or three times as fast as the Bubble Sort. The Shell Sort speeds up execution because the number of comparisons that need to be made is reduced.

In an array of N numbers, it first determines B so that $2^B < N < 2^{B+1}$ and then the variable B is initialized to 2^{B-1} . The loop varies the counter I from 1 to N-B. First, it checks if $A(I) < A(I+B)$. If so, it increments I and continues with the comparisons. If not, it exchanges $A(I)$ and $A(I+B)$ and changes the subscript.

When I reaches the value of N, it reduces B by a factor of two and starts the loop again. When $B=0$ the sort is complete. I've used a couple of extra variables in the example for clarity.

Sort C

The third kind of sort routine offered here is also faster than the Bubble Sort if the numbers are quite mixed up. The program goes through all the numbers and places the minimum value in the first spot of the array. The loop keeps finding the minimum of the numbers remaining and replaces it in order.

Sort D

This sort is similar to the previous one, except that with each pass through the numbers, both the minimum and the maximum numbers are found and placed at the appropriate end spots.

The way these sorts are listed, the given numbers will be arranged in ascending order. To change to descending order, simply exchange the less than

or greater than signs in the sort comparisons.

If you are alphabetizing, the variable terms will be string variables, such as AS(I).

You may have several items which need to be associated as they are sorted. For example, suppose you have names and scores to be arranged by score. The names and scores are first arranged as NS(1), S(1); NS(2), S(2); etc. In the interchange you would need to sort the S values, and then switch both terms, such as:

```
SS=S(I)
NNS=NS(I)
S(I)=S(I+1)
NS(I)=NS(I+1)
S(I+1)=SS
NS(I+1)=NNS
```

Keep in mind that for sorts for the TRS-80 Color Computer and the VIC-20, you should use lower line numbers and leave out spaces to conserve memory. You may also save memory by naming your variables with only one letter. Too, you could combine a few more lines than I did in these examples. You should, of course, use the VIC-20 abbreviations wherever possible (such as D-shift-I for DIM)

```
140 A(I)=INT(RND*100+1)
150 PRINT A(I);
160 NEXT I
170 PRINT ::
200 B=1
210 B=2*B
220 IF B<=50 THEN 210
230 B=INT(B/2)
240 IF B=0 THEN 500
250 FOR I=1 TO 50-B
260 C=I
270 D=C+B
280 IF A(C)<=A(D) THEN 340
290 AA=A(C)
300 A(C)=A(D)
310 A(D)=AA
320 C=C-B
330 IF C>0 THEN 270
340 NEXT I
350 GOTO 230
500 FOR I=1 TO 50
510 PRINT A(I);
520 NEXT I
530 END
```

TI-99/4 BASIC Sorts

```
100 REM TI BASIC BUBBLE SORT
110 DIM A(50)
120 FOR I=1 TO 50
130 RANDOMIZE
140 A(I)=INT(RND*100+1)
150 PRINT A(I);
160 NEXT I
170 PRINT ::
200 LIM=49
210 SW=0
220 FOR I=1 TO LIM
230 IF A(I)<=A(I+1) THEN 290
240 AA=A(I)
250 A(I)=A(I+1)
260 A(I+1)=AA
270 SW=1
280 LIM=I
290 NEXT I
300 IF SW=1 THEN 210
500 FOR I=1 TO 50
510 PRINT A(I);
520 NEXT I
530 END
```

```
100 REM TI BASIC SORT C
110 DIM A(50)
120 N=50
130 FOR I=1 TO N
140 RANDOMIZE
150 A(I)=INT(RND*100+1)
160 PRINT A(I);
170 NEXT I
180 PRINT ::
200 M=A(1)
210 IM=1
220 FOR I=2 TO N
230 IF A(I)<M THEN 260
240 M=A(I)
250 IM=I
260 NEXT I
270 AA=A(N)
280 A(N)=A(IM)
290 A(IM)=AA
300 N=N-1
310 IF N>1 THEN 200
500 FOR I=1 TO 50
510 PRINT A(I);
520 NEXT I
530 END
```

```
100 REM TI BASIC SHELL SORT
110 DIM A(50)
120 FOR I=1 TO 50
130 RANDOMIZE
```

```
100 REM TI BASIC SORT D
110 DIM A(50)
120 N=50
130 FOR I=1 TO 50
```

```

140 RANDOMIZE
150 A(I)=INT(RND*100+1)
160 PRINT A(I);
170 NEXT I
180 PRINT :
200 S=1
210 MN=A(S)
220 IMIN=S
230 MX=MN
240 IMAX=S
250 FOR I=S TO N
260 IF A(I)<=MX THEN 290
270 MX=A(I)
280 IMAX=I
290 IF A(I)>=MN THEN 320
300 MN=A(I)
310 IMIN=I
320 NEXT I
330 IF IMIN<>N THEN 350
340 IMIN=IMAX
350 AA=A(N)
360 A(N)=A(IMAX)
370 A(IMAX)=AA
380 N=N-1
390 AA=A(S)
400 A(S)=A(IMIN)
410 A(IMIN)=AA
420 S=S+1
430 IF N>S THEN 210
500 FOR I=1 TO 50
510 PRINT A(I);
520 NEXT I
530 END

```

```

110 DIM A(50)
120 FOR I=1 TO 50::RANDOMIZE::A(I)=
INT(RND*100+1)::PRINTA(I);
::NEXT I::PRINT : :
200 B=1
210 B=2*B :: IF B<=50 THEN 210
220 B=INT(B/2):: IF B=0 THEN 500
230 FDR I=1 TO 50-B :: C=I
240 D=C+B :: IF A(C)<=A(D) THEN 260
250 AA=A(C):: A(C)=A(D):: A(D)=AA :
: C=C-B :: IF C>0 THEN 240

260 NEXT I :: GDTO 220
500 FOR I=1 TO 50 :: PRINT A(I);: :
NEXT I
510 END

```

```

100 REM TI EXTENDED BASIC SORT C
110 DIM A(50):: N=50
120 FOR I=1 TO N::RANDOMIZE::A(I)=I
NT(RND*100+1)::PRINT A(I);
::NEXT I::PRINT : :
200 M=A(1):: IM=1
210 FOR I=2 TO N
220 IF A(I)>M THEN M=A(I):: IM=I
230 NEXT I
240 AA=A(N):: A(N)=A(IM):: A(IM)=AA
:: N=N-1 :: IF N>1 THEN 2
00
500 FOR I=1 TO 50 :: PRINT A(I);: :
NEXT I
510 END

```

TI-99/4 Extended BASIC Sorts

```

100 REM TI EXTENDED BASIC BUBBLE SO
RT
110 DIM A(50)
120 FOR I=1 TO 50:: RANDOMIZE:: A(I
)=INT(RND*100+1):: PRINT A
(I);: : NEXT I :: PRINT : :
200 LIM=49
210 SW=0 :: FOR I=1 TO LIM :: IF A(
I)<=A(I+1) THEN 230
220 AA=A(I):: A(I)=A(I+1):: A(I+1)=
AA :: SW=1 :: LIM=I
230 NEXT I
240 IF SW=1 THEN 210
500 FOR I=1 TO 50 :: PRINT A(I);: :
NEXT I
510 END

```

```

100 REM TI EXTENDED BASIC SORT D
110 DIM A(50):: N=50 :: S=1
120 FOR I=1 TO 50::RANDOMIZE::A(I)=
INT(RND*100+1):: PRINT A(I
);: : NEXT I::PRINT : :
200 MN=A(S):: IMIN=S :: MX=MN :: IM
AX=S
210 FOR I=S TO N
220 IF A(I)>MX THEN MX=A(I):: IMAX=
I
230 IF A(I)<MN THEN MN=A(I):: IMIN=
I
240 NEXT I
250 IF IMIN=N THEN IMIN=IMAX
260 AA=A(N):: A(N)=A(IMAX):: A(IMAX
)=AA :: N=N-1
270 AA=A(S):: A(S)=A(IMIN):: A(IMIN
)=AA :: S=S+1
280 IF N>S THEN 200
500 FOR I=1 TO 50 :: PRINT A(I);: :
NEXT I
510 END

```

```

100 REM TI EXTENDED BASIC SHELL SO
RT

```

Close Routine

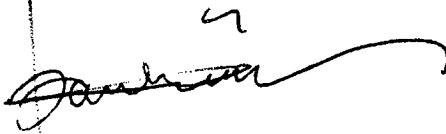
I hope you have enjoyed this issue of Tidings. If you haven't, and you think there are omissions, then put them right. It is one of my sorrows that there is no Children's Page, written by one of our young members. Come on, surely there is someone out there that could write an article for the magazine. Preferably someone about 12 – 15 years of age. If you think this is too arbitrary I am prepared to publish 2 young articles. One for the ages to 11 and another for 11 to 15. What do you think of that?

I thank all our contributors and ask everybody to remember that nobody gets paid by TIHOME. £12 may sound a lot of money, but, apart from the fact that it is only 25p a week, you should also remember that all the other computer companies either run the User Group or subsidise it. TI does not. So we are on our own.

I look forward to a pile of articles and letters for the next issue of Tidings. Don't be shy!

God bless

Yours



A handwritten signature in black ink, appearing to read 'Paul Dicks', with a long horizontal flourish extending to the right. Above the signature is a small handwritten mark resembling a '4' or a checkmark.

Paul Dicks MIDPM