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Washington Apple Pi

Volume 3 July/August 1981 Number 7

Highlights

HUFF IN

BINARY WORD PATTERN PRINTER

EDU-APPLE

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Apple user groups may reprint without prior permission any portion of the contents herein, provided proper author, title and publication credits are given.

Membership dues for Washington Apple Pi are $18.00 per year, beginning in the month joined. If you would like to join, please call the club phone and leave your name and address, or write to the PO Box above. A membership application will be mailed to you.

Members who would like to sign onto the Washington Apple Pi ABBS system should call the club phone and leave your name (first and last), WAP number and phone number. You will be assigned a password and the message will be forwarded to John Moon who will take cake of signing you on.

EVENT QUEUE

Washington Apple Pi meets on the 4th Saturday of each month at 9:30 AM, at George Washington University, usually in Building C, on G Street at 23rd Street, NW. (To be sure of the exact location call the club phone or ABBS during the week of the meeting.) The July meeting is on the 25th and the August meeting on the 22nd.

The Executive Board meets on the 2nd Wednesday evening of each month. All members are welcome to attend. Details will be on the club phone and ABBS.

NOVAPPLE meets on the 2nd Saturday of the month at 1:00 PM at Kings Park Library on Burke Lake Road in Fairfax County; and on the 4th Thursday of the month at 7:30 PM at Computerland of Tysons Corner.

EDITORIAL

Shameless! Absolutely shameless! Imaginea pair of articles entitled "Huffin" and "Puffin". Huffin, by our beloved Treasurer and Integer BASIC freak Dana Schwartz, is featured in this issue. Its a nifty program which will convert Pascal files into DOS text files. Puffin, by Dr. Wo, your friendly Pascal Pusher, will do the reverse. I hope to print it in the August issue. Rumor has it that the notorious Dr. Who? has a related article in the works entitled "Wheezin". Literature, if thats what this is, surely mirrors life. (Only kidding, Howard.)

*****

In last month's President's Corner, Dave Morganstein thanked Bernie and Genevie Urban for their tireless efforts on behalf of WAP. I know we all share Dave's sentiments.

In view of our recent elections I think it appropriate to also extend our gratitude to the outgoing officers and directors. (We'll deal later with those scoundrels who were reelected!) Sandy Greenfarb is on his way to the Far East with plenty of apple seeds in his pocket. Hersch Pilloff remains a steady contributer to the newsletter (see his article on digital filters in this issue). Bob Peck will continue his active club participation as Membership Chairman. Bob deserves a special "thank you" for all those hours keeping the club's books and initiating our group purchase program. Thank you, all, gentlemen.

RSW

CLASSIFIEDS

For sale: Dan Paymar Chip, $30.00. Fred Shultz (WAP#58) 223-1397.

Wanted: Donation of 300 baud acoustic coupler for the Fort Howard VA Hospital. Call Carl Bauer (WAP#041) 935-5190.

For sale: Apple Comm. Card, $125; AJ acoustic coupler, $125. Hersch Pilloff 292-3100.

For sale: Apple II Plus, 48K with original manuals, cables, tapes, etc. $1150. Ira Cotton 468-2266 (h), 951,2693 (w).

BE A WAP DELIVERY PERSON

We need your help to deliver the newsletter to area computer stores. Beginning with the July meeting, we will establish a roster for each store so that you need not attend every meeting to help out. Please sign up at the rear of the meeting room on July 25, or call Jim Graham at (703) 494-1848 (h) or (202) 755-3743.

SIG-NEWS

SIGAMES is the special interest group of computer hobbyists interested in using their APPLEs for entertainment. The main meeting of this group is held at a location announced at and following the Washington Apple Pi monthly meeting.

John Alden will be chairing July's meeting on hi-resolution adventure games. Discussion will include a survey of what is available, a buyer's guide, and player stratagies for several games.

August's meeting will cover some pointers for writing game programs.

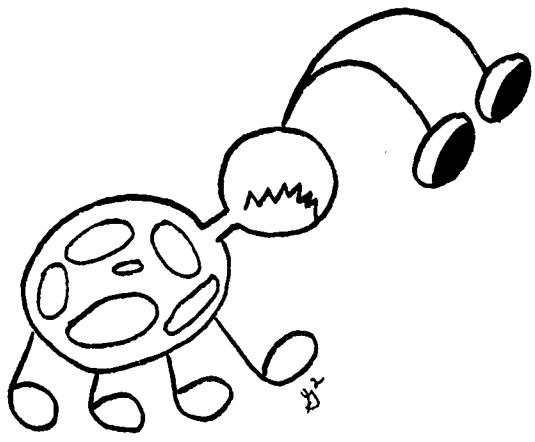
PIG, the Pascal Interest Group, meets on the third Thursday of each month at 7:30PM at the Uniformed Services University of the Health Sciences, Bldg. A, Room A2054 (2nd floor), on the campus of the National Naval Medical Center at 4301 Jones Bridge Road, Bethesda, MD.

EDSIG will meet immediately after the regular meeting of Washington Apple Pi.

NEWSIG will meet just after the regular Washington Apple Pi meeting. The meeting seems to best help the new members by answering their questions, and telling them what to do to get their system up and running. We also tell them something about WAP, how to order the disks, what's on the disks, etc.

The following members have agreed to answer questions over the phone when someone gets stuck and needs help between meetings:

Bob Chesley	560-0121
Paul Hoffman	831-7433
Sara Lavilla	926-6355
Boris Levine	229-5730
John H. Smith	439-4388
Steve Sondag	281-5392



NOTICES

IF YOU HELP US...

This club is run by volunteers. We can provide only those services which members have agreed to perform. YOUR club needs help with NEWSIG; library documentation; machine language, Applesoft and graphics persons for the hotline; and the many little chores necessary to make this club work. Please call Boris Levine ((301) 229-5730), our Volunteer Coordinator, if you would like to help.

...WE'LL HELP YOU.

Have a question? The following club members have agreed to help. PLEASE, NO CALLS AFTER 10:00 PM.

Applesoft/graphics----Mark Crosby (202) 488-1980 (Mark has asked for some help.Volunteers, please leave your name with Mark, Boris Levine or the club phone.
Pascal----Tom Woteki (202) 547-0984
Hardware----Howard Lefkowitz (301) 649-3373
DOS/Integer BASIC----Dana Schwartz (301) 621-2719
Communications----John Moon (Use ABBS number.)
Machine language----Volunteer needed!

TXFILER PROGRAM CORRECTION by Bruce F. Field

Boy am I embarassed! My article for TXFILER stated that disk indentifiers D1, and D2 could be appended to file names when loading and saving files. Unfortunately doing this produces a DOS syntax error due to an oversight on my part. The corrections below will fix this.

```
9C6: 4C 14 0E
A9E: 31

E14: 20 38 09 A9
E18: EC 85 05 A9 0C 85 06 B1
E20: 05 F0 1A C9 AC F0 98 E6
E28: 05 D0 F4 E6 06 D0 F0 A9
E30: 8D 91 05 E6 05 D0 02 E6
E38: 06 A9 00 91 05 60
```

After loading the old version and making these corrections, save the whole mess with BSAVE TXFILER,A$803,L$63C .

PRESIDENT'S CORNER by

David Morganstein

Four subjects come to mind: the location of our meetings; a proposed change in the elections procedure; some joint WAP and Novapple functions; and the need for help. At our June meeting, it was clear that most of us want to continue meeting at G.W. We can not do this if a large sum of money must be supplied from our meager treasury. At the meeting it was suggested that individual donations could provide the rental cost and indeed three/fourths of the days rental flowed forth from the attendees. However, I suspect that collections at each meeting is a tenuous solution to the problem. One glimmer of hope came from several members associated with the University. It is possible that an appeal can be made to reduce the quoted one hundred dollars per meeting rental. To make the appeal we must determine the number of current or former G.W. students and staff. At the July meeting, I will try to collect this information from those of you in attendance. Until then, we will continue the search for a large, comfortable, centrally located and virtually free meeting place. Tom Woteki has discovered that we can use the large auditoriums at the NIH compound. Their are three possible rooms, all of which are large enough for us. Apples are available for demonstrations. The best news...the facilities are free!! This will be hard to beat.

At the June board meeting the suggestion was made to increase the size of the Executive Board. The subject was sent to a committee (gee, just like the Congress...) for review. A proposal will be brought to the July meeting that will surely stimulate some thought. The proposal hopes to solve several problems at once. Not only would participation in the Board be increased to ten, the annual election would be used to select a Board of ten and to designate one member to be President and one Vice-president. The Board would then elect a Secretary and Treasurer. The President and Vice-president would not be nominated separately from board positions. Rather, they will be selected as the leading two vote recipients in the election of the Board. The principle advantage of this method is that members who are well thought of and who receive support from almost half the membership will not become excluded from a voting participation in the Board by failing to obtain a plurality in a specific vote. I am very inclined to support this change of procedure.

Theron Fuller, President of Novapple spoke to me about joint Wap/Novapple ventures. Two specific suggestions were to combine our efforts in helping Newsig members and holding a joint Flea Market to sell or exchange equipment. I think both ideas are good ones. Particularly, a joint development of an orientation package regarding the Apple. What is your reaction to these? Again, the ideas can move ahead if their are volunteers to move them.

I requested help from the members in several areas. Folks are still needed for the following:

- o Newsig chairman
- o Group purchase chairman
- o Regular delivery of newsletters
- o Orientation package
- o Arrangements

If any of the above subjects appeal to you please contact any of the Officers or our volunteer co-ordinator, Boris Levine so we can get you started!!

AN OPEN LETTER TO AREA COMPUTER STORES

As of June 1981, the Washington Apple Pi had a membership of over 750 Apple enthusiasts. At the monthly meeting, approximately 200 members attended and heard an extensive review of the more well known word processors. Many other valuable talks will be given over the next year. The reason for the strong growth of our group is the increasing interest in the capabilities of our favorite home computer, the Apple. Our group is dedicated to informing and helping owners get the most out of their machine. To this end we are writing to you.

Many Apple groups around the country began with a connection to a particular store. The computer salesmen recognized the mutual benefit of offering help to people who were still in the learning stage or simply wanted to keep in touch with new products. As you know, the WAP has not affiliated with any particular store. This does not mean that we can not help each other and the many Apple owners.

This letter is both a request for and an offer of help. Our newsletter reaches many owners and can be used as an excellent means of communicating your services. You may wish to announce notices of courses being offered in a column dedicated to important events of interest. By taking out ads you can reach many area Apple owners regarding your products and sales. If you do not currently carry our newsletter along with other relevant magazines, we urge you to contact us and add it to you shelves. You may find it valuable to have your store Apple-expert write an article or two for the newsletter.

Many of our members purchase software and hardware by mail order. This may be for several reasons: discount prices, national advertising or availability. We believe that members may be better served by purchasing locally and supporting our area stores. To combat these problems we propose several remedies.

cont'd.

First, we ask you to consider a modest discount to WAP members. By recognizing the WAP membership card you may attract additional sales and enable us to offer yet another service to our members. We will be glad to include a list of stores offering such a discount to members in the newsletter, thereby providing you with some additonal advertising.

Second, work with us to determine items of interest to members so that you can obtain them early. Obviously, the issue of advertising product availability, mentioned earlier, will help get the word around.

One store owner proposed helping the WAP by offering a years membership to all new Apple purchasers. Needless to say, we would be delighted if you would consider this. It would be a selling point for you, support us and help new owners by introducing them to a group dedicated to instruction and use of the Apple.

We extend an open offer to discuss the above topics, or any others you think will benefit the Washington area Apple community.

Sincerely,

David Morganstein

David Morganstein
WAP President

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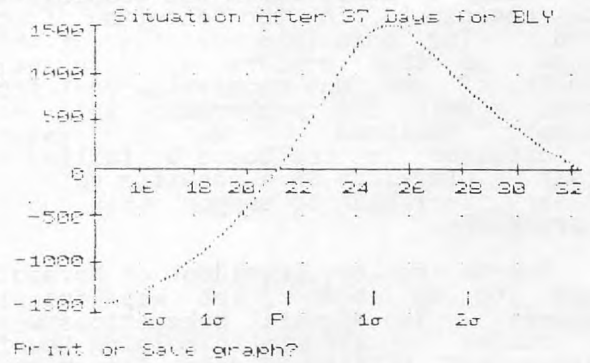

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AN APPLE COOLER

by Jay M. Thal

To cool your Apple there's enough space on the right side of the motherboard, and in front of the tv modulator, to mount a 3 1/8 inch box fan. The fan sits on a block of styrofoam to lift it off the bottom of the case. Screws (size 6-32) installed from the outside fit tightly through the cooling slots. CAUTION: use nylon hex-nuts (6-32) on the inside so if they loosen, they will not short anything. An illuminated switch helps remind you that you've left the fan on. The switch is mounted in a box, which for convenience, I've placed on the left side using, again, 6-32 screws and nylon nuts.

The fan has an output of 35 CFM. However, the limited cooling slots of the Applerestrict airflow. For additional airflow more slots can be routed into the right side of the case (remove the case first, of course). Perhaps Apple will consider moulding the case with additional slots at some future date.

PARTS LIST:

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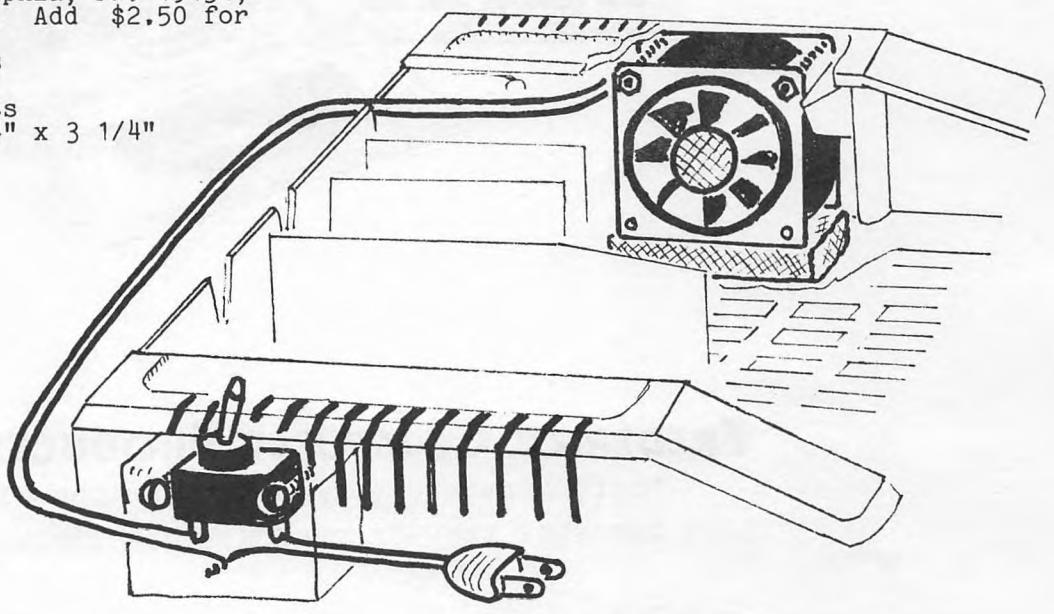

!!!!!CAUTION!!!!! The construction project described in this article may void your Apple warranty. Neither the Editor nor WAP warrants that this project is safe for your Apple or that it will accomplish its stated purpose. Proceed at your own risk and then only if you are skilled in electronics.

HUFFIN (PASCAL TO DOS TEXT FILE CONVERSION) by Dana J. Schwartz

After discovering that the DOS 3.3 RWTS (Read or Write a Track and Sector) routines could access any of the blocks on a Pascal formatted disk, it became a simple task, knowing the Pascal directory and text file structures, to locate any such file and convert it to a DOS text file. This Higher-level language mUFFIN type program (HUFFIN) is the implementation of that concept.

Line 1 reduces HIMEM: by 2100 bytes to reserve space for the RWTS access routine and the buffers for the Pascal disk blocks. Lines 20-90 POKE this general purpose RWTS routine, and the associated IOB and DCT. See the DOS 3.3 manual, pp.94-98, for a description of these data structures.

The screen display is set up in lines 100-130, followed by a request to the user for the number of drives (1 or 2) on the system. To 'hardwire' this number, add the line:

```
135 DR = n:  GOTO 150
```

where n is a 1 or 2. Instructions are next issued to the user for disk insertion. Note that in a single drive system there will be several manual disk exchanges performed, and that to avoid possible human error the Pascal input disk should be write-protected (especially during your early testing!).

Line 170 asks for the name of the file on the Pascal disk to be copied (without a volume name appended, e.g. DJS.TEXT). If no name is given, an abbreviated directory is displayed (GOSUB 4000) and the user is queried again. If a name is given, the directory is searched (GOSUB 1000) and, if found, the file type and size are verified. Lines 190-200 subsequently initialize the buffers and the DOS output file.

The conversion is performed in lines 210-320, prompting the single drive user when necessary. Characters are simply appended onto an output string (A$) until a CR (13) is encountered, at which time the string is sent to DOS. Lower case characters are not converted to upper case. Special processing is required for the DLE (16) and NULL (0) characters. (See the description of Text File Formats on p.266 of the Pascal Operating System Manual for an explanation of their use). In addition, in order to entertain the user while Applesoft manipulates strings and memory, a window is provided to view the Pascal lines as they are written to the disk.

Lines 330-350 wrap up the session, closing the output file and restoring HIMEM:.

The subroutine at 1000 reads the Pascal directory into memory and searches for the named file (N$). The top and bottom blocks of the file are returned in TP and BT, respectively, and the file type is returned in TY. TY is set to -1 if the file is not found. The directory structure was supplied by Apple and was reproduced on p.9 of the December 1980 Washington Apple Pi.

The subroutine at 2000 reads two Pascal blocks into memory (BK and BK+1). The subroutine at 2500 is used to place the corresponding Track/Sector pairs for each block (BL) in TR and S1/S2. Note that any given block is contained in two sectors on a single track. See the DOS Track/Sector to Pascal Block Conversion Chart, located elsewhere in this issue, for a detailed picture of this correspondence. The routine at 3000 is the Basic level access to the RWTS routine which was POKEd earlier. The 256 bytes of track TR, sector SE are read into the buffer address with high order byte BF (the low order byte was previously stored and does not change during execution).

The subroutine at 4000 reads in the Pascal directory and displays the file names. It is followed by a general purpose error handler at 9000. This handler will attempt to CLOSE the output file if it is believed to be present, allowing an early CTRL-C to effect a partial file transfer.

```
]LIST

1 HI =  PEEK (115) +  PEEK (116) *
    256 - 2100: HIMEM: HI
10  ONERR  GOTO 9000
20  DEF  FN MOD(X) = (X / 256 -  INT
    (X / 256)) * 256
30 RWTS = HI:ER = HI + 17:IOB = H
    I + 18:DCT = HI + 36:BUFF =
    HI + 40
40 TK = IOB + 4:SC = IOB + 5:HB =
    IOB + 9:G$ =  CHR$ (7):PA =
    0:DR = 0
50  POKE RWTS,169: POKE RWTS + 1,
     INT (IOB / 256): POKE RWTS +
    2,160: POKE RWTS + 3, FN MOD
    (IOB): POKE RWTS + 4,32: POKE
    RWTS + 5,217: POKE RWTS + 6,
    3: POKE RWTS + 7,176: POKE R
    WTS + 8,1: POKE RWTS + 9,96
60  POKE RWTS + 10,173: POKE RWTS
     + 11, FN MOD(IOB + 13): POKE
    RWTS + 12, INT ((IOB + 13) /
    256): POKE RWTS + 13,141: POKE
    RWTS + 14, FN MOD(ER): POKE
    RWTS + 15, INT (ER / 256): POKE
    RWTS + 16,96
70  POKE IOB,1: POKE IOB + 1,96: POKE
    IOB + 3,0: POKE IOB + 6, FN
    MOD(DCT): POKE IOB + 7, INT
    (DCT / 256): POKE IOB + 8, FN
    MOD(BUFF)
80  POKE IOB + 10,0: POKE IOB + 1
    1,0: POKE IOB + 12,1: POKE I
    OB + 13,0: POKE IOB + 14,0: POKE
    IOB + 15,96: POKE IOB + 16,1
```

cont'd.

```
90  POKE DCT,0: POKE DCT + 1,1: POKE
    DCT + 2,239: POKE DCT + 3,21
    6
100  CALL  - 936: VTAB 5: HTAB 16
    : PRINT "HUFFIN": VTAB 9: PRINT
    "  PASCAL TO DOS TEXT FILE C
    ONVERSION"
110  VTAB 13: HTAB 10: PRINT "BY
    DANA J. SCHWARTZ": HTAB 10: PRINT
    "WASHINGTON APPLE PI": VTAB
    18: INVERSE
120  PRINT "
                          ": VTAB 2
    3: PRINT "
                              ";: REM
    40 SPACES EACH
130  NORMAL : VTAB 19: POKE 34,18
    : POKE 35,22: IF DR <  > 0 THEN
    150
140  INPUT "HOW MANY DRIVES YOU G
    OT? 1 OR 2 ? ";I$: CALL  - 9
    36:DR =  VAL (I$): IF DR <  >
    1 AND DR <  > 2 THEN  PRINT
    G$;G$;: GOTO 140
150  POKE IOB + 2,DR: IF DR = 1 THEN
     PRINT "INSERT PASCAL DISK (
    WRITE PROTECTED)": GOTO 170
160  PRINT "INSERT DOS DESTINATIO
    N DISK IN DRIVE 1  INSERT PA
    SCAL SOURCE DISK   IN DRIVE
    2"
170  PRINT : INPUT "FILE (<CR> FO
    R DIRECTORY):";N$: IF  LEN (
    N$) = 0 THEN  GOSUB 4000: GOTO
    100
180  GOSUB 1000: IF TY <  > 3 OR
    BT - TP < 4 THEN  PRINT G$;G
    $;"FILE EMPTY, NOT TEXT, OR
    NOT FOUND": GOTO 170
190  CALL  - 936:B1 =  INT (BUFF /
    256):B2 = B1 + 1:B3 = B2 + 1
    :B4 = B3 + 1:BK = TP + 2: GOSUB
    2000
200 A$ = "": PRINT  CHR$ (4);"OPE
    N ";N$;",D1":D$ =  CHR$ (4):
     PRINT D$;"MON O"
210  PRINT D$;"WRITE ";N$
220  FOR I = BUFF TO BUFF + 1023
230 C =  PEEK (I): IF C > 16 THEN
    A$ = A$ +  CHR$ (C): GOTO 29
    0
240  IF C = 13 THEN  PRINT A$:A$ =
    "":Y =  FRE (0): GOTO 290
250  IF C <  > 16 THEN 280
260 I = I + 1:SP =  PEEK (I): IF
    SP < 33 THEN 290
270  FOR S = 1 TO SP - 32:A$ = A$
     + " ": NEXT S: GOTO 290
280  IF C = 0 THEN I = BUFF + 102
    3
290  NEXT I
300 BK = BK + 2: IF BK = BT THEN
    330
310 PA = 1: IF DR = 1 THEN  PRINT
    D$;"PR#0": CALL  - 936: PRINT
    G$: INPUT "INSERT PASCAL DIS
    K AND SMASH RETURN";I$: CALL
     - 936
320  GOSUB 2000:PA = 0: GOTO 210
330  TEXT : CALL  - 936
340  IF D$ =  CHR$ (4) THEN  PRINT
    D$;"CLOSE ";N$: PRINT D$;"NO
    MON O"
350  HIMEM: HI + 2100: END
990  REM
992  REM ********************
994  REM * FIND PASCAL FILE *
996  REM ********************
998  REM
1000 BF =  INT (BUFF / 256):TR =
    0: FOR SE = 11 TO 4 STEP  -
    1: GOSUB 3000:BF = BF + 1: NEXT
    SE
1010 NU =  PEEK (BUFF + 16):PT =
    BUFF + 32:LN =  LEN (N$)
1020  IF  PEEK (PT) <  > LN THEN
    1100
1030  FOR J = 1 TO LN
1040  IF  PEEK (PT + J) <  >  ASC
    ( MID$ (N$,J,1)) THEN 1100
1050  NEXT J
1060 TP =  PEEK (PT - 6) +  PEEK
    (PT - 5) * 256
1070 BT =  PEEK (PT - 4) +  PEEK
    (PT - 3) * 256
1080 TY =  PEEK (PT - 2)
1090  RETURN
1100 PT = PT + 26:NU = NU - 1: IF
    NU > 0 THEN 1020
1110 TY =  - 1: RETURN
1990  REM
1992  REM ********************
1994  REM * READ 2 PASCAL BLKS *
1996  REM ********************
1998  REM
2000 BL = BK: GOSUB 2500
2010 BF = B1:SE = S1: GOSUB 3000
2020 BF = B2:SE = S2: GOSUB 3000
2030 BL = BK + 1: GOSUB 2500
2040 BF = B3:SE = S1: GOSUB 3000
2050 BF = B4:SE = S2: GOSUB 3000
2060  IF DR = 1 THEN  PRINT G$: INPUT
    "INSERT DOS DISK AND SMASH R
    ETURN";I$: CALL  - 936
2070  RETURN
2490  REM
2492  REM ****************
2494  REM * BLK -> TR/SE *
2496  REM ****************
2498  REM
2500 TR =  INT (BL / 8):TMP = (BL
     / 8 - TR) * 8
2510 S2 = 2 * (7 - TMP):S1 = S2 +
    1
2520  IF TMP = 0 THEN S1 = 0
2530  IF TMP = 7 THEN S2 = 15
2540  RETURN
2990  REM
2992  REM *************
2994  REM * CALL RWTS *
2996  REM *************
2998  REM
3000  POKE TK,TR: POKE SC,SE: POKE
    HB,BF: POKE ER,0: CALL RWTS
3010  IF  PEEK (ER) = 0 THEN  RETURN
3020  IF D$ =  CHR$ (4) THEN  PRINT
    D$;"PR#0": PRINT D$;"NOMON O
    "
3030  TEXT : PRINT G$;G$;"RWTS DI
    SK ERROR ": PEEK (ER): POP :
     POP : GOTO 9020
3990  REM
3992  REM ********************
3994  REM * PASCAL DIRECTORY *
3996  REM ********************
3998  REM
4000  TEXT : CALL  - 936:BF =  INT
    (BUFF / 256):TR = 0: FOR SE =
    11 TO 4 STEP  - 1: GOSUB 300
    0:BF = BF + 1: NEXT SE
4010 V$ = "":NL = BUFF + 6: FOR I
     = 1 TO  PEEK (NL):V$ = V$ +
     CHR$ ( PEEK (NL + I)): NEXT
    I: PRINT V$;":":L$ = "":Y =
     FRE (0)
4020 LN = 1:NF =  PEEK (BUFF + 16
    ): IF NF = 0 THEN  PRINT " <
    NO FILES>": PRINT : INPUT "T
    YPE <CR> TO CONTINUE";I$: CALL
     - 936: RETURN
4030  FOR I = 1 TO NF:ST = BUFF +
    I * 26 + 6:NL =  PEEK (ST): IF
    NL = 0 THEN  GOTO 4050
4040  FOR J = 1 TO NL:L$ = L$ +  CHR$
    ( PEEK (ST + J)): NEXT J: PRINT
    " ";L$:L$ = "":Y =  FRE (0):
    LN = LN + 1
```


cont'd. p.22

QUESTIONS, QUESTIONS, QUESTIONS by Mark L. Crosby

Q. What does "STROBE" mean and what does it do?

A. Strobe usually refers to the Apple keyboard and sometimes to pin 20 of the peripheral slots. Generally it means "reset". The keyboard outputs a single character then "locks up" when a key is pressed. This gives the system (applesoft, monitor, etc.) a chance to read that character and send back a reset signal (strobe) that "unlocks" the keyboard and readies it for another key press. Normally this happens quickly and automatically so the user is not aware of what is happening between one key press and the next. Peripheral or "device" strobing is used for various purposes depending on the nature of the device. These are strobed periodically during phase 0 of the clock (1.023 MHz nominal) if the slot is selected for I/O.

Q. What does "THIS MAY CAUSE YOU TO LOSE APPLESOFT" mean?

A. You wouldn't think it possible on an Apple II Plus or ROM card system but Applesoft is very easy to "confuse" or "lose". For example Applesoft programs normally load beginning at memory location 2049 decimal. Location 2048 must be a zero or the program will not function. Most commands will garner a "SYNTAX ERROR IN 65513" or similar impossible message. By simply POKEing 2048 with a zero many programs can be saved that were formerly "lost". Another case involves the "WINDOW" settings of the text page. Try POKE 32,20 and see what happens! Both these and many other situations may cause you to "lose" Applesoft which, at worst, simply means you'll have to re-boot or power up again. For those of you who use RAM Applesoft, there are additional pitfalls, e.g., you may not use HGR or the area of memory from 2048 to 12287 decimal or you literally will "lose" Applesoft since you will have overwritten its code.

Q. How do I create lower case text using Applesoft for use on my printer?

A. For the characters A-Z, left- and right-bracket, backslash, carat, and underscore (ASCII 65-95), add 32 to the ASCII value to print in lower case (ASCII 97-127). See the sample program below:

```
10    PRINT CHR$(4)"PR# 1":
       REM SLOT NUMBER
20    A$ = "WASHINGTON APPLE PI"
30    PRINT A$
40    FOR I = 1 TO LEN (A$)
50    UFLAG = 0
60    B$ = MID$ (A$,I,1)
70    IF I = 1 OR B$ = " " THEN UFLAG  =
1
80    IF NOT UFLAG THEN B$ =
       CHR$( ASC( MID$(A$,I,1)) + 32)
90    PRINT B$;
100   NEXT I
110   PRINT :  PRINT CHR$(4)"PR# 0"
```

Q. I need a generalized routine to read a flat file where the record length is known and write out a new file with a different format.

A. There is no such animal! It is easy to write a generalized "reading" program for files but writing out a new file in a particular format requires some forethought. Assuming you are referring to random access files, you really only need to know 1) How many fields are to be stored on the new record and 2) The maximum length of each record. The latter is calculated by adding the total length of the fields plus the number of fields. Let's suppose you have a record length of 1000 with an unknown number of fields in that record. It is assumed that the fields were written out with PRINT (A$) statements which would each automatically be followed by a carriage return on the record. Decide on what form your new record is to take - actually write down each field that you want to store. Calculate the new record length (as above) and determine the sequence of the fields.

The program shown will read in an unknown number of fields from a record of fixed length L1. It then writes out a record in a new file of length L2 with a mixed sequence of fields and a few more thrown in for good measure. This program is highly adaptable to your needs and I encourage you to try your hand on a newly initialized diskette.

```
10    DIM A$ (400) : REM MAX # OF
FIELDS
20    L1 = 1000 :  L2 = 2000
30    I = I + 1
40    PRINT CHR$ (4)"OPEN FILE,L"L1
50    PRINT CHR$ (4)"READ FILE,R"I
60    ON ERR GOTO 100
70    J = J + 1
80    INPUT A$ (J)
90    GOTO 80
100   POKE 216,0
110   IF J = 1 THEN 1000
120   PRINT :  PRINT CHR$ (4)"CLOSE"
130   PRINT CHR$ (4)"OPEN NEW FILE,L"L2
140   PRINT CHR$ (4)"WRITE NEW FILE,R"I
150   FOR K = 1 TO 3
160   PRINT A$ (K)
170   NEXT
180   FOR K = J - 1 TO 4 STEP -1
190   PRINT A$ (K)
200   NEXT
210   PRINT "DATE OF CHANGE- 7/31/81"
220   PRINT "EXTRA STUFF"
230   PRINT CHR$ (4)"CLOSE"
240   J = 0
250   GOTO 30
1000  PRINT CHR$(4)"CLOSE"
1010  END
```

Where L1 is the length of your original file and L2 is the length of your new file. The sequence of fields (lines 150-220) may be altered or new fields added, etc. prior to writing out the new file. This procedure may also be

hastened by reading several records at once, processing, then writing out multiple records.

Q. Can you give me a list of producers of CAI software for Applesoft BASIC?

A. Aside from Handholding BASIC from Apple, Inc., which is an on-line interactive program development/learning system, I only know of one complete system. It consists of seven disks containing about 65 programs designed to teach the novice programmer about Applesoft. The series runs $190. An eighth disk contains programs and subroutines that can be used in your work as you write programs - $39. Available from Educational Courseware, 3 Nappa Lane, Westport, CT 06880.

Q. Why is it that when I read strings into an array and then compare them to another array or a litteral they are not always equivalent? I've checked carefully and the strings are identical!! But a comparison (IF A$ = B$) says they are not always the same.

A. Applesoft recognizes CHR$ (65) and CHR$ (193) as the letter "A". When you print these two CHR$'s they appear identical. Because their ASCII values are different the conditional test simply confirms that fact. The only way to compare them would be to first normalize the strings by subtracting 128 from any ASCII value that is greater than 128. Use something like this:

```
10 FOR I = 1 TO LEN (A$)
20 A = ASC (MID$ (A$,I,1))
30 IF A > 128 THEN A = A - 128
40 B$ = B$ + CHR$ (A)
50 NEXT I
60 A$ = B$
```


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A PAGE FROM THE STACK: LIBRARIAN'S CORNER by Dave Morganstein

Robotwar (MUSE). Ever want to design your own robot? We've been waiting for this one for a long time. It's finally available!!! This "game" is unlike any game you've seen yet. (I know, I always say that...) In fact its more like a course in Robotics. The essentials are that you must learn the robotics language described extensively in the 75 page manual. Then you can begin testing out a program to control your creation. The system comes with several robots already designed so that you can watch the little critters do battle, then study their programming and improvise your own version. The main menu allows you to pick from the following: Execute a robot battle; Access the language assembler and test branch; Access text editor to modify program; Access match scheduling and more!!! There is even a simulator where you can try out your robot and monitor its potential before doing battle.

Perhaps the best reason for buying Robotwar is to provide you with an incentive for learning how to program. Not for every one but certainly educational.

Gorgon (Sirius Software). Another brilliant arcade game by Nasir. In this one you fly your ship up/down/left/right as beasties materialize before your eyes and swoop down to the ground. There, they pick up unsuspecting folk and carry them off. Your job, should you accept it, is to blow them away before they hit you or land. If they pick some one up, you can still shoot them (being careful not to hit the nice folks they're carrying) and then fly underneath and catch the figures and land them safely. There are two views, the magnified one showing the hi-res characters, and a wide angle showing little dots for you and the gorgons. As usual, Nasir has done it again.

Autobahn (Sirius Software). What, another review of Sirius stuff? Well just to show I can be critical (as I was of the impossible Cyber Strike), stay away from the Autobahn. While many like the road race games with you steering right or left to avoid the oncoming traffic and road hazards, I find the I 270 exciting enough!!! Yes, I know this one includes tunnels which suddenly throw you in the dark and it is a challenge, it just doesn't hold my attention...

Pool 1.5 (IDSI). Lots of games have been simulated on the Apple (see the next review) but to my knowledge this is the first pool game written. And written well at that!!! You choose from among several of the more well known versions: eight ball, regular pool, nine ball etc. Name your players and rack-em-up. Its a delight to see and hear the balls bounce around on the table...for your turn, you set your aim, speed of shot and english. These are done with a paddle. Pressing the button causes the action. You can also set some global parameters like table friction (which when set to zero allows the balls to just keep bouncing till they all sink!!). If you want to learn the game, this program will give you a good start.

Raster Blaster (Bill Budge). We've all been wondering where Bill has been. Well now we know!! Remember his first trilogy which included Space War, Night Driver and a little number called Pinball. Bill has rebuilt a pinball program to surpass them all. This simulation is superb. In his usual hi-res graphics and sound, he has captured the "sport" at its best. The kids need no longer sneak down to the 7-11 to waste away their quarters. You can keep them at home now!!!

Visicalc II (Personal Software Inc.) If you ever use your Apple for serious number manipulating, you should probably think about Visicalc. I know some folks who bought their Apple because of the potential of this program. The essentials are an electronic worksheet with a maximum of 254 lines and a maximum of 60 columns. (The more lines the fewer columns). Each cell in the table can hold a label for descriptive purposes or a value. The value can be a number or more importantly, an expression describing how to calculate the number. The expressions can range from the simple "add column B to column C" (columns are indicated by letters, rows by numbers) to very exotic functions including exponentials, maxima and more. The main question is whats new about the II version. The answer is not all that much. You now have logical expressions like if-then-else which can be used to evaluate a cell. You also have the ability to interface, both into and out of VC, with your own data file. The data files are stored in sixteen sectored form. Perhaps the best news is the completely new manual. In addition to the extensive tutorial in the old manual, you now get an equally extensive reference manual in which each command gets it own description. The bad news is that the program is bigger, restricting the size of your worksheet. Also, the program is slower. We should also add that VC is one of the few programs around which let language card owners use their extra memory!!

EDU-APPLE by Tom Van Flandern

assisted by Brian and Kevin

"Algebra I? Oh, no!" When I brought home the first educational diskette for our Apple, its arrival was greeted with groans by our seventh and sixth graders, Brian and Kevin. But ten minutes later they were as involved in the first lesson as if it were an adventure game. It took Brian nearly a month to complete the course and pass the post-test, and Kevin will be there any day now. Both feel it has made their regular math classes in school easier for them.

Thus began a new dimension in the usage of our Apple -- educational programs from EDU-WARE, the California-based software house which specializes in programming excellent teaching models. I called the company to say some flattering things about their Algebra program, and they asked me to represent them in the area. I am now familiar with their entire line, and am happy to report that more and more dealers in the area are carrying a complete line of EDU-WARE teaching programs to supplement their unlimited inventories of the latest action games.

The following is an up-front, no-holds-barred review of the EDU-WARE line, as judged by the three of us from actual learning experiences with the programs.

Algebra I: The first out of a series of five independent systems in Algebra, this one assumes no previous familiarity with the concept of numerals or variables in its introductory levels. It introduces operations, sets, coordinates, evaluating expressions, and finally rules for equation reduction. Learner entry into the lessons and progress through them are automatically flow-charted. Each lesson is complete with definitions, rules, examples, and sample problems for the learner. A series of post-tests use positive reinforcement only. Sample and test problems are not repetitive, so they measure true learning, not just memorization. Requires no teacher monitoring! If there is a way to cheat on the "final exam", we haven't found it yet. For this program only, DOS 3.3 is required. Excellent.

Compu-Math: A series of three independent diskettes representing progressively advanced levels of arithmetic learning. ARITHMETIC SKILLS is for the young learner, and teaches addition, subtraction, multiplication, and division with an absolute minimum of text. It can also be set to start with the teaching of counting for the beginning learner. Displays answers to sample problems numerically and graphically, and shows a hand with a finger moving over a screen image of the keyboard, showing how to press the right keys to register an answer. Many options are available to the teacher which the learner never knows about and cannot access. Moves too slowly to hold the attention of someone who already knows the material, and we don't have anyone in the right age bracket to give this one a good test. Let me know your evaluations. FRACTIONS begins with a pre-test to determine the learner's level, but we found the pre-test too easy to pass as compared with the lessons themselves. Six lessons cover definitions, common and lowest denominators, and operations on fractions. Good teaching model, but doesn't hold learner's attention well for long lessons. DECIMALS is similar to fractions but with seven lessons, including conversion, round-off, and percentage. Package represents a huge investment in developing effective programs based on good teaching models with positive reinforcement; but at a minimum of $40 each, these may be over-priced for the average family budget.

Compu-Spell: For my tastes, this one has the best teaching model of the lot. How do you teach spelling, you ask, without a teacher to pronounce the words for you? By an interesting technique developed especially for teaching by computer. In the first pass through your lesson words, the words to be learned are highlighted in sentences selected to remind you of the words when they disappear ("A --- says meow"). The learner studies the spelling of the highlighted words until ready to spell. They then disappear, and the learner types them back in. If you forget the word, the escape key brings it back. On this round, you cannot cause the screen to display an incorrect spelling! You just keep trying until you get it right or give up. But the program remembers all the words you goofed on, and you can't get to the second round until you have successfully spelled each lesson word correctly once. In the second round you may spell freely, using the backspace keys to make corrections as you like. Again, all words incorrectly spelled are recycled at the end of the lesson until you get them correct once. But the infernal program then remembers the words you missed most often, and brings them back to haunt you in future lessons! (Learning is highly individualized, with up to 60 simultaneous learners at a time, whose progress and scores are individually remembered and reported to the teacher. All the incentives of the classroom, but more fun!) System diskette contains program and learner records, data diskettes contain lessons for specific grade levels, 800-1200 words each. Grades 4 through 8 plus adult/secretarial available, with levels K through 3 (called "Spelling Bee") coming in July. Excellent.

Compu-Read: Increase your reading speed with this program. First level flashes just letters. Other levels use individual words, then lists from which you must recall a particular word, and finally full sentences. Will surely build reading speed, but not necessarily comprehension, which is the problem with most speed-reading techniques. Adjusts its speed to your learning rate, so that you are always challenged without ever

being left in the dust. Graphic displays after 25 problems record progress. However numeric estimates of reading speed achieved are a joke, since display time is said to reach 0.001 second, whereas the time for the image to fade from your TV screen may well be 10-20 times that long. Overall, disappointing.

Perception: A series of challenges to your abilities to perceive images, shapes, and perspective, and to eye-hand coordination. Practice up for those other challenging action games. Seven games in all, out of which most time will be spent on Shape Memory and Tilt Maze. The former lets you view an arbitrary shape of complexity you select through a slowly falling window which shows only part of the shape at a time. You must then pick out the correct answer from four closely-matched choices. Beware -- older versions have a bug which reverses choices three and four. It will drive you crazy! Tilt Maze is a computer version of one of those action maze games with a small steel ball and a wooden maze containing lots of holes through which the ball can fall. You steer the ball in two dimensions trying to circle the maze to the goal without falling through a hole. All seven games can be adjusted for level of difficulty. Interesting.

Metri-Vert: Aid to metric conversion. Length/distance, area, volume, weight, temperature. Might be useful for students.

Uni-Solve: Electronics Designer. For example, transmission line formulae, reactance, coil-winding models, modulation percentages. For the electronic hobbyist or engineer.

Statistics: Mean, variance, standard deviation, Pearson Correlation, normal distribution, probability and frequency, chi-square distribution, chi-square test, T-test. Results numeric and graphic. Recently updated and improved.

Interactive Fantasies: Six games which have some mind-challenging element to them. By far the best known and most widely enjoyed is the classic game, THE PRISONER. Definitely not for the easily frustrated, The Prisoner places you in an island prison under the control of "The Caretaker" (your Apple). You win by escaping from the island. Though many have played, few have found the secret of the island, and they're not telling. You lose by keying in your identification code, which the computer constantly tries to trick or frustrate you into doing. You must learn the rules as you play, and they change as the game proceeds. Each new room you enter offers a game within a game. Reading accompanying instructions is a must. Excellent rating. TERRORIST, WINDFALL, AND NETWORK are more of Edu-Ware's answer to those bored with the usual shoot-em-up and adventure games. In TERRORIST, one player is the extortionist group and the other is the government, and play consists of raising or lowering demands, making bluffs or threats, and negotiations until one side or the other "wins". Provides insights into real-life no-win situations. WINDFALL capitalizes on the gasoline shortage as the basis for a game in which you represent a large oil conglomerate, and must make a profit for your stockholders in the face of competition, gas lines at your stations, oil embargos by Arab countries, and government intervention. Clever graphics, and price-fixing is allowed! NETWORK lets you buy and sell mock TV programs for the fall series, in competition with the other networks. Fun to play once mainly for the zany program titles, but we found several bugs which frustrate continued play. Edu-Ware is giving it the axe this fall. SPACE and SPACE II are character generating adventure programs in the "Dungeons and Dragons" tradition. Hours of fun, and greatly underrated, to judge from the players around here.

(Editor's Note: My first inclination was not to publish this article, since it was written by Edu-Ware's local distrubutor. Editorial policy prohibits promotion of products by individuals with a financial stake in those products. On reflection, however, Tom's evaluation of his own company's software appears objective and this well written article will certainly be of interest to many WAP members. Publication of such articles in the future will be on a case by case basis. I welcome members's comments on the publication of this article and the editorial policy. RSW)

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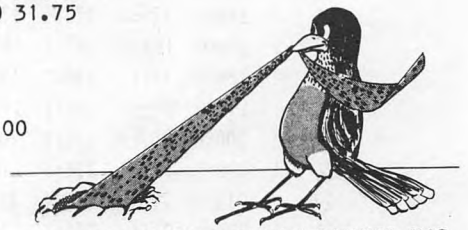

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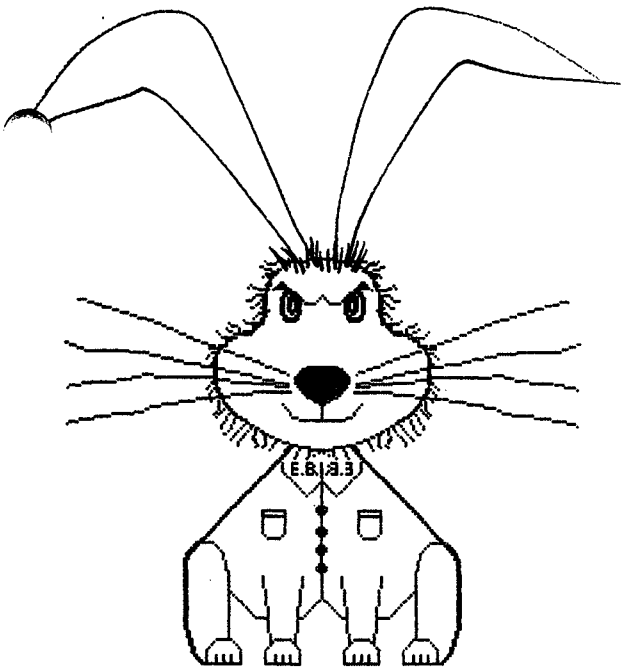
For each DOS 3.3 sector, a Pascal block number is listed, along with a 0 or 1 indicating whether it is contained in the first or second 256 bytes. (Remember, a Pascal block is 512 bytes long and maps to two DOS sectors).

Examples:

1. To examine a DOS VTOC (track 17, sector 0) from Pascal, look at the first 256 bytes of block 136.
2. To examine the first block of a Pascal directory (block 2), look at track 0, sectors 11 and 10.

TRACK \ SECTOR	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
0	0:0	7:0	6:1	6:0	5:1	5:0	4:1	4:0	3:1	3:0	2:1	2:0	1:1	1:0	0:1	7:1
1	8:0	15:0	14:1	14:0	13:1	13:0	12:1	12:0	11:1	11:0	10:1	10:0	9:1	9:0	8:1	15:1
2	16:0	23:0	22:1	22:0	21:1	21:0	20:1	20:0	19:1	19:0	18:1	18:0	17:1	17:0	16:1	23:1
3	24:0	31:0	30:1	30:0	29:1	29:0	28:1	28:0	27:1	27:0	26:1	26:0	25:1	25:0	24:1	31:1
4	32:0	39:0	38:1	38:0	37:1	37:0	36:1	36:0	35:1	35:0	34:1	34:0	33:1	33:0	32:1	39:1
5	40:0	47:0	46:1	46:0	45:1	45:0	44:1	44:0	43:1	43:0	42:1	42:0	41:1	41:0	40:1	47:1
6	48:0	55:0	54:1	54:0	53:1	53:0	52:1	52:0	51:1	51:0	50:1	50:0	49:1	49:0	48:1	55:1
7	56:0	63:0	62:1	62:0	61:1	61:0	60:1	60:0	59:1	59:0	58:1	58:0	57:1	57:0	56:1	63:1
8	64:0	71:0	70:1	70:0	69:1	69:0	68:1	68:0	67:1	67:0	66:1	66:0	65:1	65:0	64:1	71:1
9	72:0	79:0	78:1	78:0	77:1	77:0	76:1	76:0	75:1	75:0	74:1	74:0	73:1	73:0	72:1	79:1
10	80:0	87:0	86:1	86:0	85:1	85:0	84:1	84:0	83:1	83:0	82:1	82:0	81:1	81:0	80:1	87:1
11	88:0	95:0	94:1	94:0	93:1	93:0	92:1	92:0	91:1	91:0	90:1	90:0	89:1	89:0	88:1	95:1
12	96:0	103:0	102:1	102:0	101:1	101:0	100:1	100:0	99:1	99:0	98:1	98:0	97:1	97:0	96:1	103:1
13	104:0	111:0	110:1	110:0	109:1	109:0	108:1	108:0	107:1	107:0	106:1	106:0	105:1	105:0	104:1	111:1
14	112:0	119:0	118:1	118:0	117:1	117:0	116:1	116:0	115:1	115:0	114:1	114:0	113:1	113:0	112:1	119:1
15	120:0	127:0	126:1	126:0	125:1	125:0	124:1	124:0	123:1	123:0	122:1	122:0	121:1	121:0	120:1	127:1
16	128:0	135:0	134:1	134:0	133:1	133:0	132:1	132:0	131:1	131:0	130:1	130:0	129:1	129:0	128:1	135:1
17	136:0	143:0	142:1	142:0	141:1	141:0	140:1	140:0	139:1	139:0	138:1	138:0	137:1	137:0	136:1	143:1
18	144:0	151:0	150:1	150:0	149:1	149:0	148:1	148:0	147:1	147:0	146:1	146:0	145:1	145:0	144:1	151:1
19	152:0	159:0	158:1	158:0	157:1	157:0	156:1	156:0	155:1	155:0	154:1	154:0	153:1	153:0	152:1	159:1
20	160:0	167:0	166:1	166:0	165:1	165:0	164:1	164:0	163:1	163:0	162:1	162:0	161:1	161:0	160:1	167:1
21	168:0	175:0	174:1	174:0	173:1	173:0	172:1	172:0	171:1	171:0	170:1	170:0	169:1	169:0	168:1	175:1
22	176:0	183:0	182:1	182:0	181:1	181:0	180:1	180:0	179:1	179:0	178:1	178:0	177:1	177:0	176:1	183:1
23	184:0	191:0	190:1	190:0	189:1	189:0	188:1	188:0	187:1	187:0	186:1	186:0	185:1	185:0	184:1	191:1
24	192:0	199:0	198:1	198:0	197:1	197:0	196:1	196:0	195:1	195:0	194:1	194:0	193:1	193:0	192:1	199:1
25	200:0	207:0	206:1	206:0	205:1	205:0	204:1	204:0	203:1	203:0	202:1	202:0	201:1	201:0	200:1	207:1
26	208:0	215:0	214:1	214:0	213:1	213:0	212:1	212:0	211:1	211:0	210:1	210:0	209:1	209:0	208:1	215:1
27	216:0	223:0	222:1	222:0	221:1	221:0	220:1	220:0	219:1	219:0	218:1	218:0	217:1	217:0	216:1	223:1
28	224:0	231:0	230:1	230:0	229:1	229:0	228:1	228:0	227:1	227:0	226:1	226:0	225:1	225:0	224:1	231:1
29	232:0	239:0	238:1	238:0	237:1	237:0	236:1	236:0	235:1	235:0	234:1	234:0	233:1	233:0	232:1	239:1
30	240:0	247:0	246:1	246:0	245:1	245:0	244:1	244:0	243:1	243:0	242:1	242:0	241:1	241:0	240:1	247:1
31	248:0	255:0	254:1	254:0	253:1	253:0	252:1	252:0	251:1	251:0	250:1	250:0	249:1	249:0	248:1	255:1
32	256:0	263:0	262:1	262:0	261:1	261:0	260:1	260:0	259:1	259:0	258:1	258:0	257:1	257:0	256:1	263:1
33	264:0	271:0	270:1	270:0	269:1	269:0	268:1	268:0	267:1	267:0	266:1	266:0	265:1	265:0	264:1	271:1
34	272:0	279:0	278:1	278:0	277:1	277:0	276:1	276:0	275:1	275:0	274:1	274:0	273:1	273:0	272:1	279:1



BINARY WORD PATTERN PRINTER by Howie Mitchell

Dear Mr. Editor,

For a long time, it seems, I have been intrigued by the beauty of repetitive visual patterns and mosaics. I taught a couple courses in photography in the mid-'60's (The Hawthorne School; Washington, DC.) and recall the enchantment with patterns in bricks, shadows, multiple soap bubbles, layered BB's, grills, and macro-views of fabric.

This interest is still with me, and it was only a matter of time before I decided to explore the possibilities with a graphics printer. When I succeeded in obtaining binary mosaic patterns from words, names, and phrases, I seemed to be provided with a "magic window" into the inner symmetry of words, ideas, and concepts. (Of course, this is probably not so, but is an attempt to name the sense of Wonder, Awe, and Mystery of the experience.)

Every word or phrase I have tried is, at the very least, "interesting", and usually results in a surprisingly handsome "fabric pattern". Armed with a knowledge of binary patterns (and a good magnifying glass!), one can actually decode the pattern in any location, and reveal the words once more. It's a sort of "mathematical hologram", if you will! There are a practically infinite number of variations, too. For example, a 20-character phrase would give about 2×10^{28} different permutations.

I am including the program listing I use with the Anadex DP-9501 printer. It may or may not be generally useful, since different graphics printers use different commands. With a little luck, the general approach will be clear enough so that an interested reader can have similar success. I hope someone does try it. It is absolutely THRILLING!

Sincerely, Howie Mitchell

*** SYMMETRICAL BINARY PATTERNS FROM WORDS AND PHRASES ***

THE HANDSOME AND (PERHAPS) CURIOUS MOSAIC PATTERNS INCLUDED ARE DERIVED MATHEMATICALLY FROM THE LETTERS IN WORDS. SINCE EVERY WORD IS UNIQUE, IT MUST FOLLOW THAT EACH PATTERN IS (AND **MUST** BE) UNIQUE, ALSO.

EACH LETTER IS ASSIGNED A NUMERICAL VALUE: 'A'=1, 'B'=2, 'C'=3, AND-SO-ON, UP THROUGH 'Z'=26. EACH NUMERICAL VALUE CAN THEN BE ASSOCIATED WITH A SO-CALLED 'BINARY DOT PATTERN' SPECIFIC TO THAT VALUE.

A FEW EXAMPLES MIGHT HELP. NOTE THAT EACH COLUMN (BELOW) HAS A VALUE, AND THE COLUMN VALUE IS INCLUDED WHEN MARKED WITH AN ASTERISK (*), AND IS OTHERWISE IGNORED.

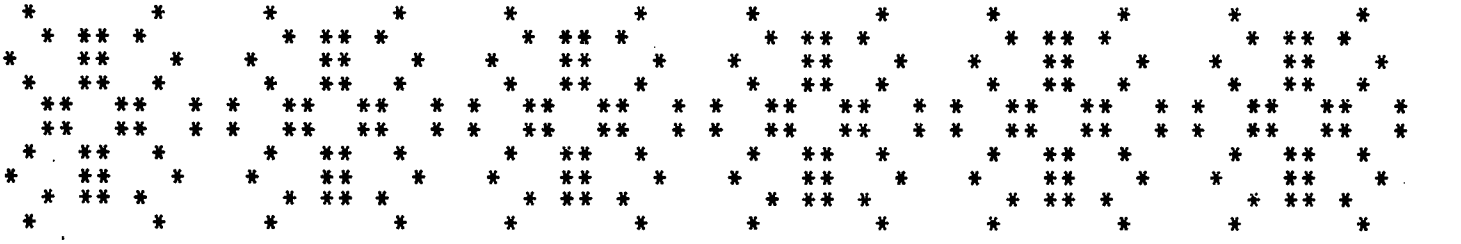
(16'S)	(8'S)	(4'S)	(2'S)	(1'S)	(VALUE)	(LETTER REPRESENTED)
				*	1	A
			*		2	B
			*	*	3	C
		*			4	D
*		*	*	*	23	W

THE LETTERS IN EACH WORD ARE PRINTED USING SIMILAR DOT-PATTERN REPRESENTATIONS, **EXCEPT** THAT THE DOTS ARE IN VERTICAL COLUMNS, AND ARE VERY TINY. IN ADDITION TO THAT, THE PATTERNS ARE EXTENDED SO AS TO PROVIDE 'MIRROR-IMAGES' (I.E. THE PATTERNS ARE SYMMETRICAL BOTH HORIZONTALLY AND VERTICALLY).

FOR EXAMPLE, THE WORD 'ADRIAN' WOULD BE MIRROR-IMAGED TO BECOME THE WORD: 'ADRIANNANIRDA', AND A **DUPLICATE** SET OF DOTS WOULD BE PRINTED BELOW, TO MATCH THOSE ABOVE. LOOK:

```
16'S:     *       *
 8'S:       * ** *
 4'S:    *    **    *
 2'S:      *  **  *
 1'S:   *  **  **  *
       (ADRIANNAIRDA)
 1'S:   *  **  **  *
 2'S:      *  **  *
 4'S:    *    **    *
 8'S:       * ** *
16'S:     *       *
```

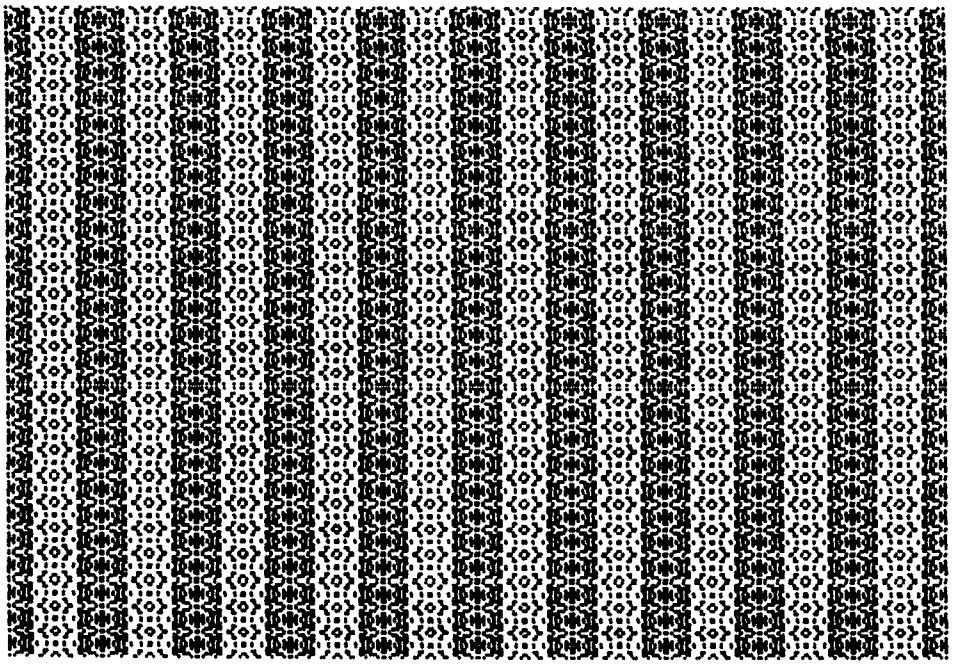
IF YOU CAN IMAGINE THIS SORT OF PATTERN BEING PRINTED REPETITIVELY, USING VERY TINY DOTS, YOU WILL THEN GET A GOOD IDEA OF HOW THE MOSAICS ARE BUILT UP.



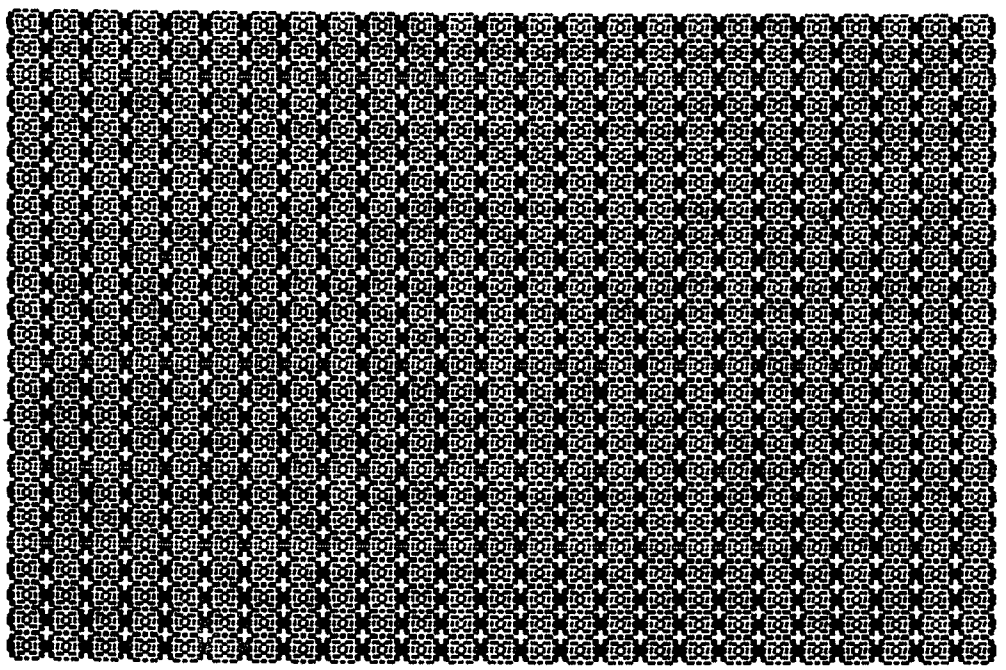
```
5  REM ************************
     *   BINARY WORD-PATTERN   *
     *      P R I N T E R      *
     ************************

10  TEXT : HOME
20  HTAB 2
30  PRINT "*** BINARY WORD-PATTER
     N PRINTER ***          ------
     --------------------": PRINT

40  PRINT "  THIS PROGRAM MAKES U
     SE OF THE ANADEX  DP-9501 GR
     APHICS PRINTER FOR PRINTING
       SYMMETRICAL 'BINARY DOT PA
     TTERNS' DE-   RIVED FROM THE
      LETTERS OF WORDS AND/OR  PH
     RASES."
50  PRINT
60  PRINT "  THE LETTER 'A' IS EQ
     UIVALENT TO 1; THELETTER 'B'
      IS 2; 'C' IS 3, AND-SO-ON,
       THROUGH 'Z'= 26.": PRINT
70  PRINT "  BY CONVERTING THE LE
     TTERS INTO PAT-   TERNS WHIC
     H ARE SYMMETRICAL (BOTH HORI
     - ZONTALLY AND VERTICALLY),
     EACH NEW WORD WILL PROVIDE Y
     OU WITH A UNIQUE, HANDSOME(A
     ND SOMETIMES SURPRISING) MOS
     AIC.": PRINT
80  INPUT "  TYPE IN YOUR WORD(S)
     , AND THEN PRESS    THE 'RET
     URN' KEY.
       )-) ";NAME$
90 L =  LEN (NA$): IF L = 0 THEN
      PRINT "(PROGRAM ENDED.)": VTAB
     23: END
100  REM ************************
     * MAKE A "MIRROR-IMAGE"    *
     * CHARACTER STRING FROM    *
     * THE WORD STORED IN NAME$.*
     ************************

105  FOR N = 1 TO L
110 A$ =  MID$ (NA$,N,1): IF  ASC
     (A$) < 64 THEN A$ = "@": REM
     ELIMINATE NON-GRAPHICAL
     CHARACTERS, REPLACING THEM
     WITH "@" SYMBOLS.

115 PTTERN$ = PTTERN$ + A$
120  NEXT N
125  REM ************************
     * "PTTERN$" IS THE SAME AS *
     * "NAME$", EXCEPT THAT ALL *
     * CHARACTERS WHOSE ASCII   *
     * VALUE IS LESS THAN 64    *
     * HAVE BEEN REPLACED WITH  *
     * "@" CHARACTERS.          *
     ************************

130 MIRRER$ = PT$:L =  LEN (PT$)
135  FOR N = L TO 1 STEP  - 1
140 MI$ = MI$ +  MID$ (PT$,N,1): NEXT

145  REM ************************
     * "MIRRER$" IS THE SET OF  *
     * GRAPHICAL CHARACTERS FOR *
     * PRINTING AN "UPRIGHT" BI-*
     * NARY WORD PATTERN (WORD  *
     * FORWARDS & BACKWARDS).   *
     * E.G."WATER"="WATERRETAW".*
     ************************


200  REM ************************
     * NOW, WE WANT TO BUILD A  *
     * STRING OF REFERENCE CHAR-*
     * ACTERS TO DRAW UPON WHEN *
     * CONSTRUCTING STRINGS FOR *
     * THE "UPSIDE-DOWN" BINARY *
     * DOT PATTERN.             *
     ************************

210  FOR E = 0 TO 1: FOR D = 0 TO
     1: FOR C = 0 TO 1: FOR B = 0
      TO 1: FOR A = 0 TO 1
220 SUM = E + D * 2 + C * 4 + B *
     8 + A * 16
230 DOWN$ = DOWN$ +  CHR$ (SUM +
     64)
240  NEXT A,B,C,D,E
250 MI$(1) = MI$
260  FOR N = 1 TO  LEN (MIRRER$)
270 PLACE =  ASC ( MID$ (MI$,N)) -
     63
280 SEEK$ =  MID$ (DOWN$,PLACE,1)

290 MI$(2) = MI$(2) + SEEK$
300  NEXT N
310  REM ************************
     * AT THIS POINT, WE HAVE   *
     * THE WORD CODED IN GRAPH- *
     * ICAL CHARACTERS. MI$(1)  *
     * GIVES THE TOP PART;MI$(2)*
     * GIVES THE UPSIDE-DOWN    *
     * MIRROR-IMAGE.            *
     ************************

320 PADDERNS =  INT (400 /  LEN (
     MI$)): REM : THIS GIVES THE
     NUMBER OF COMPLETE PATTERNS
     WHICH CAN BE PRINTED WITHIN
     400 GRAPHICAL CHARACTERS.

330 DOTS = PADDERNS *  LEN (MI$):
     EXCESS =  INT ((600 - DOTS) /
     2)
335  REM ************************
     * HERE, WE ARE MAKING CAL- *
     * CULATIONS FOR CENTERING  *
     * THE BINARY PATTERN. THERE*
     * ARE 600 DOT POSITIONS A- *
     * VAILABLE IN AN 8" LINE.  *
     ************************
```


cont'd. p.22

*** BINARY PATTERN FOR 'WASHINGTON APPLE PI' ***



*** BINARY PATTERN FOR 'COMPUTER' ***



cont'd. p.26

THE EXPONENTIALLY WEIGHTED MOVING AVERAGE AS A DIGITAL FILTER

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by Hersch Pilloff

There are many applications involving time-series data where it is important to smooth data and/or calculate moving averages. This can be done using various computational procedures and each has a rather unique effect on the original data. Whether this difference is critical depends on the particular application. In some cases it will be quite acceptable to "eyeball" the results whereas in other situations this will not be adequate. In the latter case it is essential to understand precisely what the particular operation is doing to the data. More specifically, if the original data is transformed from the time to frequency domain, then the result of averaging or smoothing the data can be expected to change not only the amplitudes of the frequency components but also their relative phase relationships.

The remainder of this article will emphasize the exponentially weighted moving average (EWMA). This particular analysis was motivated by its use in the development and validation of automatic stock trading models and also by the philosophy that it is important to understand simple procedures before rejecting them out of hand in favor of more complicated approaches. The subsequent analysis is general and is in no way limited to any specific application. While much of the following is likely to be déja vu to electrical engineers, it is possible that others may not be familiar with this subject and may find it useful.

The EWMA is widely used for smoothing time series data and for calculating moving averages and is given by

$$y_i = (x_i - y_{i-1}) \frac{2}{D+1} + y_{i-1} \qquad (1)$$

where y_i is the current average, x_i is the current data, y_{i-1} is the last average, and the quantity $2/(D+1)$ is the smoothing constant where D is the number of days, or more precisely, the number of entries over which the data is to be smoothed. Note that this expression is recursive; i.e. the calculation of the current EWMA requires only the current entry and the last calculated average. In actual practice this expression is often evaluated by setting $y_1 = x_1$; in this case the EWMA becomes meaningful for $i \Rightarrow D$. While the EWMA places the greatest weight on the most recent entry which may or may not be desirable, its popularity is due to its seeming simplicity, minimal memory requirements, and fast execution speed.

The problem associated with using the EWMA is that it is by no means obvious as to what it does to the data. As previously noted, whenever data is averaged or smoothed the transforming function acts as a filter in the sense that it changes both the amplitudes and the phases of the frequency components. Once the filter characteristics are known and the original data has been Fourier analyzed, the user can then determine the optimum representation for any given

application. This might include, for example, the determination of the smoothing constant(s) as well as the phase shift(s) in order to compensate for the fact that the moving average will trail or lag behind the original data.

In the following analysis the EWMA has been treated as a recursive digital filter. The transfer function has been derived and the frequency response and phase shifts are given as a function of the averaging interval. In addition the principal results are shown graphically for representative input parameters.

The general expression for a recursive digital filter is given by Hamming as

$$y_n = \sum_{k=-\infty}^{\infty} c_k x_{n-k} + \sum_{k=1}^{\infty} d_k y_{n-k} \qquad (2)$$

From Eqn.(1) it can easily be seen that the EWMA corresponds to a rather simple recursive digital filter in that it has only two non-zero coefficients:

$$c_0 = \frac{2}{D+1} \qquad d_1 = \left(1 - \frac{2}{D+1}\right) \qquad (3)$$

In order to determine the effect of this filter, it is first necessary to determine its transfer function, H(f). The transfer function can then be used to calculate both the resulting frequency amplitudes as well as the phase shifts.

The general expression for the transfer function for a recursive filter is given by

$$\tilde{H}(f) = \left(\sum_{k=0}^{M} c_k e^{-2\pi i f k}\right) \Big/ \left(1 - \sum_{k=1}^{N} d_k e^{-2\pi i f k}\right) \qquad (0 \le f \le 1/2) \quad (4)$$

Substitution of c_0 and d_1 from Eqn.(3) followed by some algebra gives the transfer function for the EWMA as

$$\tilde{H}(f) = \frac{\left(1 + (D-1)\sin^2 \pi f\right) + i\,(1-D)\sin \pi f \cos \pi f}{1 + (D^2-1)\sin^2 \pi f} \qquad (5)$$

The frequency amplitudes are obtained from the modulus of the transfer function

$$\sqrt{\tilde{H}(f)\,\tilde{H}^*(f)} = \left(1 + (D^2-1)\sin^2 \pi f\right)^{-1/2} \qquad (6)$$

by multiplying the initial amplitudes by the appropriate value of the transfer function. The phase angle ϕ is given by

$$\phi = \tan^{-1}\left(\frac{-(D-1)\sin \pi f \cos \pi f}{1 + (D-1)\sin^2 \pi f}\right) \qquad (7)$$

Finally, the maximum phase shift is obtained in the usual way by setting the first order partial derivative equal to zero and solving the resulting equation to give

$$\phi_{max} = \tan^{-1}\left(\frac{-(D-1)\sqrt{D}}{2D}\right) \qquad (8)$$

FIGURES

Fig.1 is a graph of Eqn.(6) showing the frequency response (modulus of the transfer function) of the filter for D = 3, 10, 30.

Fig.2 shows the phase shift of the filter in radians as a function of frequency as given by Eqn.(7) for D = 3, 10, 30.

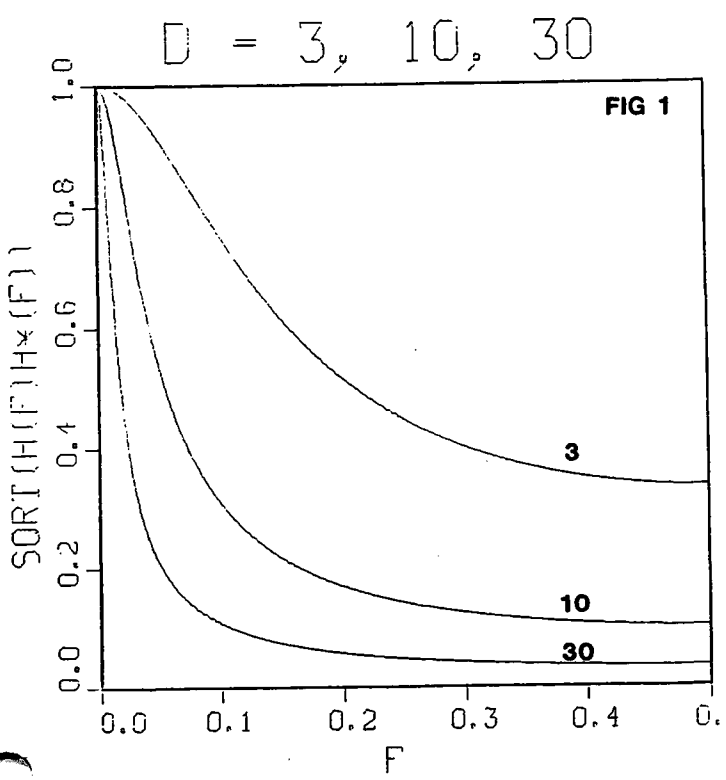
Fig.3 shows the maximum phase shift in radians as a function of integer values of D as obtained from Eqn.(8).

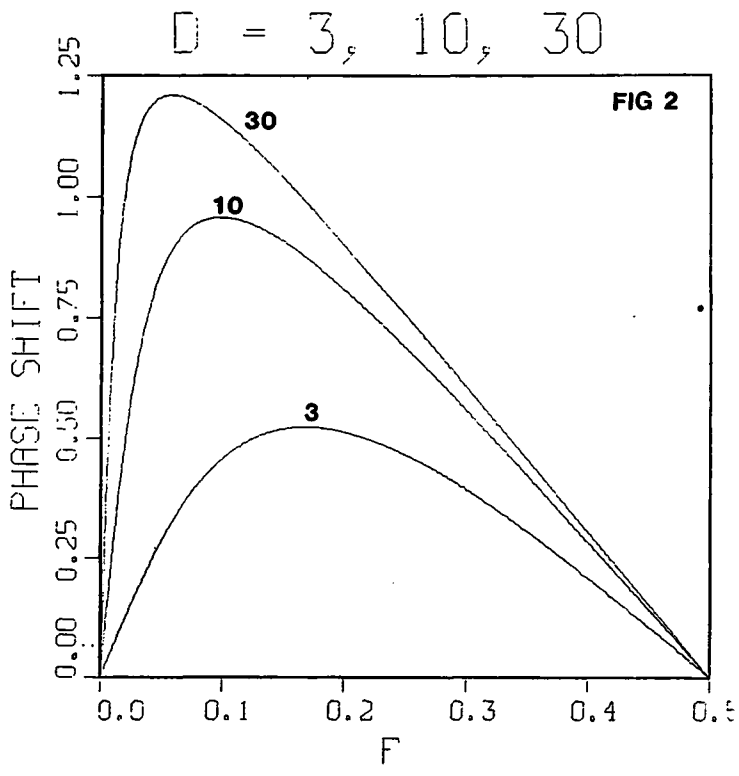
The author thanks M. Hundt for kindly providing the graphs.

References:

R. W. Hamming, "Digital Filters", prentice Hall Pub., Englewood Cliffs, NJ (1977).

L. D. Enochson and R. K. Otnes, "Programming and Analysis for Digital Time Series Data", Navy Publication and Printing Service, Washington Navy Yard, Wash., D.C. (1968).





cont'd. p.22

```
4050  IF LN > 20 OR I = NF THEN  PRINT
    : INPUT "TYPE <CR> TO CONTIN
    UE";I$: CALL  - 936: PRINT V
    $;":":LN = 1
4060  NEXT I: RETURN
8990  REM
8992  REM ******************
8994  REM * ERROR HANDLER *
8996  REM ******************
8998  REM
9000  IF D$ =  CHR$ (4) THEN  PRINT
    D$;"PR#0": PRINT D$;"NOMON O
    "
9010  TEXT : PRINT G$;G$;"ERROR "
    ; PEEK (222);" AT LINE "; PEEK
    (218) +  PEEK (219) * 256
9020  POKE 216,0: IF (DR = 2 OR P
    A = 0) AND D$ =  CHR$ (4) THEN
     PRINT D$;"CLOSE ";N$
9030  GOTO 350
10000  REM ***********************
10010  REM *                     *
10020  REM *       HUFFIN        *
10030  REM *                     *
10040  REM *PASCAL --> DOS TEXT*
10050  REM *  FILE CONVERSION   *
10060  REM *                     *
10070  REM *BY DANA J. SCHWARTZ*
10080  REM *WASHINGTON APPLE PI*
10090  REM *                     *
10100  REM *      JULY 1981      *
10110  REM *                     *
10120  REM ***********************

]
```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A Multiple Entry Key to
Orders of Insects

Is an interactive computer program to help students identify insects and stimulate interest in insect biology.

Can identify any North American insect to one of the twenty six orders in the Class Insecta.

Will lead the student step-by-step through a series of questions until an identification is obtained.

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```
340 INDENT$ = ";" +  STR$ (EXCESS
     )
350  PR# 1: PRINT  CHR$ (18)
360 NAME$ =  CHR$ (30) + NAME$ +
     CHR$ (31): REM ADD
    UNDERLINE SET/RESET.

370 TITLE$ = "*** BINARY PATTERN
    FOR '" + NAME$ + "' ***":TI =
     LEN (TI$) - 4
380  PRINT  TAB( 40 - TI / 2);TIT
    LE$: PRINT
390  PRINT  CHR$ (28): REM
    ENTER GRAPHICS MODE.
400  FOR LINE = 1 TO 25
410  FOR LEVEL = 1 TO 2
420  PRINT INDENT$;
430  FOR REP = 1 TO 400 /  LEN (M
    I$)
440  PRINT MI$(LEVEL);: NEXT REP:
     PRINT 5
450  NEXT LEVEL
460  NEXT LINE
470  PRINT  CHR$ (29): REM : EXIT
     GRAPHICS.
480  PRINT : PRINT : PRINT : PR#
    0: END
```

```
26000  REM ***********************
    *                           *
    *  HOWIE MITCHELL *         *
    *  408 JACKSON AVE.         *
    *  LEXINGTON, VA. 24450     *
    *  JUNE, 1981               *
    *                           *
    *****************************
```

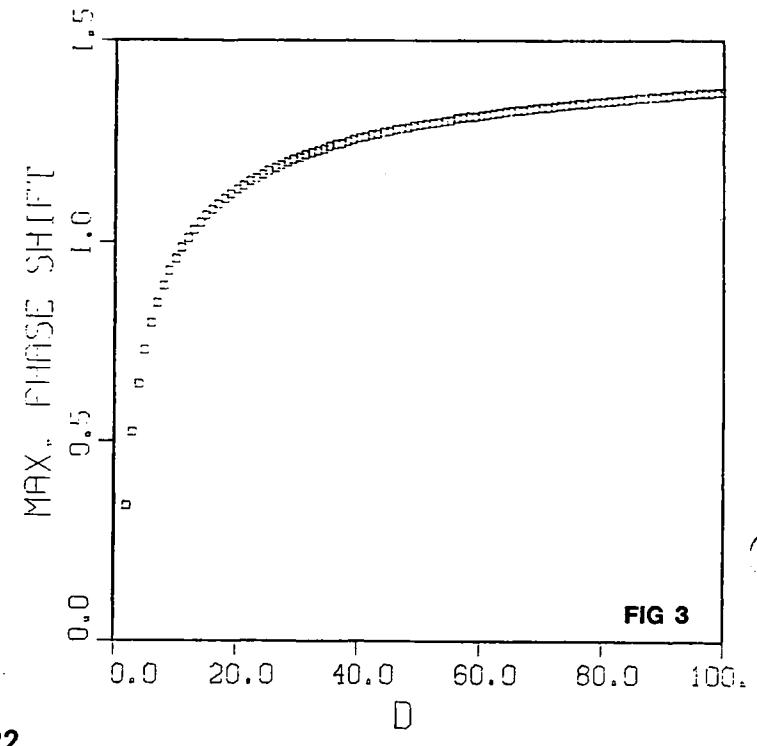

FIG 3

Mindstorms; Children, Computers, and Powerful Ideas
By Seymour Papert. Basic Books, Inc. 230 pp. $12.95

A Book Review by Sara Lavilla, EDSIG

As consumers of educational toys, promoters of Sesame Street type TV watching, and frequenters of area museums, it naturally follows that we would partly justify our purchase of an Apple as a means of giving our children an advantage for their future. Familiarity with personal microcomputers and a mastery of BASIC, we reasoned, would enhance their ability to grow and prosper in a world which promises to be dominated by computers.

A microcomputer culture can do much, much more for children claims Seymour Papert and careful thought should be given, now, to the application of computers for educating our young people. Papert urges that the use of BASIC as a first computer language should be reconsidered. Although easy to learn because it has a limited vocabulary, Papert believes BASIC limits a child's exploration of what computers can do.

Mindstorms is, in part, a report on Papert's work with children and computers at the MIT Artificial Intelligence Laboratory. He cites, with pride, several examples of children discovering an understanding of learning, overcoming poor self concepts and developing an appreciation of mathematics as well as language arts. To achieve this, Papert has integrated his Turtle Geometry concepts with the Logo Language which is much richer than BASIC.

Turtle Geometry is Papert's system for bringing children into a kinesthetic relationshop with spatial concepts. The child is first instructed to pace out a shape, such as a square, by stepping forward so many paces, turning 90 degrees, going forward again, turning...etc., while verbalizing his actions. He then can manipulate a turtle robot by pressing command box keys which move the turtle through the same routine. The turtle has a pen which draws the shape as it moves. Finally, the child enters commands at a computer keyboard and a turtle substitute, a small triangle on the CRT, will trace out the figure.

If the child has difficulty achieving what he sets out to do on the computer, he is encouraged to return to the turtle robot to act out and verbalize his movements. In so doing, he learns about problem solving and discovers the beauty of active participation in the learning process, as opposed to passive acceptance of yes or no responses from teahers or conventional CAI programs.

Mindstorms also presents Papert's educational philosophy based on that of his mentor, Jean Piaget. Piaget observed and noted with painstaking detail the cognitive development of his own children from infancy on a daily, monthly and yearly basis. He then generalized about the cognitive skills children acquire.

Papert is intrigued by the massive amount of informal learning which takes place with children. He seems to delight in a Tom Sawyer approach to learning and sees the computer as a means to learn without apparent effort. In this environment, the child is encouraged to explore his oun questions and develop solutions without critical comment from the teacher. Thus, immersed in his manipulation of the computer, the child is often surprised to learn that he is using formerly "disliked" math slills or to realize that there is a reason for spelling, grammar and sentence structure. Papert even suggests that in thinking about how to think at an early age, some of Piaget's developmental stages may be reversed.

Mindstorms also serves as a forum for Papert's vision of a utopian American society in which no dichotomy exists between science and the humanities. Today, this dichotomy limits our ability to communicate with each other. Too many people suffer, for example, from math anxiety. This and similar learning and skill anxieties are often traceable to specific educational experiences. Papert would use the computer to bridge these gaps.

When a child demands that the teacher explain how to program one of Papert's turtles to draw a circle he is, instead, instructed to act out the solution. Papert believes that this approach to learning will enable us all to feel just as comfortable with quantum physics as with French literature or religious philosophy.

I will not venture so far as to say that Papert's utopian dreams will be realized if we all grow up with something akin to Turtle Geometry and Logo. I do, however, support an educational method which makes children feel good about themselves and which helps them to grow up with positive feelings about learning. However, just as Piaget was critized for using the children of a genius as his subjects, I am wary of the technophilic MIT atmosphere of Papert's work even though his subjects ranged in ability. Nonetheless, time and further studies in many cultures have vindicated Piaget. Perhaps Papert's theories will be born out when implemented in other environments.

Extract yourself from your computer for a few hours to read this provocative book. It should be required reading for those involved in developing computer curricula for our schools.

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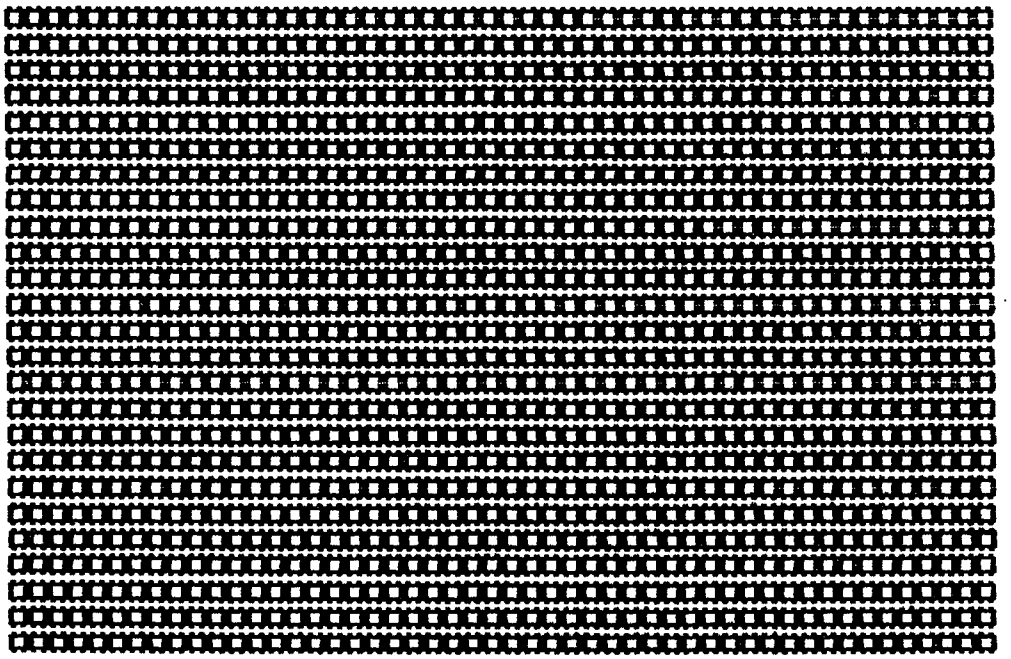

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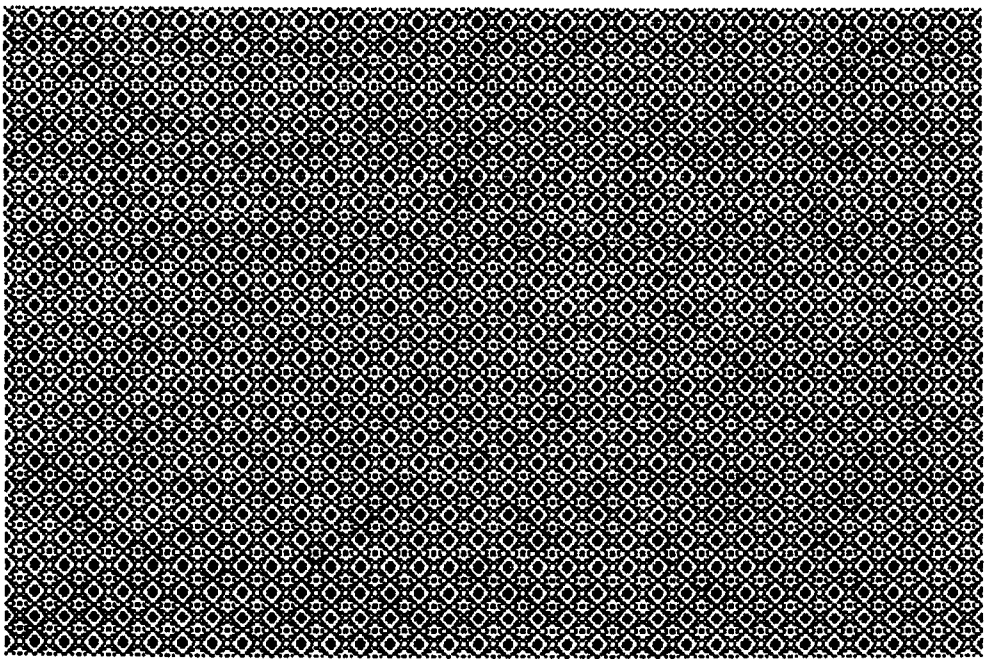

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