16092 RADBURN STREET
WOODBRIDGE, VA. 22191

WASHINGTON D.C. AREA TI 99/4 USER'S GROUP NEWSLETTER

VOL #2 MARCH - 1983 ISSUE # 3

Bill Whitmore, President Richard D. Sturgell, Editor

NEXT MEETING

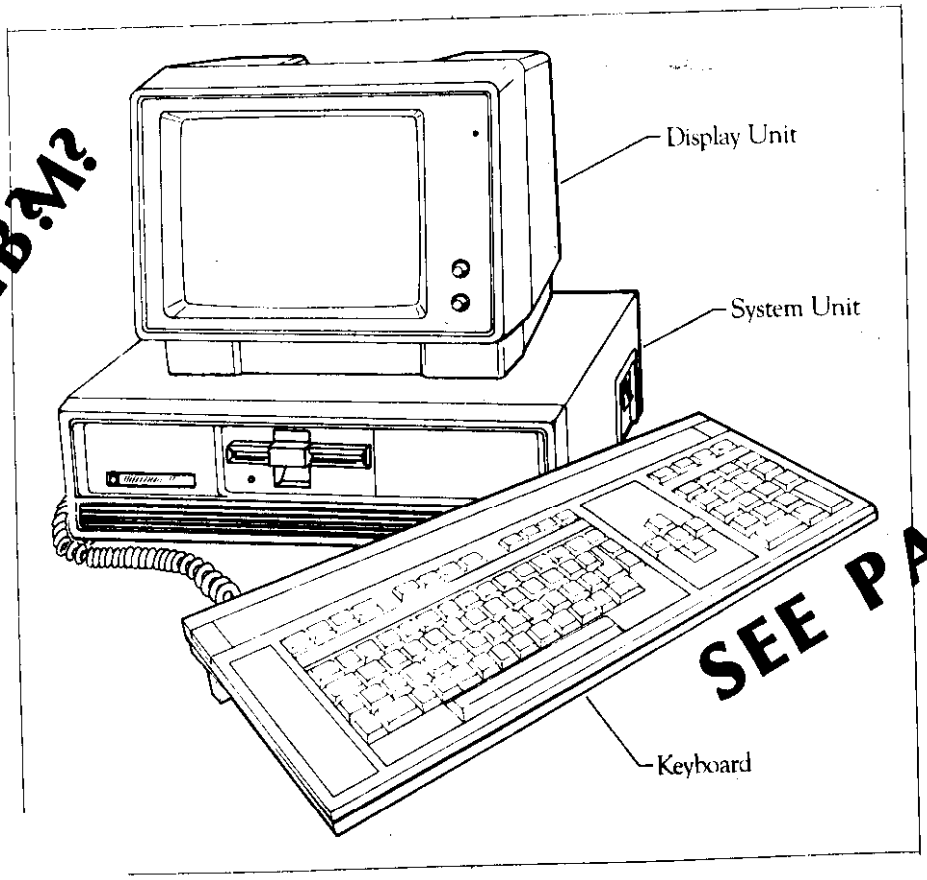
THURSDAY MARCH 10, 1983

3500 OLD LEE HIGHWAY
7:00 PM

FAIRFAX HIGH SCHOOL

See page 2

IS IT AN IBM?



SEE PAGE 4

NEXT MEETING

Directions: From I-495 (Washington Beltway) exit 8 West, U.S. 50, go 3.5 miles (at 3 miles you will drive thru Fairfax Circle), another 1/2 mile at a traffic light turn left. There is a small sign on the right shoulder of the road directing your left turn to Fairfax High School. Also on the right is a Denny's Restaurant (good food, inexpensive), and P. J. Skidoos Restaurant. After turning left the road winds around the athletic field to the school building. At the school building enter to the left side of the pillared center section. Located just inside the entrance will be a bulletin board directing you to the meeting room.

Alternate Directions: From Beltway take I66 west to the exit at Va. Route 123 South. Go south on 123 about 3/4 mile to the second traffic light, and turn left, this is U.S. 50 east, then go about 1/2 mile, pass the Red Lobster Restaurant, the Old Buddapest Restaurant. Watch for a Fire House on right, then go to the next traffic light and turn right to school. This is the same light as described above at Denny's and P.J. Skidoos Restaurants.

In the event of bad weather, snowing, etc., or if Fairfax Schools are closed this meeting will be cancelled.

PROGRAM LIBRARY

In order to eliminate the time-consuming procedure of accepting Tape Requests at a meeting, the following new procedure has been adopted. Effective immediately, mail all Tape Request Forms to: Ken Geremia, 1401 Peachwood Lane, Bowie, Md. 20716. Be sure to include a check made out to "Washington DC Area TI 99/4 Users Group" in the amount of $1 for each tape ordered. Requests that are received two weeks prior to a meeting, may be picked up at that meeting. For example, Requests that are received by Feb. 24, may be picked up at the March 10 meeting. You must show your mailing label on a newsletter in order to pick up the tapes.

Robert Goff has graciously offered to process the Disk Requests. Please give your Disk Requests to him and pick them up from him at a meeting. (Elwood Schneider, Ken Young, and Hugh Brackett also generously volunteered to handle the Disk Requests.)

Programs to be donated to the Club library may be given to Larry Hughes.

* * NOTICE * *

Each person who receives programs from the Club library must agree not to sell the programs and not to give them to anyone who is not a member of the Club.

WHEN IS 2 NOT EQUAL TO 2? Take your calculator and do the following: (What is this? I hear you say. I thought this was a COMPUTER newsletter? Well, trust me, it will be relevant!) Put 2 in the display. Take the square root, five consecutive times. That means, take the square root of 2, leave the result in the display, take the square root of that result, leave it in the display, take...etc. five times. Now reverse the process and square the result, again five times. You should now have a 2 in the display. But is that REALLY a 2? From the 2 in the display, subtract 2. Do you get zero? I suppose not, otherwise you must have a super calculator, one not yet on the market. An average calculator will show something like 0.00000001 and a good one, like the TI-59, will show -0.0000000001 or -1E10 in TI-99/4 parlance. The most accurate calculator so far is the TI-88, which works with 16 internal digits. It shows a difference of -8E-11. That is a very small error. Unfortunately, TI decided not to market this one.

Where does this error come from? The User's Reference Guide has a rather good explanation of it on page III-13:"The higher order mathematical functions use iterative and polynomical calculations. The cumulative rounding error is usually kept below the 10 digits the display seems to be working with. But calculations are done to a 13-digit accuracy. These digits, sometimes called guard digits, normally don't have to be taken in consideration. But under certain conditions, such as in numerical comparisons, the user should be aware of their presence."

So, in plain English, if the result of your calculation SEEMS to be 2, that is not always true, as we have proven above. The ACTUAL result might well be 1.999999999981, which the display dutifully will round off to 2. But if you ask your computer: IS THIS RESULT EQUAL TO 2 ?, it will answer: CERTAINLY NOT ! Let us write the following illustrative program, doing the same thing as we did with our calculator:

```
100 CALL CLEAR
110 A=SQR(2)
120 B=SQR(A)
130 C=SQR(B)
140 D=SQR(C)
150 E=SQR(D)
160 PRINT:A:B:C:D:E::
170 F=E^2
180 G=F^2
190 H=G^2
200 I=H^2
210 J=I^2
220 PRINT F:G:H:I:J::
230 IF J=2 THEN 260
240 PRINT :"J IS NOT EQUAL TO 2"
250 GOTO 270
260 PRINT :"J IS EQUAL TO 2"
270 END
```

2 + 2 = ?

If you run this program you will first see the five square root values printed, followed by the five squared values, finally ending with 2. Then the baffling statement "J IS NOT EQUAL TO 2" will follow, in spite of the fact that the very last number printed is J, which the display says is a 2.

If you want to make sure that what you see on the screen corresponds to what is in the memory of the computer, you might use a truncating routine. That means, you chop off the last, invisible digits. Altough the book recommends to truncate only the last three digits and leave the first 10 digits on the screen, a mathematically correct solution, in practice the computer will still show a (frustrating) 2 on the screen. The best compromise is truncating the result to 9 digits, chopping off the last 4, by means of this algorithm:

R = 1E-9*(INT(R*1E9)) in which R is the variable where the result is stored. To demonstrate the use of this algorithms, let us ad the following lines to our program:

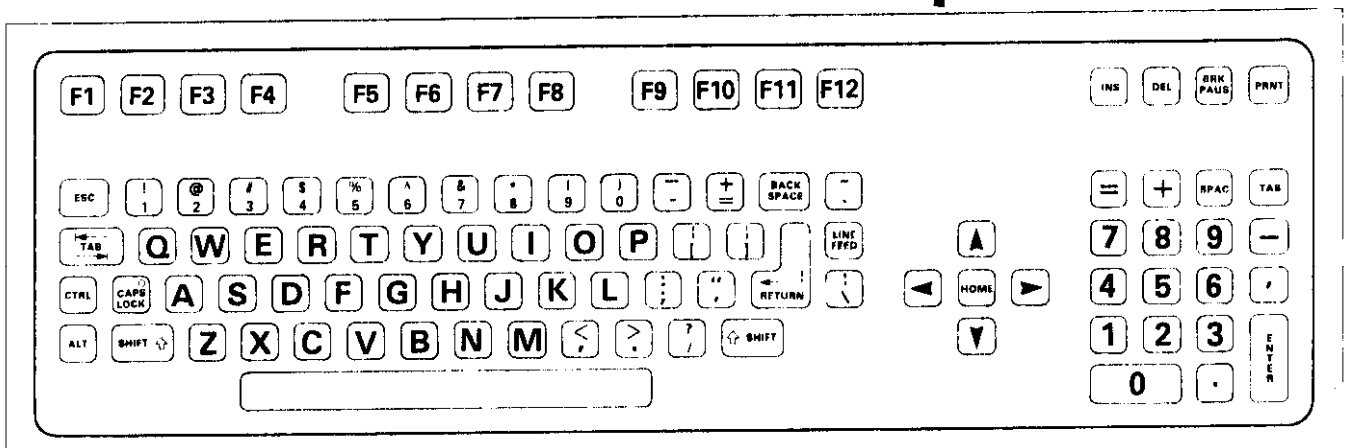
```
225 J=1E9*(INT(J*1E9))
228 PRINT J::
```

If you now run the program you will again see two colums of five numbers, but now followed by the truncated value of J, which prints as 1.999999999, proving that indeed J was NOT equal to 2.

Practical value of this? In comparisons you sometimes have baffling results. So, rather irritated, you query the computer from the keyboard. It faithfully tells you that "X is equal to Y", but in the program itself it fools you by stating just the opposite. In ninety nine cases out of one hundred the reason can be found in the guard digits. Solution: Truncate to 9 digits if the accuracy to be achieved allows it.

Maurice E.T. Swinnen.

Texas Instruments Professional Computer



System configuration.

The Texas Instruments Professional Computer consists of three basic parts: the System Unit, the Keyboard, and the Display Unit. In its basic configuration the following features are included:

System Unit

- Central processor unit (CPU) with 8088 16-bit microprocessor.
- 64K byte Random Access Memory (RAM) with dynamic RAM interface, currently expandable to 256K bytes.
- 8K byte system Read Only Memory (ROM), expandable to 16K bytes.
- 4K byte video display memory.
- Diskette controller.
- 320K byte internal diskette drive. A second 320K byte internal diskette drive or a 5 or 10 Mbyte internal Winchester disk drive may be added.
- Expansion RAM interface.
- Five expansion card slots.
- Keyboard interface.
- Power supply.
- Parallel printer port (industry standard interface).
- CRT controller (uses one expansion slot).
- Speaker.

Keyboard

- Attractively styled, low-profile keyboard connects to System Unit by means of a telephone-type coiled cord.
- Infinite height adjustment through a 5 to 15 degree slope.
- 97 keys, grouped by function for added versatility, including a separate numeric keypad, 12 function keys, and a separate cursor control cluster.
- Optimised key tactile response for fast, positive data entry.
- Uppercase indicator light.

Display Unit

- 720 x 300 pixels high resolution display. Both a 12-inch green phosphor monochrome monitor and a 13-inch color monitor are available.
- 25-line x 80-column format.
- Character line scrolling.
- Operator controls for brightness and contrast (monochrome monitor) and brightness and horizontal position (color monitor).

Printers

Printouts of text or graphics are provided by the new Texas Instruments 850 Series printers (available Spring 1983). These low-cost, 150-cps printers are the latest addition to TI's reliable line of impact and non-impact printers.

Operating System	Language
MS™-DOS	MS™-BASIC MS™-COBOL MS™-FORTRAN MS™-Pascal
Digital Research™ CP/M-86™	CBASIC-86™
Digital Research™ Concurrent CP/M-86™	CBASIC-86™
UCSD p-System™	UCSD Pascal™

Diskette Drives

You may add a second 320K byte diskette drive. The second drive is installed in the right front of the System Unit, which contains the necessary power and control cable harnesses and connectors for easy user installation.

Winchester Disk Drive and Controller

Providing 5 or 10 Mbytes of storage, this option consists of the appropriate Texas Instruments Winchester disk drive and controller board, cabling, and associated hardware and software. Either unit mounts internally on the right front of the System Unit and may be user installed. The standard diskette drive is used for initial formatting and transfer of the operating system to the Winchester drive. After the operating system is installed on the Winchester drive, the diskette drive is used for the transfer of files and programs to and from the

TEXAS INSTRUMENTS INTRODUCES NEW DESKTOP PERSONAL PRINTER

A new 150 character-per-second (CPS) dot matrix printer retailing for less than $600 was announced by Texas Instruments Incorporated. The OMNI 800 Model 850 printer is designed to operate with well-known personal computer systems. It is the newest addition to the family of OMNI 800 printers and announced with the TI Professional Computer at a press conference here.

The Model 850 printer provides the capability and reliability usually found in large printers-but at a price affordable for individuals.

The Model 850's compact size and low price are tailored to the needs of professional and personal computer users. The suggested retail price of $599 for the basic model makes the Model 850 the price/performance leader in its class.

The Model 850 features optimized bidirectional printing at 150 characters-per-second (CPS) using a 9x9 dot matrix character font for high speed draft-quality print. An enhanced print mode produces higher quality print at 90 characters-per-second using a 15x9 dot matrix. A number of printing features, such as compressed, expanded, double strike, and emphasized print, are also standard. In addition, the Model 850 has "raster graphics" printing capability, which can be used to produce a hard copy from a video display, including graphics as well as text.

The Model 850 is capable of printing an original and two copies, and can accommodate paper of three to eleven inches in width. It prints up to 80 characters per line in normal print mode, and up to 134 characters per line in compressed print mode.

The Model 850 supports serial and parallel interfaces which make it possible to use the printer in a wide variety of communications networks. Epson- and Centronics-compatible interfaces are available which allow the Model 850 to be connected to well-known personal computer systems.

The Model 850 is manufactured with the same attention to quality and reliability that has made the OMNI 800 Model 810 the industry leader. The Model 850 will be available in April.

HAGERSTOWN-WILLIAMSPORT USER'S GROUP

The first organizational meeting of the Hagerstown area User's was held at the Williamsport Memorial Library on Friday Feb. 18, 1983. The next meeting is scheduled for Friday March 18, at 7 p.m.. DIRECTIONS: From Hagerstown area and I 70 take I 81 south to US Rt. 11, Williamsport Exit. Proceed through the first light and watch for the library prior to the second light. For further information write Sam Williams Box 376, Williamsport, MD 21795 or call (301) 223-8014

SOME USEFUL ROUTINES. The following programming routines appeared in the newsletter of the 99/4 USERS OF AMERICA, Flint MI. The author is the club's president Duane Fisher. Duane is blind and has written over the years several routines to help himself overcome his handicap. Most of his routines involve either the speech synthesizer and either the speech module or the TE-II, such that words are not only shown on the screen but also spoken out loud. Maybe you too might have a use for such tricks or maybe you know somebody to whom they are very valuable. This review is being written by Maurice Swinnen.

The following routine is called the TALKING KEYBOARD. It will enable your console to speak the entire alphabet, the numerals and some of the special characters, such as $, %, &, * (,), =, and /. You will need the speech synthesizer box and the TE-II module.

```
10 CALL CLEAR
20 OPEN #1:"SPEECH",OUTPUT
30 CALL KEY(0,K,S)
40 IF S=0 THEN 30
50 PRINT #1:CHR$(K)
60 GOTO 30
```

Duane not only develops these speaking routines, but he also teaches correct programming. Here he tells his members how to use correctly "data statements". The first program is written in Extended Basic and thus requires that module.

```
10 CALL CLEAR
20 RANDOMIZE:: A=INT(RND*5)+1::
   FOR B=1 TO A
30 READ A$
40 DATA HELLO+I+AM+COMPUTER,WHAT
   +IS+YOUR+NAME,THE+SCREEN+IS+
   RED,OID+YOU+HEAR+THE+TONE,IT+
   IS+A+CASSETE
50 NEXT B:: CALL SAY(A$):: RESTORE
   :: GOTO 10
```

As you can see, the routine is written in Extended Basic. It should be possible to write it in TI-Basic as well and to use the TE-II module to produce speech. After a little experimenting we came up with the following program. Note that we used as the first line not CALL CLEAR, but a different one, prossed by Duane in one of his former newsletters. Line 10 will produce a very attractive sweep of your screen from left to right.

```
10 CALL VCHAR(1,1,32,768)
20 OPEN #1:"SPEECH",OUTPUT
30 RANDOMIZE
40 A=INT(RND*10)+1
50 FOR B=1 to A
60 READ A$
70 DATA HELLO HOW ARE YOU,I AM JUST
   FINE,WHAT ARE YOU DOING TONIGHT,
   MAYBE WE COULD HAVE A DRINK TOGE
   THER
80 DATA WHAT WOULD YOU SAY ABOUT DI
   NNER,MAYBE A DRIVE IN THE COUNTR
   Y,I AM CRAZY ABOUT YOU,I'LL CALL
   YOU
90 DATA SUPERCALLIFRACTIOUSLISTICEX
   PIALLIDOCIOUS,IT WAS VERY NICE T
   O HAVE MET YOU
100 NEXT B
110 PRINT #1:A$
120 RESTORE
130 INPUT "PHRASE OR PITCH? ":C$
140 PRINT #1:C$
150 GOTO 30
```

This thing really talks! It will randomly select one of the DATA statements and pronounce them, if you have the TE-II module and the speech synthesizer box installed. After each sentence it will stop and ask you :PHRASE OR PITCH?. You can simply type in a new phrase, to which one of the randomly selected ones will be tacked, or you can change the pitch. This is done by typing in a pitch change format as //xx yyy, in which xx is a number between 00 and 63 (00 gives a whisper, 35 about natural speech and 60 being a rather low voice) and in which yyy is a number between 000 and 255 to control the slope of speech. The best slope for a given pitch is about 3.5 times the pitch number. After entering either an additional phrase or a new pitch, press ENTER. If you don't want to enter either, just press ENTER.

Another one of Duane's useful routines is a print centering trick. The secret is to develop a TAB, here in line 130, such that it will be equal to exactly half of the number of remaining spaces when you subtract the number of chacters in your title from the maximum line width of your printer. We assume here that the latter is equal to 80, but you may substitute any other number for it, such as 132, if your printer supports such a long line. This TAB is then used in line 140, the actual PRINT statement. Of course, the OPEN statement has to be adapted to your particular printer and its switch settings.

```
100 CALL VCHAR(1,1,32,768)
110 OPEN #1:"RS232.DA=8.BA=9600"
120 A$="WASHINGTON DC AREA 99/4 CO
    MPUTER CLUB"
130 A=(80-LEN(A$))/2
140 PRINT #1:TAB(A);A$
150 END
```

Duane also recommends that, if you want to keep data on the screen until the user has read them, not to use a loop such as:

```
130 FOR I=1 TO 1000
140 NEXT I
```

It is very difficult to judge the reading speed of the average user. Better is to keep the information on the screen indefinitely, until the user pushes the space bar.

```
120 ...
130 PRINT "PRESS THE SPACE BAR TO
    CONTINUE"
140 CALL KEY(0,K,S)
150 IF S=0 THEN 140
160 IF K=32 THEN 170 ELSE 140
170 ...
```

And lastly, one of the Ohio members, J.Petersen, offers this routine in the February newsletter. It permits you to move the cursor about the screen by means of the four arrow keys. This routine might need some refinement if you want to use it in a program, but it is a nice start and will save you lots of time devising one yourself.

```
100 CALL VCHAR(1,1,32,768)
110 CALL CHAR(44,"FFFFFFFFFFFF
    FFFF")
120 R=1
130 C=3
140 CALL HCHAR(R,C,44)
150 CALL KEY(0,K,S)
160 IF S=0 THEN 150
170 IF K=68 THEN 210
180 IF K=69 THEN 230
190 IF K=83 THEN 250
200 IF K=88 THEN 270 ELSE 150
210 C=C+ABS(C<30)
220 GOTO 280
230 R=R-ABS(R>24)
240 GOTO 280
250 C=C-ABS(C>3)
260 GOTO 280
270 R=R+ABS(R<24)
280 CAL HCHAR(R,C,44)
290 GOTO 150
```

And to close this review, here is a variation on Duane's screen clearing routine, which I have been using in several programs. It is fancy, but I am sure it will please you.

```
100 CALL VCHAR(1,1,42,768)
110 CALL HCHAR(1,1,32,768)
120 GOTO 120
```

Press FCNT CLEAR if you want to run it again.

FYI: For the members who have requested information on the International 99/4 Users Group, Dues $12,00 per year, Address: PO Box 67, Bethany, OK 73008 ph. (405) 787-8521

FOR SALE: 80 col. Impact Printer, IDS-440 Paper Tiger with graphics, fan fold or roll paper, 3 rolls inc. $350.00 ph. (301) 460-5518

THE ARTICLES ON THIS AN THE NEXT TWO PAGES WERE TAKEN FROM TIC TALK THE NEWSLETTER OF THE COLORADO 99/4 USERS GROUP.

SORT OF FUN
by Gary Clack

The microcomputer has many practical (and impractical) applications in homes, schools, and businesses. The TI 99 home computer is designed to be a powerful tool for problem solving in each of these areas. One problem easily solved by the TI 99/4A is common to computer applications. The problem is the need to order information being processed or stored by the computer. Data entry is usually more efficient if information is entered as it becomes available. However, working with information in random order leaves much to be desired. For example, when entering information from my checkbook register to my budget program I would waste a lot of time if I tried to order the data as I typed it in. But, I don't want to use the check data in the order it was entered in, either. The obvious answer is to tell the computer how you want the data ordered and let it do all the busy work. There are several methods by which you can program your computer to sort data. The correct method for you depends on the purpose of your program, the amount of items to sort, and how much time you have to stare at the screen while your computer is sorting. The purpose of this article is to describe two simple ways to sort data and to introduce TI BASIC programs implementing these sorts. The programs allow you to experiment with the sorting methods and see how fast the TI 99/4A can order data for you.

First, let us consider the standard exchange sort (also called "Bubble Sort"). This sort is simple to program and understand. It does not require much memory to implement. However, for a large number of items the bubble sort is time consuming. (You can experiment with the program to determine the number of items to sort where you would begin to loose interest in the bubble sort.)

The standard exchange sort (bubble sort) attempts to position one item of a list in its final position during each pass through the list. The sort begins by comparing the first item to the second item of the list. If the second item is less than the first (sorting in ascending order) the items exchange positions in the list. Item 2 is compared to item 3 and exchanged if necessary. The process continues until item (N-1) is compared to item N and exchanged as necessary and the first pass ends. If no items are exchanged during a pass then sorting is complete and the process ends. The second and successive passes are carried out in the same manner as the first until the data is ordered. The number of passes required to sort the data depends on the initial order of the list. You may be able to exploit this fact in your application if you will need to order partially sorted items.

The following listing is for a program implementing the standard exchange sort. The program asks for the number of items to sort, generates the desired number of items in random order, and allows you to clock the run time of the sort with a stopwatch.

```
100  OPTION BASE 1
110  RANDOMIZE
120  DIM A(500)
130  CALL CLEAR
140  PRINT : : :TAB(11);"BUBBLE
     SORT": : :
150  INPUT "HOW MANY NUMBERS?
     (2-500)":NN
160  REM***INPUT NUMBER < 2 TO
     STOP***
170  IF NN<2 THEN 430
180  IF NN>500 THEN 150
190  FOR I=1 TO NN
200  A(I)=(RND*NN+1)
210  NEXT I
220  PRINT "READY STOPWATCH": : :
230  CALL SOUND(1000,33000,30)
240  CALL SOUND(100,560,1)
250  REM***BEGIN BUBBLE SORT***
260  EXCOUNT=0
270  FOR I=1 TO NN-1
280  IF A(I)<=A(I+1) THEN 330
290  T=A(I)
300  A(I)=A(I+1)
310  A(I+1)=T
320  EXCOUNT=1
330  NEXT I
340  IF EXCOUNT=0 THEN 370
350  GOTO 260
360  REM***END BUBBLE SORT***
370  CALL SOUND(1000,440,1)
380  REM***PRINT SORTED NUMBERS***
390  FOR X=1 TO NN
400  PRINT A(X)
410  NEXT X
420  GOTO 140
430  END
```

Another sort which is simple to program and understand is the Shell sort. It is named for its inventor D.L. Shell. It is a much more efficient method of sorting as compared to the standard exchange sort. It operates on long lists quickly with minimal storage requirements.

The Shell sort begins by comparing items some distance from one another in the list. The usual distance is equal to one half of the number of items in the list. For example, if the number of items to be sorted is 11 then the initial distance would be 5 (d=INT(n/2)). The Shell sort would begin by comparing item 1 to item 6 and exchanging them as necessary. Then item 2 would be compared to item 7, item 3 to item 8, and so on until item 6 is compared to 11 and exchanged as necessary. These comparisons and exchanges continue until no exchanges are made during a pass. Then the distance is halved again and the process begins again. Now the distance would be 2. Item 1 would be compared to 3, 2 to 4, 3 to 6, and so on until item 9 is compared to item 11. Again, if exchanges were made during the pass the comparisons are made again until no exchanges are made. When the distance is reduced to 1 and the comparisons yield no exchanges the sort is finished.

The program listed here utilizes the Shell sort and operates almost identically to the program implementing the bubble sort. Compare the time it takes Shell sort to order 100 random items to the run time for bubble sort to operate on 100 random items. Shell sort should be 3-4 times faster.

```
100  OPTION BASE 1
110  RANDOMIZE
120  DIM A(500)
130  CALL CLEAR
140  PRINT : : :TAB(11);"SHELL
     SORT": : :
150  INPUT "HOW MANY NUMBERS?
     (2-500)":NN
160  IF NN<2 THEN 450
170  IF NN>500 THEN 150
180  FOR I=1 TO NN
190  A(I)=RND*NN
200  NEXT I
210  PRINT "READY STOPWATCH": : :
220  CALL SOUND (1000,33000,30)
230  CALL SOUND (100,560,1)
240  REM***BEGIN SHELL SORT***
250  D=NN
260  FLAG=0
270  D=INT (D/2)
280  FOR N=1 TO NN-D
290  IF A(N)<=A(N+D) THEN 340
300  T=A(N)
310  A(N)=A(N+D)
320  A(N+D)=T
330  FLAG=1
340  NEXT N
350  IF FLAG=0 THEN 380
360  FLAG=0
370  GOTO 280
380  IF D>1 THEN 270
390  REM***END SHELL SORT***
400  CALL SOUND(1000,440,1)
410  FOR X=1 TO NN
420  PRINT A(X)
430  NEXT X
440  GOTO 140
450  END
```

Two simple methods of sorting information have been introduced and explained along with short programs to demonstrate each method. Both methods have their advantages and disadvantages which will determine their usefulness in your applications. Experiment with the demonstration programs to become familiar with each method. Hopefully they will find their way into your own programs.

Bibliography:

Lorin, Harold - Sorting and Sort Systems Reading, Mass.: Addison Wesley Publishing Company

Miller, Alan R. - Basic Programs for Scientists and Engineers Berkeley, CA: SYBEX

TIC FEVER

By Lloyd Maple

I picked the title of my article because Webster's definition of fever is: "Excessive excitement due to strong emotion". Well, this is how I feel about our organization, this computer, and our newsletter and not necessarily in that order. Hopefully, I will attempt to make this a regular column sharing with you ideas and programs that I have run across here and there. If you have any ideas please send them along, as I would appreciate your comments and ideas. Enough of that. Now for my first program.

If you have a printer and the Extended BASIC Module you can turn your computer into an electronic typewriter which will print a line at a time. At first I wasn't keen on this until I typed a couple of letters and a memo with the program. One advantage over the regular typewriter is accuracy. I can't remember when I have typed a page without making many errors and using a lot of whiteout when using the regular typewriter. The program enables you to see the line and edit out any errors before you send it to the printer.

The one disadvantage of the program is the inability to store the data for a reprinting. If you have any ideas on how to fix this please let me know so we can share with all. Another idea would be to add a series of commands that would change the print styles available. As you can see, I am just learning programming and to some of you this would be a simple matter. Please help!!

```
100  CALL CLEAR
101  CALL COLOR(0,1,2)
102  CALL COLOR(1,1,2)
103  CALL COLOR(2,1,2)
104  CALL COLOR(3,1,2)
105  CALL COLOR(4,1,2)
106  CALL COLOR(5,1,2)
107  CALL COLOR(6,1,2)
108  CALL COLOR(7,1,2)
109  CALL COLOR(8,1,2)
110  OPEN #1:"RS232.BA-1200"
120  PRINT "** ELECTRONIC TYPEWRITER
     **": :"          VERSION 1.0"
130  PRINT "_____________________"
140  PRINT : : : : : :
150  PRINT "YOU MAY BEGIN TYPING
     NOW:"
155  PRINT
160  IF LEN(B$) >=70
     THEN GOTO 190
170  LINPUT A$
180  IF A$="END" THEN 300
190  AS="                "B$&A$
200  IF LEN (A$) <=70 THEN 280
210  FOR I=1 TO 59
220  IF SEG$(A$,70-I,1)< >" " THEN 270
230  PRINT #1:SEG$(A$,70-I)
240  B$=SEG$(A$,LEN(A$)-70+I)&" "
250  PRINT "REMAINDER OF LINE STORED:
     > ";B$;" <"
260  GOTO 290
270  NEXT I
280  PRINT #1:A$
285  PRINT
290  GOTO 160
300  END
```

TECHNICAL DATA MANUAL AVAILABLE

A Technical Data Manual for the TI-99/4A is now available. It includes sections on: General Description of TI-99/4A Home Computer, I/O Pin Description, Memory Allocation, CRU Allocation, Interrupt Handling, Electrical Characteristics, and a Glossary. Illustrations included are: TI-99/4A System Block Diagram, I/O Read Timing, I/O Write Timing, CRU Timing, Connector Pin Identification Diagram, TI-99/4A Logic Board Component Location Diagram, and TI-99/4A Schematic Diagram.

To get a copy of the Technical Data Manual, send $15 plus applicable sales tax, and $2 postage and handling to: Texas Instruments Incorporated, Dealer Parts Department, P.O. Box 53, M/S 5833, Lubbock, Texas 79408.

COMPU-SOURCE CORNER

By Rick Stickle
TI0121
70220,242

This month I had planned to go into Texnet. This is the special section of the Source just for users of the TI computer. I have decided to wait until at least next month because, after over a year of stagnation Texnet is being overhauled at this time.

I've decided to go into the bulletin boards on the two systems instead. Each of the systems has a bulletin board that is reserved just for TI users, needless to say they are reached by different commands.

If your access is to MicroNet you'll find the TI board is part of the Computer-Electronics section. To got there you just enter GO CEM-450 at any prompt. This section of Compuserve is interactive in that there are on-going conversations on the board. We here in our club have an advantage, the system operator for the TI section is our own Jim Horn. Since the system is interactive Compuserve has allowed the ability to read the messages by title in sequence. They call this threading, it allows you to follow the questions and answers in a single string.

On The Source the TI board is accessed by typing at the command level "POST READ TI-99/4". This starts at the top of the board (latest message) and continues down. The Source allows you to search the board by account number, subject, or read all the messages. It also pauses prior to each message after showing the subject line and lets you decide whether you want to read the current message. The Source bulletin board is not as interactive as compuserves but people will answer questions left there although they usually answer them by Smail.

These boards and others like them provide a valuable service to the TI user that has access to them. Not only do they provide a place to get help with problems that you might be having with your computer but they also provide the TI user with rapid access to what is going on in the TI world. An excellent example of this is the rapid dissemination of the news that came from the computer show in Las Vegas last month. With in two days of the shows close there was news on the boards on the new computers and other things seen at the show, not to mention advertisments of third party software that appear at all times. (some that doesn't show up in 99'er)

I'll close again this month looking for suggestions on what you wat to see in this column, and asking that the next time you go on-line that you take a few seconds and send me your name, address, phone number, and account number.

NEWS FROM AROUND

By now you have all heard about the wafertape, a closed loop, high speed substitute for the disk drive. The wafertape and its cassettes will store up to 48k per tape and the tapes will range in size from 48k down to 5k. The access speed of the wafertape is about 1k per second. This new storage system can be used with the 99/4 console but will require a Hexbus interface (PHP 1300) which will retail for $59.95. Home Computer-Ware of New Fairfield, CT. will offer the interface and wafertape drive for a package price of $160.00.

Personal Computer Products has sent out a special edition catalog dealing with the new CC 40 system. It explores the CC 40 which we saw at the January meeting and the peripherals for it which include the printer plotter (4 color), wafertape, and an RS232. Everything except the RS232 is battery powered, therefore minus the RS232 this will make a compact briefcase system with a price of only about $470.00. TI will also market 22 programs initially, 8 in solid state software, and the rest on wafertape. The programs are priced from $22 to $110.

On the down side! I have heard from a source that I will not name that TI has pressured Gary Kaplan (99'er Magazine) into refusing advertising space to companies that are selling TI products at a discount (ie. Dhein's, Tex-Comp, and Elek-Tec etc.). This is supposed to protect the mass market sellers that use suggested retail (ie. K Mart, Toys-R-Us). I think that if this proves to be true people might want to drop Gary a line and remind him about free enterprise!

On the software side there was a lot of news from the WCES. For starts Fox Video Games (20th Century Fox) showed 18 games for Atari, Vic, and the TI with such names as M*A*S*H, Flash Gordan, and Mega Force. Thorn EMI showed Submarine Commander and River Rescue for the TI. DataMost Corp announced plans to convert its entire line of Apple II games and business programs to every major home computer to include the TI.

Last but not least two software companies announced that they will be producing lines of educational software this year and they will be available for our machine. The companies are ISA Software and Wizware.

Rick Stickle

TI 99/4A CONSULTANT (NORTHERN VIRGINIA)

Are you interested in computing using the TI 99/4A Home Computer? If so, then I should "ENTER" your life. I have owned my TI 99/4A for more than a year and it continues to impress me with its performance. With my experience as training manager and instructor, I can assist you in getting your feet firmly planted in the TI 99/4A world of Home Computing. Whether you prefer to use your computer or mine for learning, I can help. As a TI Distributor, I am also able to assist you in assembling your system using the latest hardware and software as they become available. I have reasonable rates, so if you are interested please contact Bill Howard by "INPUTing" (703) 378-7243.

BIT and BYTE'S

Dear BIT

Recently I purchased a Texas Instruments TI-99/4A computer and I must confess the sensation of computing is an exciting adventure. The sound and graphics of Tombstone City are fascinating. I've even scored 160,300 on level three of the game. However, now is the time to really get serious and explore the full capability of my computer. But I ask you, is it necessary to buy all those peripheral devices? What do they do anyway? Why doesn't my cassette recorder work on the TI-99/4A. Can the problem be corrected? How can I use the programs written for those ??????? well, you know "other computers"? Must I always suffer the agony of frustration before experiencing the thrill of "WOW----I DID IT---IT WORKS"? I have tried to answer these and other questions but Bill Crosby only mentions rebate, rebate, and rebate during his TV commercial. The instructional booklet has many alien words and phrases that are sometimes more confusing than the Washington Redskins defense. I even tried osmosis but that did not help either. Can you?

Sincerely BYTE's

P. S. The store clerk said two bits was equal to a quarter. Is that true?

Dear Sincerly BYTE's

Congratulations on your TI-99/4A ownership and welcome to the world of computing and the TI adventure. We will try to reduce your frustration but accept the challenge because-because you have a powerful and very friendly-user computer. It is friendly to you a user because for the most part you can quickly and easily set up the computer and begin operating it without formal training. Your TI-99/4A is packed full of automatic instructions that accomplish many functions similiar to the method your body carries out its vital functions. For example, you do not tell your body to breathe or get hungry. The computer operates similiar in that few instructions are necessary by the user to accomplish many tasks.

Your TI is well built and will endure for many years but its life and usefulness can be shortened by abuse, moisture, heat and static electricty. So BIT when your abuse temper rises go take a cold shower and than rejoin the adventure. Speaking of temper, your computer is solid state and operates at a low(heat) temperature. However, it can overheat if you do not keep the computer air vents open. Blocking the air vents can cause a meltdown worse than three mile island. Of course, do not expose your computer to moisture of any kind. Moisture is an excellent conduit of electricity and can cause your TI-99/4A to self destruct and possibly give you a shock equal to a bolt of lightening from the sky. That brings me to the last item of static electricty.

Mother natures normally is balanced but sometimes she gets into an unbalanced condition. When unbalancing occurrs, she rights herself at first opportunity. An unbalance can be caused by walking on carpets which builds a negative charge of electricity on your body. When you touch a metal object the body discharges or releases the negative engery that the body built up thereby balancing the static electricity charge. This release of engery can have the same affect as a bolt of lightening striking your computer. Beware and discharge any static electricity by touching a metal object (chair leg) before using your computer or its accessories.

Now for the question about the cassette recorder. You have four or more options to correct the cassette recording problem. First, not use it. But thats like carrying a bucket of water while hopping on one leg. Second, you may buy the new TI Program Recorder (PHP2700). It is compatible to your TI-99/4A. This option may be an unnecessary expense. Come to the users group is another option. Or you can read the next issue and we will address the actions that may correct the problem and give you some insight on the recording process.

Sincerely BIT

P.S. Its Users Reference not instructional booklet. Also, eight bits equal a byte.

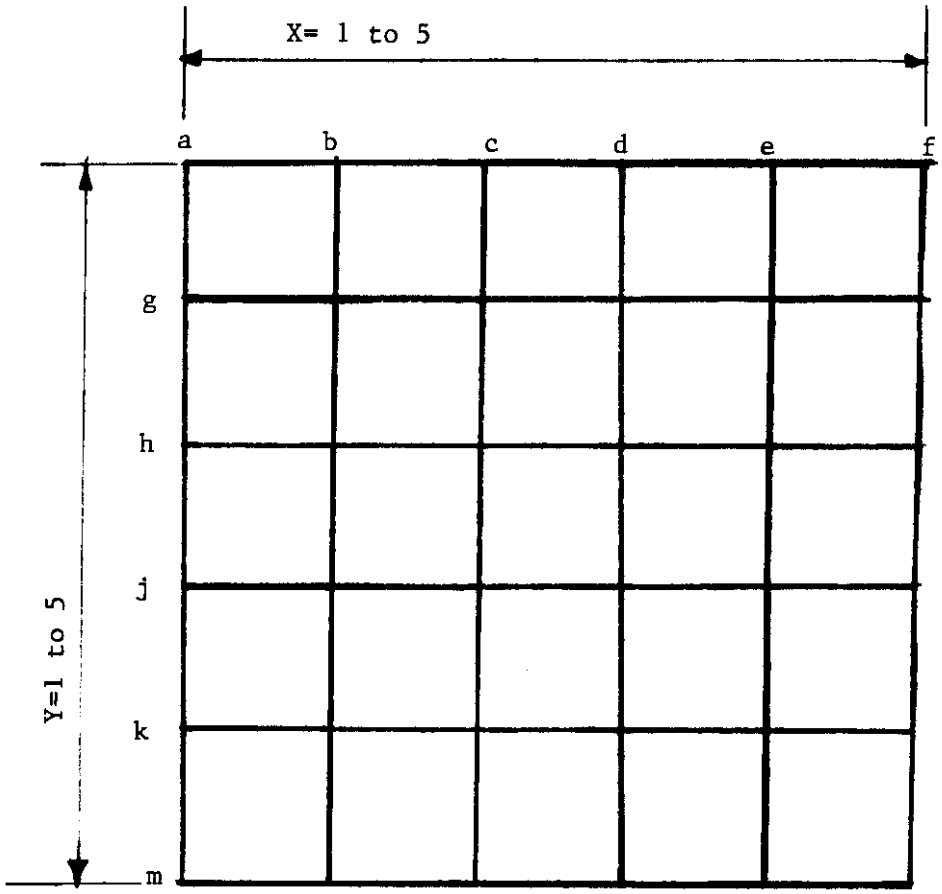
To ease your mind until the next issue take the following actions. Check your cassette recorder for a tone control. The tone control is needed for recording high level frequencies (tones). Without the tone control the recorder may only record low volume frequencies (i.e. human voices). If you are without a tone control you will probably need to visit the local retailer and purchase the TI Program Recorder. For reliability, use only recorders that operate with AC power, Which reminds me, BIT, did you plug your recorder in the electrical outlet and also follow the instructions in your users guide to connect the cable from the computer to the cassette recorder? If not do so and do not forget to purchase only high quality tapes (C-5 or C-10 recommended).

Sincerely BYTE's Believe it or not

Did you know that transistors and diodes of solid state circuits can be as small as 28 thousandths of an inch and are protected by a glass film only 60 millionths of an inch thick. The circuits operating speed range is about 300 down to six billionths of a second.

Sincerely BYTE's PRO Challenge

Figure 1 below has many interesting characteristics and could be developed into an excellent game. Relating to that figure can you solve the following problem. Develop and write a program that will compute the total number of squares contained in figure 1. Twenty-six squares are apparent to the eye but how many more are hidden and can your program find them. The problem's answer could keep you from getting a driving violation (if you drive) while traveling our nations highways.



ab=1
ag=1

Figure 1

RATING CATEGORY

Amateur---Tried but could not solve problem.
Super amateur---Solved problem by trial and error method on paper.
Pro 1----solved problem with program.
Pro 2----Solved problem with display of each block on the screen.
Super pro--Solved problem and complemented the program with sound, music and graphics.

BEGINNERS CHALLENGE

A program line number uses ____ bytes of memory storage.

A space in strings(does)or(does not)occupy memory space. (why)

INTERMEDIATE CHALLENGE

State in 25 words or less, the philosphy of programs,programming and programmable.

Questions, answers or comments may be sent to BIT and BTYE's at 4100 Canterbury Way Temple Hills, Md 20748. Material is not returnable unless sent with self address envelop with correct postage. Response to mail inquiries is limited to our newspaper space allotment.

TI99/4A MEMORY

The TMS9900 Microprocessor which resides inside your TI 99/4A Home Computer has the capability of directly addressing 65,536 bytes of memory. (Think of one byte as 8 on/off switches.)

But you say: "Well then I'm cheated. I only have 16K of RAM (Random Access Memory) to 'play' with. Where is the other 48K that is due me?" I'm glad you asked. Let's break the computer into 6 addressing areas from 0 to 65,536 (or to do it TI's way, 0 to 32,767 and then -32,768 to -1 which amounts to the same thing.)

AREA #1: addresses 0 to 8191--Here two 4K byte-chips of ROM (Read Only Memory) are built into the computer. They contain the operating system, the GPL (Graphics Programming Language) interpreter and part of the TI Basic interpreter.

AREA #2: addresses 8192 to 16383--This 8K RAM is located in the 32K Memory Expansion and is called "low memory".

AREA #3: addresses 16384 to 24575--Here space is contained for 8K bytes of ROM used for DSR (Device Service Routines). These ROM's are built into the peripheral devices such as the Disk Controller, RS232, Thermal Printer, etc. which tell the 99/4A--"Here I am and this is how I work, if you need me just do such and such." By the way, the fact that these routines are built into the peripheral and not into the computer will allow us to access future items not thought of when the computer was developed.

AREA #4: addresses 24576 to 32767--These addresses are reserved for the application ROM's which are located inside of your Command Modules. If you have the Mini-Memory, then a part of this location is where its 4K RAM is addressed--called "medium memory".

AREA #5: addresses -32768 to -24577--This area is set aside for "memory-mapped" devices and from the user's viewpoint if the most worked area because it contains:
- VDP (Video Data Processing)--where our Basic programs reside
- PAD (Peripheral Access Device) routines
- Sound--3 tone and 1 noise generators
- Speech--if your were lucky to get the "freebie" from TI
- GROM (Graphic Read Only Memory)--The 99/4A can access up to 8 GROM's of 6K each. Three are built in the console and up to five others are located in your Command Modules.

AREA #6: addresses -24576 to -1--This 24K RAM called "high memory" is located in the 32K Memory Expansion.

Thus if you add up all addresses and you have all of TI's peripherals attached (some of which are yet to be released or announced), then all 64K bytes of direct memory is used up.

But what if I want more space? Then you need a "memory-mapper" device such as TI's TIM99610. It will allow the TMS9900 to address 16 Mega (as in 1,000,000) bytes. I wonder if TI will release such a peripheral item--we can dream can't we? In the meantime, those with Extended Basic can have fun PEEKing and POKEing (CALL LOAD) in the above addresses when life gets too boring.

Rev. Keith G. Koch

JOYSTICKS THAT ARE A JOY

by Dick & Carla Clementson

Ok, so you have grown tired of the Invaders and Car Wars modules. You've tried every combination of keyboard entry and TI joysticks. Perhaps, you've grown so weary that the modules are gathering dust on a shelf somewhere. Well, there is hope to revive your interest in these old game modules.

One of the things we have seen in magazines are adapters that allow you to use different brands of joysticks on the TI Home Computer. Some MSP 99 members have been using the ATARI™ joysticks on the 99. These have generally proved successful.

The DENALI™ adapter is a little box that plugs into the joystick jack on the side of the 99 console. The adapter is fitted with two jacks so you can plug in the particular joysticks you have chosen. One of the items we noted with this adapter was that the cords exit from the box and drape over your keyboard.

We had heard about some joysticks made in Niles, Illinois. The Chicago Users Group had a demonstration of the units earlier this year, so we knew they would be compatible.

Apparently many people decided to buy the WICO™ joysticks because the supply in the MSP area was quickly depleted. We made numerous searches for the WICO™ adapter for the TI. It was the day before Christmas and there to my wondering eyes appeared the adapter but no joysticks. The price was reasonable by comparison with the others "available" by mail.

The WICO Command Control™ is a nice little black box. It has a cord and plug that goes directly into the jack on the side of the console. The box is fitted with two jacks so you can attach two WICO™ joysticks if the budget will permit. Incidentally most of the latest games seem to be for only one player anyway.

WICO makes three different types of joysticks. We didnot see any RED-BALL™ joysticks in this area. Most were the Model 15-9714 Joystick with the red "bat-type" handle. There is another model which has a heavier base called the "deluxe" but this was not seen in this area either. So as is often the case "decisions" are made by default-availability.

One feature we like is the option of using a "fire-button" either on the stick or on the base. There is a slide switch which provides a choice of either. The handle is very nice with a comfortable feel. The base is large enough so you can sit the unit on a table and it is quite stable. The base is perhaps too large to hold in your palm as you would with some other units. The handle appears to be a bright red plastic with a metal tube insert. WICO™ is a large designer and manufacturer of control devices for commercial arcade games so they should know how to make the joystick durable.

The accurate response and control makes those "old" modules a new and enjoyable experience. Perhaps, a necessity for full enjoyment of game modules like TI's PARSEC™.

You will find that a single WICO™ joystick will cost you more than the dual TI joysticks. We also have the "old" TI Command Controls with the little ball handle that we can use on "slower" games. Still work after a year of "service".

WICO makes things rather nice. The unit has a five foot cord and optionally you can purchase either a six or twelve foot extension cord if you want to get away from the TV. It would be nice if you had projection TV setup.

Another interesting WICO product is the TRACKBALL™. It has a phenolic ball that provides 360 degree movement in infinite positions. It can also be used to vary the speed of an on-screen object. Model 72-4560 is specifically designed for the Texas Instruments System and includes an AC power supply. What new generation of games would become possible with this hardware is exciting to imagine as it would take us beyond the eight directions of movement which the ordinary joystick provides.

FOR SALE

TI 99/4, Mint Condition, all manuals and keyboard overlays for basic and chess, $135, or $150 with cassette cables. Herb Ley, P.O. Box 2047, Rockville, MD 20852, TEL (301) 340-0484, during day only.

PROGRAM LIBRARY REPORT

We wish to thank Herb Ginsberg and Greg Barth for helping hand out tapes at the Feb. meeting.

Thanks to Pete Eddy, Mike Lambert, John Quick, and Pete Anderson for programs donated to the library.

We need volunteers to help hand out tapes at the March meeting please call Ken Geremia at (301) 249-5486

Please get your future orders in early for library tapes, due to pending vacations.

.....

MEMBERSHIP LIST

Membership lists will be available to pick up by all members attending the March meeting.

.....

Please notice our new format for the Newsletter. It is our hope that it will be more durable, and subject to less damage during mail ing.

Texas Instruments Unveils a Computer To Compete With IBM's Personal Model

By DAVID STIPP
Staff Reporter of THE WALL STREET JOURNAL

DALLAS—Texas Instruments Inc. introduced a small computer aimed primarily at the fast-growing market for desk-top computers used in business.

Though similar in many respects to International Business Machines Corp.'s personal computer, the new TI model, which it calls the Professional computer, has features intended to set it apart from the burgeoning family of IBM look-alikes. Notable among these are the capability to respond to a limited number of spoken commands and the capability to accept certain kinds of commands in English sentences rather than a computer language.

Introduction of the computer may have helped fuel an 11⅛-point spurt in Texas Instruments on the New York Stock Exchange composite tape yesterday. It closed at 176.

The new computer, called Pegasus within the company during its development, represents a departure by Texas Instruments from its tradition of using its own integrated circuits as central processors in computing products. The new machine uses an Intel Corp. 8088 microprocessor as its "brain," the same central processor used in IBM's personal computer. The new computer's standard model also includes 64K bytes of memory, enough to hold 65,536 characters, a 320K byte floppy disk and a TV-like monitor. Its suggested retail price is $2,595, about 10% less than a comparably equipped IBM personal computer.

Texas Instruments has tried to sidestep one problem that often hinders sales of new computers—lack of extensive software libraries available for competitors' more established machines—with the capability of its new computer to run a variety of programs on the market. The new computer is able to run popular control programs such as CP/M and accommodate such software packages as EasyWriter, WordStar, MultiPlan dBase II and PFS. The company said more than 100 software packages are available for use on the new computer, the majority of which are for business applications.

In tune with a trend toward "user friendliness" in the small-computer world, or ease of use for novices, Texas Instruments plans to sell an optional program with its new computer that allows data to be manipulated by commands in sentence form. The program displays parts of English sentences and allows them to be pieced together into sentences like "What was the price Monday of company X's stock?" The program will be available by midyear, a Texas Instruments spokesman said.

The option most likely to draw attention to the new computer is its speech recognition and synthesis package, also to be available by midyear as a plug-in device for the computer. Spoken commands will be treated by the computer as if they were entered through the computer's keyboard, a spokesman said. The computer also will be able to respond with spoken words.

Though the new computer is generating interest with its unusual features, a lot depends on the success of the company's sales efforts, according to analysts. "Having a new product is just the price of admission (to small-computer competition)," said Everett T. Meserve, an analyst for Arthur D. Little & Co. "Whether the new TI computer will shake up the computer world will depend not on its jazziness, but on marketing."

THE WALL STREET JOURNAL
Tuesday, February 1, 1983

THE WALL STREET ARTICLE WAS SUBMITTED BY CARL SAVILLO

MORE ON TI 99/4A

Q: *Why aren't there more articles on the TI 99/4A Computer? At its current low price, it is a very popular machine. What is the outlook for future software and peripherals for it?—George Reynolds, Virginia Beach, VA.*

A: Texas Instruments sent us a complete TI 99/4A Computer with an Expansion Box, Memory Module, and LOGO and Pascal modules. We want to do a complete review and test of this equipment, but we are missing two important parts of the system—the disk drive and controller in the Expansion Unit. They have promised to send us these components as soon as they can. We will then write a feature on this popular computer. We want to report on the new features since there is no point in considering the TI 99/4A as a cartridge operated "video computer." ◇

MORE DEFINITIONS:

27. Disk drive-A unit used to read data from or write data onto one or more disks.

28. Display unit-A device that provides visual representation of data.

29. DOS-An acronym for Disk Operating System. The program which controls storage and reading of information onto disks. Many computers use their own disk operating systems.

30. Dot matrix printer-Computer printing in which letterss, numbers, and characters are made of small dots. The more dots used to make the characters the closer to letter quality is the print. Common dot matix dot patterns are 5 x 7, 7 x 9, and 9 x 9. The printer used to print this article is an Epsom MX80 and uses a 9 x 9 dot pattern.

31. EDP-An acronym for Electronic Data Processing.

32. EIA-Electronic Idustries Association.

33. EIA interface-EIA standard for communications interface between business machines.

34. Electronic mail-A feature that allows short memos or messages to be sent to another computer. The system would be as follows: computer-modem-telephone lines-modem-computer.

35. Error-A discrepancy between a computed, observed, or measured quantity and the true, specified, or theoretical correct value or condition. Systematic error is a consistent error than varies in a systematic manner. Example: equipement misalignment. Random error is an error that varies in random fashion. Example: static electronic charges.

36. Fanfold paper-A continuous sheet of paper where pages are folded accordian style and separated by perforations.

37. Floppy disk-A storage medium where information is recorded magnetically on the surface of a flexible disk.

38. FORTRAN-An acronym for FORmula TRANslation. FORTRAN is a computer language widely used in scientific applications.

39. GROM-An acronym for GRaphisc Read Only Memory. The TI 99/4 and 4/A have built into them GROM.

40. Hard copy-The printout from a printer of a program or document.

41. Hard disk-An inflesible disk storage medium which offers a much larger storage system and a faster retrieval time over a diskette system. The Winchester disk is an example of a hard disk.

WASHINGTON CALCULATORS
and COMPUTERS

TI-99er Club Price List For
Computer Consoles, Peripherals, Calculators and Accessories

Model		Description	List Price	Sale Price
COMPUTERS				
PHC 004	*	TI 99/4A Computer Console	450.00	270.00
PHC 002		TI 99/2 Basic Computer	99.95	88.00
TI CC40		CC40 Compact Computer	249.95	192.00
PERIPHERALS				
HX 1000		Printer/Plotter-4 Color,Rechargeable	199.95	148.00
HX 2000		Wafertape Digital Tape Drive	139.95	105.00
HX 3000		RS232 Interface	99.95	75.00
HX 3000/P		RS232 Interface w/Parallel Option	124.95	95.00
PHP 1200	*	Peripheral Expansion System	249.95	177.45
PHP 1220		RS232 Card	174.95	124.20
PHP 1240-2		Disk Controller Card (w/dual disk manager)	249.95	177.45
PHP 1250		Expansion System Disk Drive	399.95	283.95
PHP 1260		Memory Expansion Card (32k RAM)	299.95	212.95
PHP 1270		P-Code Card (new with on/off switch)	249.95	177.45
PHP 1280		Pascal Development System	499.95	354.95
PHP 1300		Hexbus Interface (use w/99 4A)	59.95	47.95
PHP 1500		Solid State Speech Synthesizer	149.95	115.45
PHP 1600		Telephone Coupler (modem)	224.95	159.70
PHP 1850		Disk Memory Drive (external)	499.95	354.95
PHP 2500	*	TI Printer 80 Column	750.00	532.50
PHP 2700		Program Recorder (invcludes PHA 2622)	69.95	53.95
ACCESSORIES				
PHA 1100		Wired Remote Controllers	34.95	29.70
PHA 2000		Dual Cassette Cable	14.95	13.95
PHA 2620		Serial RS232 Y-Cable (dual serial ports)	34.95	28.95
PHA 2621		Parallel Cable (for PHP 2500)	24.95	21.25
PHA 2622		TI 99/4A Single Cassette Cable	14.95	12.95
PHA 2650		Blank Floppy Disks	19.95	16.00
PHA 2660		Cartridge Storage Cabinet	14.95	13.95
PHA 2670		Printhead (replacement for PHP 2500 printer	54.95	44.00
PHA 2671		Ribbon (for PHP 2500 printer)	14.95	13.50
PHA 4100	*	10 inch Color Monitor	399.95	335.00
WT 50		50' Blank Wafertape Cartridge	7.95	7.50
WT 25		25' Blank Wafertape Cartridge	6.95	6.50
WT 10		10' Blank Wafertape Cartridge	5.95	5.50
WT 5		5' Blank Wafertape Cartridge	4.95	4.50
HXC 36		36" I/O Cable w/Hexbus Connectors	9.95	8.95
TI 224A		TI 99/4A Dust Cover	7.95	6.50
SMARTMODEM		Hayes Smartmodem-RS232 Compatible Modem	279.00	214.00
AA MODEM		Anchor Automation Modem-RS232 Compatible	129.00	105.00
CALCULATORS				
Programmer		TI Programmer Calculator	75.00	51.75
TI 5010		Portable Print/Display Calculator	45.00	32.95
TI 5130		Desktop Print/Display Calculator w/memory	90.00	64.40
TI 55 II		Scientific LCD Programmable Calculator	50.00	37.50
BA 55		TI Business Calculator, Programmable	60.00	50.00
PC 200		TI Printer for BA 55 Calculator	70.00	58.00
HP 11C		Hewlett Packard Scientific Calculator	90.00	75.00
HP 12C		Hewlett Packard Financial Calculator	120.00	98.50
HP 16C		Hewlett Packard Programmer, Computer Scien	120.00	98.50
HP 41CV		Hewlett Packard Super Progm.Calculator	275.00	220.00
HP 97		Desktop Programmable Printing Calculator	750.00	600.00
INFORMATION MANAGEMENT SOFTWARE				
PHM 3006		Home Financial Decisions	29.95	21.00
PHM 3007		Household Budget Management	39.95	31.95
PHM 3013		Personal Record Keeping	49.95	37.50
PHM 3016		Tax/Investment Record Keeping	69.95	53.85
PHM 3022		Personal Real Estate	69.95	52.50
PHM 3044		Personal Report Generator	49.95	38.45
PHM 3111		TI Writer	99.95	76.95
PHM 3113		Microsoft Multiplan	99.95	76.95

WASHINGTON CALCULATORS
and COMPUTERS
Phone: 301-384-2010

WASHINGTON CALCULATORS and COMPUTERS

TI-99er Club Price List For SOFTWARE

Model	Description	Grade	List Price	Sale Price
Educational Software				
PHM 3002	Early Learning Fun	(age 3-6)	29.95	23.95
PHM 3004	Number Magic	K-3	19.95	16.50
PHM 3027	Addition and Subtraction I	ss 1	39.95	31.95
PHM 3028	Addition and Subtraction II	ss 1-2	39.95	31.95
PHM 3029	Multiplication I	ss 3-4	39.95	31.95
PHM 3048	Reading Rally	5	39.95	31.95
PHM 3049	Division I	ss 4-5	39.95	31.95
PHM 3059	Scholastic Spelling-Level 3	sr 3-4	54.95	40.95
PHM 3060	Scholastic Spelling-Level 4	sr 4-5	54.95	40.95
PHM 3061	Scholastic Spelling-Level 5	sr 4-6	54.95	40.95
PHM 3062	Scholastic Spelling-Level 6	sr 5-7	54.95	40.95
PHM 3083	Computer Math Games II	1-9	39.95	31.95
PHM 3088	Computer Math Games VI	1-9	39.95	31.95
PHM 3090	Addition	K-8	39.95	31.95
PHM 3091	Subtraction	K-8	39.95	31.95
PHM 3092	Multiplication	K-8	39.95	31.95
PHM 3093	Division	K-8	39.95	31.95
PHM 3094	Integers	K-8	39.95	31.95
PHM 3095	Fractions	K-8	39.95	31.95
PHM 3096	Decimals	K-8	39.95	31.95
PHM 3122	Plato Interpreter		49.95	38.45
PHD 52xx	TI Plato Courseware (call for list)		49.95	38.45
PHD 53xx	TI Plato Courseware (call for list)		49.95	38.45
Personal Enrichment Software				
PHM 3005	Video Graphs		19.95	17.95
PHM 3008	Video Chess		69.95	53.85
PHM 3011	Speech Editor		44.95	34.60
PHM 3014	Statistics		44.95	34.60
PHM 3020	Music Maker		39.95	31.95
PHM 3064	Touch Type Tutor		39.95	31.95
PHM 3109	TI LOGO II		99.95	76.95
Programming Utility Software				
PHM 3026	Extended Basic		99.95	74.95
PHM 3035	Terminal Emulator II		49.95	38.50
PHM 3055	Editor/Assembler		99.95	74.95
PHM 3058	Mini-Memory		99.95	74.95
PHT 6007	Teach Yourself Basic		29.95	23.95
PHT 6019	Teach Yourself Extended Basic		19.95	16.75
PHD 5004	Programming Aids I		14.95	13.95
PHD 5005	Programming Aids II		24.95	21.20
PHD 5012	Programming Aids III		19.95	17.95
PHD 5007	Teach Yourself Basic		34.95	29.70
PHD 5019	Teach Yourself Extended Basic		24.95	21.20
Entertainment Software				
PHM 3018	Video Games I		29.95	22.95
PHM 3036	Zero Zap		19.95	16.75
PHM 3038	Connect Four		19.95	15.75
PHM 3041D	Adventure		39.95	30.75
PHM 3041T	Adventure		39.95	30.75
PHM 3112	Parsec		39.95	31.95
PHM 3056	Alpiner (new)		39.95	31.95
PHM 3057	Munchman		39.95	31.95
PHM 3125	E.T. The Extra-Terrestrial		39.95	31.95
PHT 6015	Oldies But Goodies		9.95	7.95
PHT 6048	Voodo Castle (PHM 3041T required)		29.95	23.95
PHT 6052	Pyramid of Doom (PHM 3041T required)		29.95	23.95
PHT 6054	Savage Island (PHM 3041T required)		29.95	23.95

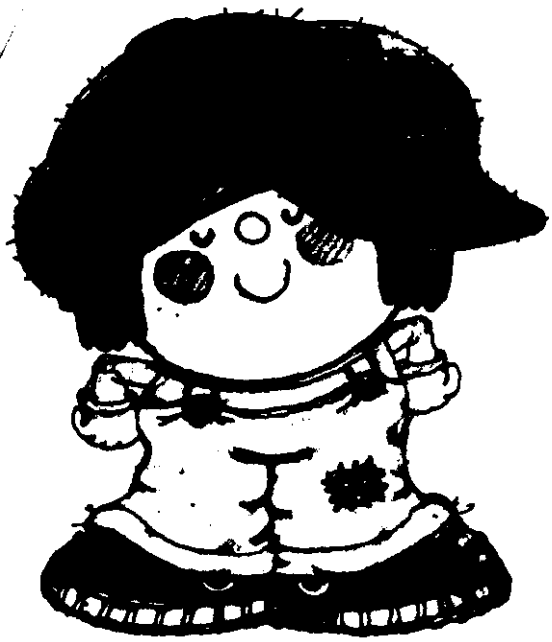
ss=Speech Synthesizer Recommended...sr=Speech Synthesizer Required
Prices in effect from March 1 to April 30, 1983
Shipping charge is $1.50...except * $4.00...C.O.D. add $2.00

Call or Write:

WASHINGTON CALCULATORS
and COMPUTERS
P.O. BOX 6763
SILVER SPRING, MD 20906

Phone: 301-384-2010

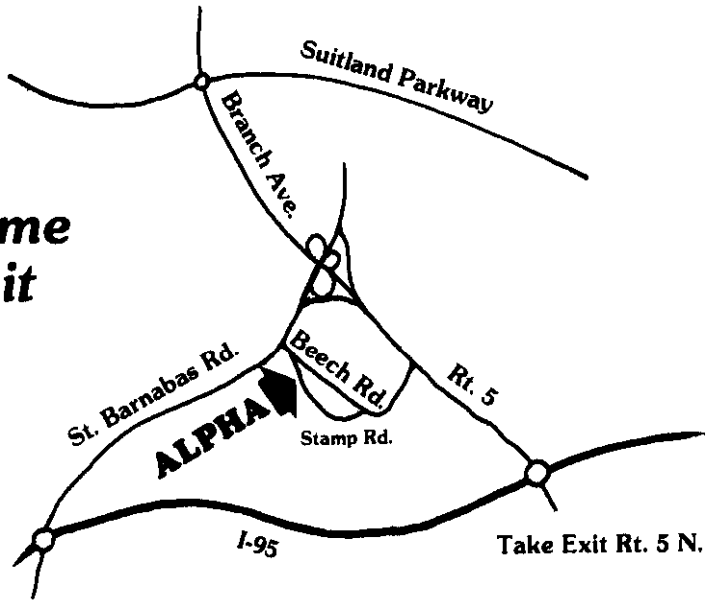
PLEASE POST!



Betcha' Didn't Know!

About The New!!

ALPHA PREVIEW CENTER



Come Visit Us

Take Exit Rt. 5 N. Branch Ave.

Featuring in house

- ***Computer hardware***
- ***Computer software***
- ***Instructional materials***
- ***Print and non-print***
  - ***Workshops***
  - ***Demonstrations and more***
  - ***Browsing***

Where - 4700 Stamp Road, Suite E-1
Temple Hills, Maryland 20748

Phone - 423-5058
or
554-0877

FOR THE REST OF US BEGINNERS....

by Wayne Page

One of the best suggestions I've heard for those of us learning Basic is "experiment." You'll find there are as many ways of getting your computer to do a particular task as there are people interested in seeing the results--everyone could and probably would do it differently.

With that in mind I'll talk a little about what I like to do best. This issue's article will describe some ways to jazz up your program title screen (headers).

```
100 CALL CLEAR
200 PRINT TAB(10);"THE HEADER"
    ::::::::::::"WMP 12/21/82"
300 FOR DELAY=1 TO 1000
310 NEXT DELAY
```

This is an example of a very simple, straight forward header. It has all the primary information needed. Line 200 holds the title of the game or program, followed by 12 colons (to center the title vertically). I also include, after the colons, my initials and the date the program was written. Lines 300 and 310 give a time delay to allow enough time to read the screen before the game or program starts. Now add different background color combinations:

```
300 FOR SCRN=3 TO 16
310 CALL SCREEN(SCRN)
320 FOR DELAY=1 TO 100
330 NEXT DELAY
340 NEXT SCRN
```

To add a little sparkle to your headers, try this program:

```
100 RANDOMIZE
110 CALL CLEAR
120 CALL SCREEN(2)
130 FOR X=1 TO 12
140 CALL COLOR (X,15,1)
150 NEXT X
160 PRINT TAB(10);"MY PROGRAM"
    ::::::::::::"WMP 12/21/82"
170 FOR STARS=1 TO 100
180 ROW=INT(RND*24)+1
190 COL=INT(RND*32)+1
200 IF ROW<>11 THEN 240
210 IF COL<10 THEN 270
220 IF COL>20 THEN 270
230 GOTO 180
240 IF ROW<>23 THEN 270
250 IF COL>14 THEN 270
260 GOTO 180
270 CALL HCHAR(ROW,COL,42)
280 NEXT STARS
```

Here's one more to try...a little more complicated, but worth it for that special program:

```
100 CALL CLEAR
110 CALL SCREEN(8)
120 CALL COLOR(13,1,1)
130 CALL COLOR(14,1,1)
140 CALL COLOR(15,1,1)
150 PRINT TAB(10);"MY PROGRAM"
    ::::::::::::"WMP 12/21/82"
160 A$="3C7EFFFFFFFF7E3C"
170 CALL CHAR(128,A$)
180 CALL CHAR(136,A$)
190 CALL CHAR(144,A$)
200 CALL HCHAR(1,2,128,30)
210 CALL HCHAR(24,2,128,30)
220 CALL VCHAR(1,2,128,24)
230 CALL VCHAR(1,31,128,24)
240 FOR X=2 TO 31 STEP 3
250 CALL HCHAR(1,X,136)
260 CALL HCHAR(1,X+1,144)
270 CALL HCHAR(24,X,136)
280 CALL HCHAR(24,X+1,144)
290 NEXT X
300 FOR X=1 TO 24 STEP 3
310 CALL VCHAR(X,2,136)
320 CALL VCHAR(X+1,2,144)
330 CALL VCHAR(X,31,136)
340 CALL VCHAR(X+1,31,144)
350 NEXT X
360 FOR FLASH=1 TO 24
370 CALL COLOR(13,15,1)
380 CALL COLOR(14,5,1)
390 CALL COLOR(15,6,1)
400 FOR DELAY=1 TO 10
410 NEXT DELAY
420 CALL COLOR(13,5,1)
430 CALL COLOR(14,6,1)
440 CALL COLOR(15,15,1)
450 FOR DELAY=1 TO 10
460 NEXT DELAY
470 CALL COLOR(13,6,1)
480 CALL COLOR(14,15,1)
490 CALL COLOR(15,5,1)
500 FOR DELAY=1 TO 10
510 NEXT DELAY
520 NEXT FLASH
```

Try some of these, adapt them, use them as building blocks for headers of your own. If you have some interesting things you've done in TI Basic that you'd share with "The Rest of Us Beginners," write them up with a little article and share it in our newsletter. There' much we can learn from each other.

TI NEWS
BOX 267
LEESBURG, VA
22075

DATED MATERIAL
MAILED
FEBRUARY 22