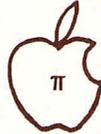


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Washington Apple Pi



The Journal of Washington Apple Pi, Ltd.

Volume 6

September 1984

Number 9

Highlights

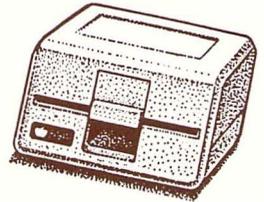
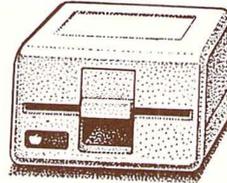
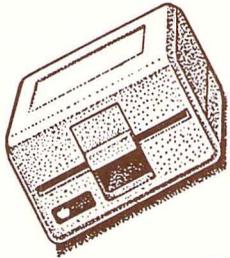
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Spreadsheet Benchmark
Anatomy of Pascal Code Files
Mac Software Sampler

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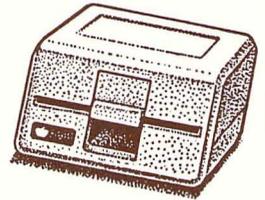
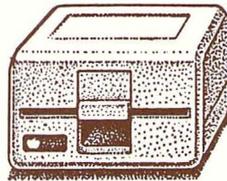
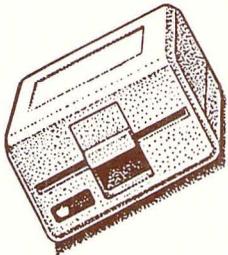
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A DISK /// ON A // ?

\$199
WOW!

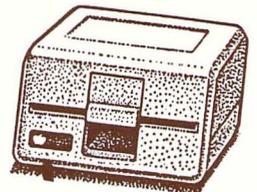
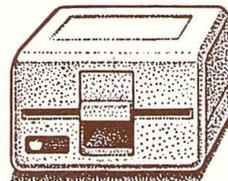
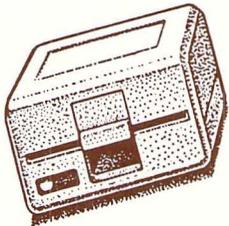


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Smartmodem 300 (300 baud, as above).....	209
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Elite Two (40 track, double side, 326K)...	389
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NEC JB-1201/1205 (green/amber anti-glare screen, 20Mhz) 159	
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VIDEO & KEYBOARD—

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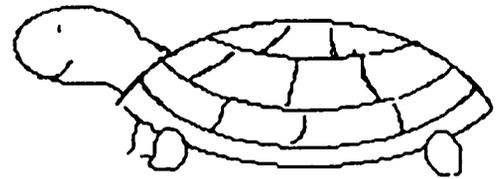
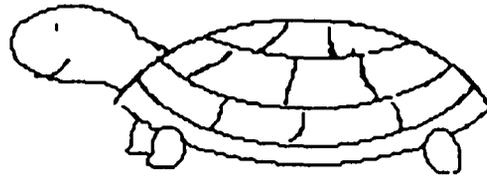
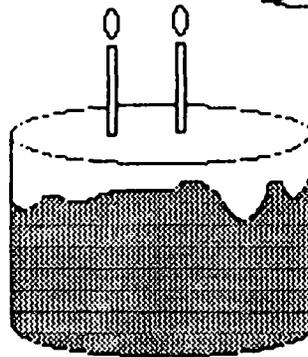
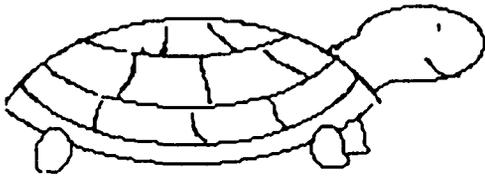
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EDITORIAL

Bernie Urban's vacation provides an excellent excuse to do all the things that our Editor would never let us get away with. (Some of these "sins" include using Mac-generated headlines and organizing the Journal into separate departments for SIGs, Forth, the Mac and regular columns.) But the one thing that Bernie would never tolerate would be a tribute to him appearing in the Journal. Who can pass up the perfect opportunity?

WAP must thank Bernie for tirelessly assembling the Journal every month for the past six years. Under his leadership it has become the premier user group magazine in the country. The strength of the Journal, in turn, has led to WAP's phenomenal growth.

WAP must thank Bernie for his visionary leadership in charting the WAP's development. He was one of our founding members, served as our President, and most recently served on our planning committee. I believe that Bernie's idealism is a principal factor for our club remaining a non-profit, service group while other user groups have turned toward commercial goals.

WAP must thank Bernie for his attempts to turn the International Apple Core into a viable support group for Apple User Clubs. Although his tenure as the Chairman of the IAC's Board did not achieve all of the reforms he had sought, he managed to articulate the services and goals that a national federation of user groups should fulfill.

Finally, WAP must thank Bernie, and his wife Gena, for conquering the immense task of assembling an office and staff. Through our office, we can now offer a level of member support that has yet to be matched by other user groups. It took considerable faith in the WAP to take early retirement from the federal government and devote his life to the WAP. The WAP is the better for his efforts. Again, our thanks to Bernie for his devoted service.

-- RC Platt

President's Corner

By David Morganstein



THE BUDGET. The Board continues the work of putting together a budget for this coming year. Hopefully, it will be presented at the August meeting. We are faced with increasing demands upon our office staff, demands which have outpaced our growth in membership and dues revenues. We may have to evaluate the benefit of some of the more time consuming services which have been added to the paid staff. Many things which used to be done by volunteers have been taken on by the office. You may be asked to step forward to put those activities back into the volunteer area or we may have to face the choices of discontinuing them or raising enough revenue to pay our staff to perform them.

The Executive Board has voted to ask the membership for a two dollar increase in dues, from eighteen to twenty dollars per year. This would be the first increase we have needed in over four years. As most of you know, during this period the services the club has been able to provide have increased dramatically. The size of the journal has doubled. To date, these benefits have been added at no increase in dues. It is possible that we can find other ways to raise revenues or decrease expenses but in case it is needed, the Board is asking for this authority.

A TALK WITH JONATHAN ROTENBERG. In July, the WAP office was visited by the founder of the Boston Computer Society. Bernie Urban, Bob Platt and I met with Jonathan to learn more about the BCS and to share with him some of the WAPs experiences. We found him to be serious and capable with a pleasant sense of humor. It is clear why the BCS continues to be the Nation's largest and most active group of Microcomputer owners. Jonathan was filled with ideas and energy, yet he was realistic about the problems faced by an organization representing owners of dozens of different microcomputers. We think we have troubles with our II, IIe, IIc, III, Lisa and Mac interests! We agreed to keep the lines of communication open and to see if there were ways we could support our mutual interests in educating our members about the uses and potential of microcomputers.

INDEXING THE JOURNAL. John Malcolm, our able head librarian, has begun the task of indexing our back issues. The job requires additional help. It does not require technical knowledge about the Apple, only a willingness to help others and a little bit of time. If you do not have a lot of back issues, this may be a way to get some missing copies! Please call John or the office if you have a few hours to contribute. Many can benefit...

SCRIBE PRINTER. Are there any owners of the new Scribe printer out there? My experience with it has, so far, been a big disappointment. When I opened the box, I discovered that the printer does not come with a ribbon! Incredible as it may seem, you must buy one separately. Has any one taken one home and hooked it up only to discover they had no ribbon? The print quality is, in my opinion, adequate only for rough drafts; although, I have only printed with one bond. Perhaps a heavier paper will improve the "carbon" appearance I see. The most disappointing aspect, however, appears to be a cable problem. I can not print more than a half a page before I get what looks like a buffer overflow. Could it be that the cable is missing a crucial control line? Can anyone out there comment?

THE SPEEDEMON. Back in December we responded to an ad for a rival to the Saturn Accelerator card. After many promises over a six month period, a sample unit has been sent for inspection. This product, at a list price of \$295 is advertised to give your Apple a 3 1/2 times speed increase. Its relatively low cost is due to the fact that the card uses the Apple's own memory. (The WAP has not done a group purchase on Saturn Accelerators, in part, because the only available model was a II+ only product.) The Speedemon is advertised to be II/e compatible. It does appear to work on either the II+ or II/e, however... It seems to have problems using some RAM chips and 16K cards. It did however, give a greatly improved game from Sargon III (by running 3 1/2 times faster). Until we understand the extent of the memory compatibility problem, we will not arrange a group purchase; although, the MCT company has expressed an interest in working with us. Stay tuned for more information.

TUTORIALS. This fall, we will restart our regular Tuesday night tutorials. You will find an outline of the four evenings in this month's Journal. The fourth session has been changed to follow the introduction to BASIC programming with a next step course. Our able tutors, Tom Warrick, Bob Platt, Bruce Field and Lee Raesly are to be commended for the marvelous job they did last year. You will find these evenings to be time well spent if you are a new-comer to the Apple. Remember, you can attend as few as one or as many as all of the sessions, according to your interests. Register now for September or October, to insure yourself a seat.

APPLE TEAS. We will try to organize Apple teas again this fall. These meetings are small, informal gatherings, held around the area, to help familiarize people with their Apples. We want to offer to our members a comfortable place to ask questions and have a hands on opportunity to learn about their computer. To do this, we need some people to volunteer their homes and others to act as consultants. If you are willing to do either, call Paula Benson, co-ordinator. We will have a sign-up at the August meeting.

BOOK KEEPER. If you have book-keeping experience and want to help the club, please call Ed Myerson. We need someone to provide up to ten hours of assistance per week, at least initially. While we can not offer the highest remuneration, we recognize that this level of assistance must be compensated. We are particularly interested in someone who has maintained books with an Apple (no surprise, right?)

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Apple CAT II	Ben Acton (301) 428-3605	General	Walt Francis (202) 966-5742
ASCII Express	Dave Harvey (703) 527-2704	Anderson Jacobson	Bill Etue (703) 620-2103
BIZCOMP Modem	Jeremy Parker (301) 229-2578	Apple Dot Matrix	Leon Raesly * (301) 460-0754
General	Tom Nebiker (216) 867-7463	Daisywriter 2000	Joan B. Dunham * (301) 585-0989
	Tom Warrick (301) 656-4389	IDS 460	Henry Greene (202) 363-1797
Hayes Smartmodem	Bernie Benson (301) 951-5294	Imagewriter	Jeff Stetekluh (703) 521-4882
Omninet	Tom Vier (1-6 PM) (703) 860-0083	MX-80	Scott Rullman (703) 779-5714
VISITERM	Steve Wildstrom (301) 564-0039	NEC 8023	Jeff Dillon (301) 434-0405
XTALK CP/M Comm.	Bernie Benson (301) 951-5294	Okidata	Bill Mark (301) 779-8938
Computers, Specific		Silentype	Fred Feer (703) 978-7724
Apple //c	Scott Rullman (301) 779-5714		Scott Rullman (301) 779-5714
Apple //e	Scott Rullman (301) 779-5714	Spreadsheets	Bruce Field (301) 340-7038
Lisa	Don Kornreich (301) 292-9225		Leon Raesly * (301) 460-0754
Macintosh	Scott Rullman (301) 779-5714	Lotus 1-2-3	Walt Francis (202) 966-5742
	Tom Warrick (301) 656-4389		Walt Francis (202) 966-5742
	Donald Schmitt (717) 334-3265	Multiplan	Roy Rosfeld (301) 340-7962
Corvus Hard Disk	Tom Vier (1-6 PM) (703) 860-0083	VisiCalc	Terry Prudden (301) 933-3065
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dBase II	Paul Bublitz (301) 261-4124	Spreadsheet 2.0	Leon Raesly * (301) 460-0754
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DB Master	Doug Daje (301) 868-5487	Statistical Packages	Jim Carpenter (301) 371-5263
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InfoMaster	Doug Daje (301) 868-5487	Apple Writer II	Walt Francis (202) 966-5742
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PFS	Bill Etue (703) 620-2103	Executive Secretary	Dianne Lorenz (301) 530-7881
	Ben Ryan (301) 469-6457	Format II	Leon Raesly * (301) 460-0754
QuickFile II	Jenny Spevak (202) 362-3887	Gutenberg	Louis Biggie (202) 296-1280
	J.J. Finkelstein (301) 652-9375	Letter Perfect	Henry Donahoe (202) 298-9107
Expediter Compiler	Peter Rosden (301) 229-2288		Neil Muncy (301) 251-9330
Graphics	Bill Schultheis (703) 538-4575	Word Processor	Cara Cira (301) 468-6118
Languages (A=Applesoft, I=Integer, P=Pascal, M=Machine		Apple Writer II	Leon Raesly * (301) 460-0754
A	Peter Combes (301) 251-6369		Joyce C. Little (301) 321-2989
A,I	Jeff Dillon (301) 422-6458	Magic Window and II	Carl Eisen (703) 354-4837
A	Richard Langston (301) 258-9865	Peach Text	Jim Graham (703) 643-1848
A	Mark Pankin (703) 524-0937	PIE Writer/Apple PIE	Peter Combes (301) 251-6369
A	Leon Raesly * (301) 460-0754	ScreenWriter II	Doug Daje (301) 868-5487
A,I,P,M	Bill Schultheis (703) 538-4575	Supertext II	Peter Rosden (301) 229-2288
A,I,M	Richard Untied (703) 241-8678	Word Handler	Jon Vaupel (301) 977-3054
M	Raymond Hobbs (301) 490-7484		Christopher Romero (703) 471-1949
P	Dottie Acton (301) 428-3605	Work Juggler //e	Carl Eisen (703) 354-4837
P	Donn Hoffman * (202) 966-2616	Word Star	Christopher Romero (703) 471-1949

*Calls up until midnight are ok.

GENERAL INFORMATION

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Membership dues for Washington Apple Pi are \$25.00 for the first year and 18.00 per year thereafter, beginning in the month joined. If you would like to join, please call the club office or write to the office address. A membership application will be mailed to you. Subscriptions to the Washington Apple Pi Journal are not available. The Journal is distributed as a benefit of membership.

Current Office hours are:

Monday - Friday - 10 AM to 2:30 PM
Tues. & Thurs. - 7 to 9:30 PM
Saturday - 9:30 AM to 12:30 PM (except meeting Sat)
- 12:00 to 3:30 PM (meeting Sat only)

Classifieds

APPLE WOMEN: The Comm Center in Laurel Maryland is offering a new course, "It's your turn, Apples for Women." The class will be taught by Pat McCoy on Monday Sept. 10 from 6:30 to 9:00. Call 953-7887 for details.

MODULA-2 GROUP PURCHASE: The WAP Board has is trying to become a licensed distributor of Volition System's Modula-2 package. Although a price has not yet been set, it will be substantially below other mail order prices. Call PIG-member Bob Masso for details. Home: 703-698-0147 or Work: 202-785-8400 ext 250.

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FOR SALE: Dow Jones Market Manager, a portfolio manager program. Sells for \$299. Bargain at \$150 or best offer. Apple II+ including good resolution 12" TV with rf modulator, shift key modification, 16K RAM card (for a total of 64K), Apple disk drive, all in good working order with same warranty as if new. Price: 60% of lowest price you can find advertised. Call Newt Steers (9:30am-9:30pm) 301/320-5820.

FOR SALE: Electrohome 12" green monitor. Like new. Best offer. Call Anne Apgar, 338-1093, eves. after 9/1.

FOR SALE: Expediter II Applesoft Compiler, \$99.00. Call Jim (301) 559-4310.

POSITIONS AVAILABLE: The U.S. Department of Agriculture is recruiting inside and outside Government for computer specialists, GS-9 to 12 (\$21,066 to \$39,711) who know Unix, Clix or C. Call Mike Mason, (202) 382-1274.

Attention AJ831 owners. If you refer a friend to AJ and he/she purchases an AJ831, you are eligible for \$50 in cash or credit from AJ. Offer good until Nov. 30, 1984.

Minutes

JULY GENERAL MEETING

WAP, Ltd. met at the USUHS on July 28, 1984 at 10:00 am, David Morganstein presiding. Lee Raesly will offer a Visiplot & Apple Plot tutorial in August. The monthly "beginner" tutorials will resume in September. Work continues on the latest version list of software and input is needed from members. Members are urged to call the office with information about the latest software so that a list may be compiled and published. While the Urbans are vacationing, Bob Platt and Cara Cira will edit the September Journal. Publication deadline is August 10th. The WAP office needs a Mac which would be available for members, office staff, and WAP meetings. A motion was made by Tom Riley that WAP purchase a Macintosh computer, modified for video projection, an external drive, an imagewriter printer, and a carrying case. Motion seconded and passed. Dave Harvey will head a committee which will explore various bulletin board possibilities. A special thank you is extended to Tom Warrick for his time and effort as sysop.

SUMMARY OF AUGUST EXECUTIVE BOARD MEETING

The Executive Board of Washington Apple Pi, Ltd. met on August 6, 1984 at the WAP office. Ed Myerson presented the budget for June 1, 1984 to May 31, 1985. No particular pattern was found for those who drop their Pi membership. Bob Platt's proposal was approved that WAP enter into a license with Volition Systems to distribute their Modula-2 compiler provided that WAP is not held liable for software piracy and a minimum number of participants are obtained. Jay Thal will poll the membership through the Journal and the ABBS to find out how many handicapped people do not have access to the WAP office.



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September 1984

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
						1
2	3	4 Begln. Tutorial #1 7:30PM-Off; EDSIG-USUHS 7:30 PM	5	6 SIG Mac 7:30 PM USUHS	7	8 SIG Mac 9:00 AM USUHS
9	10	11 Beginning Tutorial #2 7:30 PM Office	12 Executive Board 7:30 PM Office	13 StockSIG DisabledSIG Apple ///	14	15 Forth SIG 11 PM Office
16	17	18 Beginning Tutorial #3 7:30 PM Office	19	20 Pascal SIG 7:30 PM Office	21	22 WAP Meeting USUHS-9AM Appleworks
23 30	24	25 Beginning Tutorial #4 7:30 PM Office	26	27	28	29

October 1984

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
	1	2 Begln. Tutorial #1 7:30PM-Off; EDSIG-USUHS 7:30 PM	3	4 SIG Mac 7:30 PM USUHS	5	6
7	8	9 Beginning Tutorial #2 7:30 PM Office	10 Executive Board 7:30 PM Office	11 StockSIG DisabledSIG Apple ///	12	13 SIG Mac 9:00 AM USUHS
14	15	16 Beginning Tutorial #3 7:30 PM Office	17	18 Pascal SIG 7:30 PM Office	19	20 Forth SIG 11 PM Office
21	22	23 Beginning Tutorial #4 7:30 PM Office	24	25	26	27 WAP Meeting USUHS 9 AM Graphics Packages
28	29	30	31			

Q & A: Your Apple Mysteries Solved

by Bruce F. Field

A couple of months ago I had a question about using Wordstar with two printers. I suggested that the person keep two copies of Wordstar each configured for one of the printers. George Kinal has come through with another solution.

"Serial interface cards are typically used in slot #2 of the Apple II. If you are using a word or text processor under CP/M, and you have a serially interfaced printer either as the primary or as an additional printer, you may wish to patch CP/M for LIST output on slot #2 (this also allows use of the ctrl-P toggle for printer activation). I personally use a serial interface for both modem and printer operation (not simultaneously, of course), with a simple switch box to select modem or printer connection.

The following applies to Softcard CP/M version 2.23 (so-called 60K CP/M). The disk to be patched should have DDT.COM, from the system master disk, on it. Run DDT (type "DDT"). Use the DDT "S" command on location F392, changing it from the value 55 to 69:

1. Type SF392 <cr>
2. Screen should display F392 55.
3. Type 69 <cr>
4. Type ctrl-C to exit DDT.

This changes the LPT vector to point to the same location as the PUNCh device (slot 2). Use a ctrl-C to exit from DDT. If your needs are temporary, this quick modification in memory is all that is needed. Try it: type ctrl-P, which will activate the printer.

If you want to permanently incorporate this modification onto the system tracks of a CP/M disk, then you should run MBASIC CONFIGIO (again from the system master), and follow the prompted instructions to write the I/O Configuration Block to disk (command #4). Now, this patched operating system will always have slot 2 as the LIST (printer) device."

Q. I am interested in an expansion board, similar to one I heard Mountain Computer used to make. Do you know anything about it? Is Mountain Computer still in business? The board I'm talking about is actually a box that has about seven additional slots for the Apple II's peripheral boards. How does it work? Is it worth the trouble? Can one be home made? Does it switch between two banks of 7 slots, or can all 15 slots be used at one time?

A. I have not heard from Mountain Computer in a long time but I believe they are still supplying music boards and thus are probably still in business. The latest addresses I have for them (several years old) is 300 Harvey West Blvd., Santa Cruz, CA, 95060, telephone (408) 429-8600. The expansion chassis they made (make?) consisted of a box with 8 slots that could be bank switched in place of the slots in the Apple. A separate power supply was included for the extra slots. A card containing quite a few ICs plugged into one of the Apple slots to connect the chassis to the Apple. The price in 1981 was \$650.

I have seen an ad recently for another manufacturer

that makes a cable to bring the peripheral bus outside the Apple, but I'll explain why I'm skeptical of this in a minute, and I can't find the ad anyway. Douglas Electronics, 718 Marina Blvd., San Leandro, CA 94577, telephone (415) 483-8770 makes a set of Apple compatible boards designed to be a stand alone computer. It's possible that they may have an interface card designed to connect their motherboard to the Apple.

The address and data lines from the microprocessor in the Apple go to the peripheral card slots. If one is not careful, adding extra wiring or chips can easily exceed the ability of the Apple to properly drive the extra circuitry, in which case everything comes to a screeching halt. Special drivers must be added to boost up the signals before sending them to an expansion board, and care must be taken to make sure the timing relationships between the signals (both outgoing and incoming) are correct. An expansion board is probably a job for experienced circuit designer.

Q. I have an Apple II+, a Pkaso interface card, and a C. Itoh Prowriter printer. I have been trying to use the horizontal tab on the printer (ctrl-I) but the Pkaso uses ctrl-I as a lead-in for all its commands. Pkaso says you can change the lead-in character by POKEing some other number (than 9) into location 1145. They say: "To disable commands, poke a code that is never printed, such as 255, into 1145. The lead-in character is restored to ctrl-I each time the Pkaso is activated (with a PR#1, etc.) in case you forgot or mistyped the lead-in." I put a POKE 1145,255 command after the PR#1 command but it doesn't work. Can you see any reason?

A. According to Pkaso you have to print something (anything) after initializing the card but before doing the POKE. Using your example I have added a PRINT.

```
800 PR#1 : PRINT
110 POKE 1145,255
```

However you really should turn on the printer using the DOS command PRINT CHR\$(4)"PR#1" or DOS commands may not work later in your program.

Q. What's wrong with the Applesoft print routine? Certain numbers cannot be printed without additional incorrect digits being added to the end of the number. For example: PRINT 6.017 always prints as 6.01700001. I cannot get rid of the extra digits except by converting the number to a string and printing the string. This bug played havoc with an Applesoft column formatting routine I tried to write before Craig Peterson's Print Using and Friends came to my attention. His routine solves the practical problem, but why does it happen?

A. I seem to remember answering this question once before, but it turns up rather regularly. The answer has to do with the way Applesoft stores numbers in the computer memory. If you type a number in as part of a program Applesoft stores the

ASCII code for each digit into a byte of memory, so when you list a program you get exactly the same number back. On the other hand, when the number is put in a variable, printed, or used in an arithmetic operation it is first converted to a binary number. We have to digress a minute to discuss binary numbers. A binary number such as 1011,101 is 11,625 in base 10. The position just to the left of the binary point has a value of 1, the next digit to the left is worth 2, the next 4, and the leftmost is worth 8. Thus the integer part is $8+2+1 = 11$. The position just to the right of the binary point has a value of $1/2$ or 0.5 , the next to the right is $1/4$ or 0.25 , the next $1/8$ or 0.125 and so forth. The problem is that it is impossible to express some decimal numbers exactly in binary, the binary number would require an infinite number of digits (or at least more than the 32 that Applesoft uses). Therefore with a number like 6.017 Applesoft uses 6.01699999 or 6.01700001 depending on how you calculated it.

Q. I am currently in the process of creating an all-purpose sports statistics program in Applesoft for use at my school. Having arrived at the need to include a turnover ratio statistic, I ran across the problem of rounding off ratios calculated to six or more decimal places to three or four places. How can this be done?

A. This goes right along with the previous question. The easiest way to round numbers is with the following piece of code. If we want to round the variable A to three places:

```
A = INT(1000*A + .5)/1000.
```

A is multiplied by 1000, rounded to the nearest integer, and then divided by 1000 to return it to its original value minus the extra digits. This works fine until it is time to print it and then you run into the problem described above of getting extra digits. Note that the number is not substantially different than what it should be, but the extra digits are a pain if you are trying to line up columns. The easiest way to format numbers for printing is to use one of the machine language number formatting routines available. Several have been advertised in magazines. Amper-Magic by Anthro Digital, Inc., Amperware by Scientific Software Products, Inc., Routine Machine by Southwestern Data Systems, Inc. now called Roger Wagner Software, and AmperSoft by MicroSparc, Inc. are a few that offer print using features. A very nice utility by Craig Peterson "Print Using & Friends" was published in Call -A.P.P.L.E. in Depth, Number 1 and will also handle the problem.

However for quick and dirty programs the following program segment will round to three digits.

```
200 A$ = STR$(INT(1000*A + .5))
210 A$ = LEFT$(A$,LEN(A$)-3)+"."+RIGHT$(A$,3)
220 PRINT A$
```

Q. I read somewhere that you can use your video tape machine as a relay for using your color TV as a monitor. As I remember it, the article said you plug the monitor output into the video "In" on the VTR. This, it said, allowed you to use the TV without putting another connection onto the antenna screws on the back of the set. Also, you use the VTR instead of an RF modulator.

I think I understand that; but it also said

something about being able to "record" your material on the VTR. Now, and I can't find the article again, I'm wondering if that means you can use the video tape as a backup? Or am I off-base completely?

A. To answer your last question first, yes. You can take the video (monitor) output from your Apple and connect it to the VTR video input. On my VTR if you select the TV position the antenna signal is routed unchanged through the VTR to the TV. If you select the CASSETTE (or VTR) position the video signal from the Apple is converted to a channel 3 TV signal using the VTR's internal RF modulator and sent to the TV. You can record the video signal, although since the Apple doesn't exactly conform to accepted standards some recorders may not work well, try it and see. But, all you have recorded is the video, not digital information, and there is no way to get this back into the Apple.

Some companies (Corvus is one I know of) offer special converters that do permit you to use a VTR as a backup. However, these are generally only useful for hard disks where you need to backup a lot of information and it is impractical to store all the data on floppies.

Q. How can I use my game paddle port as an RS232 Input? I am currently using the game paddle port as an output with the driver program from the Big Mac disk. Now I want information to go the other direction.

(The other end of the wires from the game port are connected to the RS232 port of my IBM-PC clone, which I am using as a 256K print buffer. This arrangement has been very satisfactory for about six months, since the IBM clone never had anything to say that was worth the Apple's attention. Now the clone finally has something worth at least a little of the Apple's attention, but not worth enough to warrant the purchase of a serial or parallel card for the Apple.)

A. There are two parts to this problem. First the RS232 signals are not compatible with the voltage levels required by the game I/O port of the Apple. RS232 signals are specified for +3 to +15 volts as a space, -3 to -15 volts as a mark. The problem is that the voltages on the game I/O port inputs should not exceed +5 volts or go less than 0 volts. A circuit can be constructed to fix this, consisting of a Zener diode (something in the range of 3 to 4.5 volts) with the cathode (banded end) connected to the pushbutton 2 input and the anode connected to ground, and a resistor (about 200 ohms) from the RS232 output with the other end connected to pushbutton 2 input. The second part of the problem is to convert the serial input to parallel. The program below will do that. The only restriction is that some delay time must be added between the characters so that the Apple has time to save them.

```
0300          BYTE EQU $300          ;STORE RESULT
0300          HERE
;
0303:AD 63 CO START LDA PB2          ;LOOK FOR START
0306:10 FB          BPL START          ;START BIT IS
HIGH
0308:A2 08          LDX #8          ;9600 BAUD DELAY
030A:CA          WAIT DEX
030B:D0 FD          BNE WAIT          ;WAIT TO BIT
MIDDLE
```

contd. on page 13

Visicolumn: Spreadsheet Speed

by Walt Francis



Casual spreadsheet users need not worry about power and speed since the basic performance of all spreadsheets available for the Apple II is very good. A dozen or two spreadsheet encounters a year will be handled about as well by one spreadsheet as by another, and only the largest models will use up all available memory or take more than a few seconds to run. For the ordinary user, there are few less important things to worry about than speed.

Heavy duty spreadsheet users, however, face a number of problems when working frequently with large models. These include memory limitations on model size, disk storage capacity, disk access speed, and calculation time. In my chief application, for example, I use about 200 highly complex templates averaging over 10K each and totaling some 2 megabytes of storage. Dozens of results from each of these templates are used in summary spreadsheets, and all must be updated each year. In my early days of spreadsheet use the only option available was to type thousands of results into my summary spreadsheets, and hundreds of saves and loads were--and remain--necessary.

As a consequence, economizing on my time is very important and I have evolved from using VisiCalc on an Apple II plus (the only option available when I started) to using Multiplan on an Apple IIe. This year I will upgrade my hardware and software again.

This article is to share with you my research on calculation and storage speed. These are not necessarily the most important variables in your work (indeed, disk storage capacity and the ability to "link" spreadsheets are most important to mine), but speed differences should not be ignored by any heavy user in the light of the vast performance differences under various software and hardware combinations.

CALCULATION SPEED

Calculation speed--the time taken by a spreadsheet to calculate the results of all formulas in a model after any input--is a function of four variables:

- o hardware (primarily microprocessor) speed,
- o language used by the software,
- o efficiency of the computing algorithms used by the software, and
- o complexity of the calculations used by the model (some of my relatively small 10K templates require almost one minute to recalculate because the formulas I use are so complex).

The last of these can be controlled for by comparing the same template or model, and the second and third reduce to a single performance dimension--software speed--so that benchmarking spreadsheets is in fact a relatively simple task. One simply enters the test model(s) on a given type of machine with a given spreadsheet package and measures the time needed for calculation or recalculation.

Similarly, storage speed--both saving and loading--is measured simply by using a test model.

The most systematic comparison of spreadsheets that I have seen is in Spreadsheet Software from VisiCalc to 1-2-3, by Thomas Henderson. This excellent book is oriented strictly to spreadsheets running on the IBM PC, but most of its findings are applicable to the same software on other machines. Henderson includes--as one of dozens of points of comparison--calculation speed, and I have used his method.

The test model involves a matrix of 1,000 cells containing addition operations. The number 123456.78 is entered in the upper left cell (this cell is called A1 in most spreadsheets), and every other cell in the first 50 rows and 20 columns is told to present the results of adding A1 to A1. The time necessary to compute or recompute this result is Henderson's performance measure.

Henderson finds dramatic speed differences. For example, on the IBM Lotus 1-2-3 performs the test in 3 seconds, SuperCalc2 in 7 seconds, VisiCalc in 14 seconds, and MBA Context in 76 seconds--a difference of about 25 to 1 between the fastest and slowest results. These differences are strictly software related and reflect primarily language differences (MBA is written in Pascal; the others in much faster assembly or C).

All benchmarks are subject to possible bias, inasmuch as a program or language which is inefficient for one algorithm may be efficient for another. At the end of this article I present the results of some sensitivity tests.

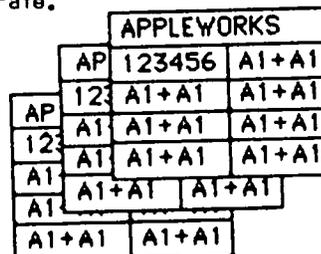
CALCULATION SPEED RESULTS

For present purposes, the question is what hardware and software combination gives the most speed. The table below presents the results of my research to date (all IBM figures from Henderson; most others from personal tests). The machines are ranked in rough order of speed on the three most popular spreadsheet programs, with results in seconds.

Machine	Lotus 1-2-3	VisiCalc	Multiplan
Apple IIe	NA	13	28
Apple III	NA	9	NA
IBM PC	3	14	16
Acc. Apple*	NA	4	22
MacIntosh	NA	NA	8
Tandy 2000	2	NA	5

* Using Titan's high speed 6502

For the most part, these results are not surprising. The IBM PC uses a notoriously inefficient (given its nominal clock speed) 16/8 bit chip, the 8088, which is not greatly faster than the Apple II and III's 8/8 6502, even though the latter has a nominally much lower clock rate.



contd. on page 13

In fact, a high speed 6502 chip in the Apple (a \$500 addition given the need to replace memory chips as well) outperforms the IBM and leaves one wondering why Apple didn't blow the IBM away with a high performance III. The Tandy 2000 (and some other high performance "clones") uses a fast 16/16 bit chip, the 80186, and the Macintosh also a fast 32/16 bit chip. (The Mac is presumably slowed down somewhat by the overhead created by its bit-mapped screen). The Apple III is somewhat faster than the //e.

The main differences are due to software, with the assembly language programs faster than those in other languages, and Lotus having the fastest code on the block.

I have tested other programs on the Apple machines, and found that the new AppleWorks, at 19 seconds, is somewhat slower than VisiCalc, but faster than Advanced VisiCalc's 26 seconds. The latter suffers, in part, from the complexity of its formatting options, information on which is carried in each cell. THE Spreadsheet 2.0 (a.k.a. MagicCalc) runs about the same as VisiCalc at 13 seconds. All programs seem to run slightly faster on the Apple III: VisiCalc at 9 seconds, III E-Z Pieces (a.k.a. AppleWorks) at 14 seconds, and Advanced VisiCalc at 25 seconds. These speeds can be increased somewhat by using CTRL-5 to turn off the screen on the III, with the result that it runs almost twice as fast as the //e.

STORAGE SPEED

For the heavy user, saving a few seconds on calculation time may be insufficient if loading and storage times are slow. The table below shows selected results, in seconds, from the same test model (about a 16K text file):

Machine	Program	Load	Save
Apple //e	VisiCalc	128	35
	Adv. VC	141	50
	THE Spr'd.	51	27
	Multiplan	19	23
	AppleW'ks	22*	23*
Apple III	VisiCalc	55	69
	Adv. VC	74	81
	III E-Z	16	21
IBM PC	Lotus	20	18
IBM PC XT	Lotus	12	5
Acc. Apple	VisiCalc	36	26
Macintosh	Multiplan	12	12
Tandy 2000	Multiplan	11	11
	Lotus	16	15

* //c speeds were slightly faster

These results are for the most part non-surprising. For example, one would expect AppleWorks to be much faster than any other Apple // program simply because it is the only one currently using PRODOS, which is much faster in storage than DOS 3.3. Apple III's SOS is simply slow, and III E-Z Pieces uses PRODOS for a vast speed improvement. And the new Mac disks are clearly as fast as advertised.

But it is surprising that the Mac is almost as fast as the hard disk IBM PC XT. And the relatively slow calculating Multiplan program shows up as one of the fastest in storage operations, probably because Microsoft made its own patches to DOS. In contrast, VisiCalc and Advanced VisiCalc are the turtles of the crowd.

MULTIPLAN		
MUL	123456	R1C+R1C
123	R1C+R1C	R1C+R1C
R1C	R1C+R1C	R1C+R1C
R1C	R1C+R1C	R1C+R1C
R1C+R1C	R1C+R1C	

CONCLUSION

Taking into account both calculation speed and storage speed, machine differences seem to be less pronounced than software differences, and overall differences among spreadsheets very significant. Consider a user who runs a 1,000 cell spreadsheet 100 times a year, recalculating it once (only once because he turns off automatic recalculation) each time and, of course, loading and saving it each time. Leaving aside the time needed to boot the spreadsheet program (and I do have to end these comparisons somewhere) total time spent in thumbtwiddling will be as follows:

Machine	Software	Hours
Apple //e	VisiCalc	48
Apple III	Adv. VC	47
Apple III	VisiCalc	37
Apple //e	Multiplan	19
Acc. Apple	VisiCalc	18
Apple //e	AppleWorks	16
Apple III	III E-Z	14
IBM PC	Lotus	11
Tandy 2000	Multiplan	9
Macintosh	Multiplan	9
Tandy 2000	Multiplan	8
IBM PC XT	Lotus	6
Mac hard disk		
	Lotus	5*

* Guesstimate

Clearly, these are significant speed differences--a best to worst ratio of 1:8--which a heavy user should not ignore. On the data above, and valuing time at \$20 an hour, a heavy user may be paying \$800 a year or more extra for the privilege of using a slow machine. In some cases this problem can be reduced greatly by switching to better software, for example to III E-Z Pieces on the Apple III. In other cases a hardware choice is vital.

Overall, these data suggest that Lotus on the Mac will be something of a speed champ when available, tying or beating the best of the MS-DOS world. But the data also suggest that diminishing returns are setting in. Saving the last several hours is not nearly as important as saving the first 20 or 30 hours.

Indeed, considering price as well as performance, either a plain vanilla Apple //e or an accelerated //e is a real bargain, especially since Multiplan is excellent and AppleWorks good in capability, even if both are only average in overall speed.

Still, a really high performance machine like the Macintosh or Tandy 2000 is very seductive, particularly when compared to the overpriced IBM PC.

SENSITIVITY OF RESULTS

I tried several other test models on each machine and found that in general the results were relatively insensitive to model differences. For example, a template of 1000 cells involving both multiplication and division in each cell required roughly double the calculation times given above for every combination of hardware and software. However, exceptions do exist and some exotic calculations take much longer, particularly on some configurations. For example, a model of 1000 cells using square roots took 20 seconds on Lotus on an IBM, almost 4 minutes on an Apple //e for Multiplan, and a staggering 10 minutes for VisiCalc, reversing the relative speed performance of the latter two programs for simpler models. Therefore, if your own models require much more than simple algebra it would be smart to check speed differences even more carefully.

A Page from the Stack: The WAP Library



by Robert C. Platt

Now that summer is over, it's time to get back to serious work on your Apple. Why not organize your Apple software collection and put together a donation for the WAP Library? For each 5-1/4 inch disk that you donate, we will give you an Apple II library disk in exchange. For your Mac/Lisa donations, you will get a Sig Mac disk. I will be at the "disketeria", our disk sales table, before the monthly meeting (and even the Sig Mac meeting) to discuss your contributions.

Two disks premiered at the August meeting: Diverslcopy and Sig Mac 4, which are described below.

MUSIC WANTED

Bernie Benson, 951-5294, continues to collect song files for the ALF Music Board. Also, if you have typed-in songs for Dennis Brother's MacMusic program, please donate them to the library.

MAC SOFTWARE

As MacPascal, MacBasic and SofTech p-system for the Mac are being released, share your initial efforts for our library. We welcome contributions to run under any Mac or Lisa application.

DISK 72: MENU HINTS

Disk 72, which premiered in June, has an easy-to-use menu program. The problem is that unless you have Integer Basic loaded before you run it, the selection of an Integer Basic program will cause a "file not found" error. (You can't read the error message because the screen is erased immediately.) This is due to the fact that the menu program automatically loads INTEGER BASIC-DISK. This file was not included on Disk 72. To remedy this problem, transfer the Integer Basic files onto another disk and also include a copy of INTEGER BASIC-DISK (from Disk 134.)

DISK 131: ERRATA

James Tichenor, III reports the following bugs on Disk 131. In program RECIPE CALORIE COST, add the following line:

```
4000 REM
```

In program RECIPE BOX, add:

```
145 VTAB 15: HTAB 6: PRINT "PRESS RETURN FOR RECIPE FILE"
```

```
150 VTAB 17: HTAB 6: PRINT "OR ENTER FILE NAME (MAX 15)":PRINT: HTAB 11: INPUT "=>";R$
```

The RECIPE BOX program will not output to a printer unless you change lines 1620 and 1760 as follows:

```
1620 PRINT DD$;"PR#1":REM TURN ON PRINTER  
1760 PRINT DD$;"PR#0":REM TURN OFF PRINTER
```

MAC NEW MEMBER DISK

We are holding off on distributing a new member disk to Mac owners until after the debut of MacBasic and MacPascal. In the mean time, Mac owners have received either a copy of a 5-1/4 inch New Member Disk for the Apple //, or a coupon to be redeemed when the Mac disk is ready. If you have received the Apple // disk, and do not want to wait for the official Mac New Member Disk, please contact the office to exchange your disk for one of our four Sig Mac disks.

SIG MAC 4: MS-BASIC PGMS

Tony Anderson prepared the following description of our latest Sig Mac disk:

Here we have the fourth Washington Apple PI SigMac Disk, and the submissions keep getting better and better. This disk is almost exclusively MS-BASIC programs. It is apparent that Mac owners are not the type to sit back and wait for "better" languages for their computer. The programmers among you are hard at work making MS-BASIC do things it's never done before. For instance, take a look at BINHEX.BAS and see how Basic can be made to take advantage of the Macintosh user interface. Look at BIGPIC.BAS to see how it makes Fatbits into Bigbits. Run MacMonitor to see what this wonderful box is like under the hood. And whatever else you do, don't, I repeat don't fail to run SUPER.

The disk has three folders:

The MS-BASIC folder:

BINHEX.BAS (by William B. Davis, Jr.) This program will convert an application document in binary form (such as a MacPaint or MacWrite document) into a text document which contains a hex listing of the document. This is very useful for transmitting documents in hex from one computer to another. For example, you can upload a MacPaint picture into a database (such as CompuServe) for others to enjoy. This program will also convert hex documents back into the appropriate type of binary document so that you may download and display documents from other computers.

BIGPIC.BAS (by John Palevich) - This program will take a MacPaint document and enlarge it to four times the original size and save the enlargement in four new documents which can then be printed and fastened together. Be sure you have enough space on the disk and some time to kill. (It takes 25-30 minutes.) In theory, you could run the program on the four new documents (and so on) to produce even bigger pictures.

FONTLIST.BAS (by Daniel Smith) - This program will produce a list of all fonts currently in the system and their corresponding font number.

XREF.BAS (by Christopher Allen) - This program will create a cross-reference listing of variables and references in a MS-Basic program.

COMPARE.BAS (by John W. Baxter) - This will compare two text files and list the differences.

SUPER (by Larry Gust) - A little something to amuse you.

DSKZAP.BAS (by Gary Boudreaux) - This is a program which allows you to read, edit and write 512-byte data blocks directly to/from the disk in the Mac internal drive.

MacTEP.RM & MacTEP II (by Dennis Brothers, Loftus Becker, and Ralph Miller) - MacTEP.RM is based on Dennis Brothers' MacTEP version 1.87, and has all of its features as well as corrects some errors. It also incorporates Loftus Becker's mouse menus. Its primary innovation is a full auto-logout sequence -- not just auto-dialing, but full auto-logout.

The Entertainer (Music routine by Dennis Brothers, Music by Scot Joplin, coded by Dana Schwartz) - that good old MacSound.

MacMonitor (by Wilhelm B. Schulthels) - provides a subset of the Apple // monitor commands on the Mac. One or more commands can be entered on the same line separated by one or more blanks. All numeric input is entered in hex. Letter commands can be entered in either upper or lower case.

In the MacPaint folder:

Explosion - The Mac can be used to express a wide range of emotions, including in this case a bit of pessimism.

Ground Hog Day 1984 - This year, being the year of the Mac, has held a few surprises for all of us.

The First Night - Do you remember the night you got yours? I sure do. It was March 22, 1984.

In the MacWrite folder:

MSBASIC Fixes - A list of the bugs corrected in version 1.01 of MS-BASIC.

MacMon Doc - Documentation for MacMonitor.

MACTEP (1.87) Doc - Documentation for the latest version of MACTEP.

DISK 45: DIVERSI-COPY

This disk is not in the public domain. Rather, its author Bill Basham is sufficiently confident about the quality of his product that he is allowing you to test it for free under an honor system. If you decide to keep and use the program, he requests that you send \$30 to DSR at the address included on the disk. You will then receive a user support number and any later versions of the program.

{45.1t Diversi-copy is a disk copying program that is faster than COPYA or FID. It includes a nice "mass production" feature which will read the entire disk into memory and then write multiple copies without rereading the original. (If you have two drives, you can use both for copying. You can insert a new blank into one drive while making copies in the second drive.) This feature requires more than the standard 64K of RAM, and Diversi-copy will recognize all of the major RAM cards, including the 192K Neptune card from Titan Technologies.

Diversi-copy will work with a one-disk drive 48K Apple, but will require up to 4 disk swaps to copy a full disk.

The program has an internal disk speed tester, and its results are automatically displayed during the copying process. The disk also includes a routine that will format new disks in DOS 3.3, ProDOS, UCSD p-System or CP/M format. However, Diversi-copy does not write a copy of the operating system on the disks that it formats. Although these disks give you 3 extra tracks for data, they cannot be used to boot your Apple.

Diversi-copy will copy 40 track disks and can compare two disks for any differences.

{45.2t DOGFIGHT - (by Bill Basham) an arcade game that is included as a bonus.

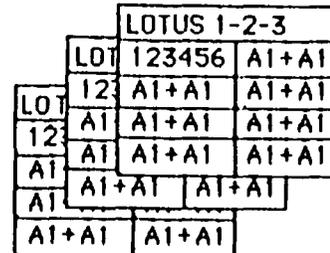
The disk includes a copy of Diversi-DOS, a quicker version of DOS 3.3 as its operating system. (See WAP Disk 130.) The author requests that you pay \$30 for a Diversi-DOS license if you copy Diversi-DOS onto your

other disks. (Upon payment of the \$30, DSR will send you a copy of Disk 130.)

Visicolumn: from page 11

ACKNOWLEDGMENTS

Thanks to Bethesda Computers and the Bethesda Radio Shack Computer Store for great accommodation and patience.



Q&A: from page 9

```

030D:AD 63 C0      LDA PB2      ;START STILL THERE?
0310:10 F1        BPL START   ;NO, FALSE START
0312:A0 08        LDY #8      ;GET 8 BITS
0314:A2 10        GETBYTE  LDX #16     ;DELAY FOR 9600 BAUD
0316:CA          WAIT2   DEX
0317:EA          NOP          ;DUMMY 2 CYCLE WAIT
0318:EA          NOP          ;DUMMY 2 CYCLE WAIT
0319:EA          NOP          ;DUMMY 2 CYCLE WAIT
031A:AD 63 C0      LDA PB2      ;GET BIT VALUE
031D:2A          ROL A        ;8TH BIT TO CARRY
031E:6E 00 03     ROR BYTE    ;MOVE INTO BYTE
0321:88          DEY          ;DEC BIT COUNTER
0322:D0 EE        BNE GETBYTE ;TOTAL 104 UCYCLES
0324:AD 00 03     LDA BYTE    ;GET BYTE
0327:49 FF        EOR #$FF   ;INVERT IT
0329:8D 00 03     STA BYTE    ;SAVE IT BACK
032C:A2 08        LDA #8      ;DELAY FOR 9600 BAUD
032E:CA          WAIT3   DEX          ;WAIT 1/2 BIT FOR
032F:D0 FD        BNE WAIT3   ;LAST BIT TO FINISH
  
```

Call this routine before sending each character from the clone. This routine gets only one byte and the byte ends up in BYTE at \$300. Save it somewhere else in memory and then call the routine again to get the next byte. The routine is relocatable and although is shown starting at \$303 it can actually be put anywhere in memory. The timing is set for 9600 baud at three locations, \$809, \$815, and \$82D. For 1200 baud use 64 decimal (\$40) at \$809 and \$82D, and 128 decimal (\$80) at \$815. (Your may have to play around with these values slightly as the timing of the RS232 signals and your Apple crystal are not always what they should be.) This routine also works well for getting data from a Macintosh.

HARDWARE HELPERS

If you are having hardware problems with your Apple and/or peripheral equipment, the following persons have agreed to help. It will be at the discretion of the Hardware Helper just how involved he becomes. He may only suggest things for you to do, or he may actively assist in cleaning, removing or replacing parts.

Tilghman Broaddus
Rt 1, Box 246
Mechanicsville, VA 23001
(804) 779-2553 (till 10)

Gene Cartier
6026 Haverhill Court
Springfield, VA 22152
(703) 569-8450 (till 10)

J.T. (Tom) DeMay Jr.
4524 Tuckerman Street
Riverdale, MD 20737
(301) 779-4632 (till 11)

Bruce Field
1402 Grandin Avenue
Rockville, MD 20851
(301) 340-7038 (till 10)

Lyman Hewins
Route 2, Box 26
Leonardtown, MD 20650
(301) 475-9563 (till 11)

Pete Jones
1121 N. Arlington Blvd.
N. Arlington, VA 22209
(703) 430-1606 (7-10)

Bob Kosciesza
2301 Douglas Court
Silver Spring, MD 20902
(301) 933-1896 (till 10)

Mark Pankin
1018 North Cleveland St.
Arlington, VA 22201
(703) 524-0937 (till 10)

Richard Rowell
1906 Valley Stream Drive
Rockville, MD 20851
(301) 770-5260 (7-11)
(202) 651-5816 (9-4)

Jim Taylor
16821 Briardale Road
Derwood, MD 20855
(301) 926-7869 (till 10)

Ron Waynant
13101 Claxton Drive
Laurel, MD 20708
(301) 776-7760 (7-10:30)

Dave Weikert
17700 Mill Creek Drive
Derwood, MD 20855
(301) 926-4461 (7-10 ex- 6)

EVENT QUEUE

Washington Apple Pi meets on the 4th Saturday (usually) of each month at the Uniformed Services University of the Health Sciences (USUHS), Building B, 4301 Jones Bridge Road, Bethesda, MD, on the campus of the National Naval Medical Center. Library transactions, journal pickup, memberships, etc. are from 8:45 - 10:00 AM. From 9:00 to 10:00 AM there is an informal "Help" session in the auditorium. The main meeting starts promptly at 10:00, at which time all sales and services close so that volunteers can attend the meeting. A sign interpreter and reserved seating are provided for the hearing impaired.

Following are dates and topics for upcoming months:

- September 22 - Appleworks - Walt Mossberg
- October 27 - Graphics Packages - Panel Discussion
- November 24 - New Microprocessors for the Apple
- December 15 - Garage Sale

The Executive Board of Washington Apple Pi meets on the second Wednesday of each month at 7:30 PM at the office. All members are welcome to attend. (Sometimes an alternate date is selected. Call the office for any late changes.)

SIGNEWS

APPLE /// SIG meets on the second Thursday of the month at 7:30 PM. The next meeting will be on September 9 at Walter Reed Institute of Research. From 16th Street entrance go 3/4 around circle. Go in North entrance of the 4-story brick building on your right and ask the guard for Room 3092.

APPLESEEDS is the special interest group for our younger members. They meet during the regular WAP meeting.

CESIG is the special interest group of computer entrepreneurs. They meet after the monthly WAP meeting at the club office.

DISABLEDSIG - meets on the 2nd Thursday of each month. Call Jay Thal for details.

EDSIG - the education special interest group - see the EDSIG Page elsewhere in this issue.

FORTH SIG will hold its next meeting on Saturday, September 15 at 1:00 PM in the WAP office.

LAWSIG usually meets in downtown Washington, D.C. at noon once a month. For information call Charles G. Field, Chairman, 265-4040, or Jim Burger, 293-7170.

LOGOSIG meets monthly at 12:45 after the regular WAP meeting at the Barrie School, 13500 Layhill Road, Silver Spring, MD.

NEWSIG will meet just after the regular Washington Apple Pi meeting and conducts a "drop-in" for new Apple owners on Thursday evenings from 7:30- 9:00 PM in the office. They will answer questions and try to help new owners get their systems up and running.

PIG, the Pascal Interest Group, meets on the third Thursday of each month at 7:30 PM at the Club Office.

PI-SIG (formerly ASMSIG) has a new emphasis - program interface. For details of their next meeting, call Ray Hobbs at 490-7484.

SigMac meets on the 1st Thursday of each month at 7:30 PM and on the 2nd Saturday from 9:00 AM to 12:30 PM at USUHS, in the auditorium.

STOCKSIG meetings are on the second Thursday at 8:00 PM at the WAP office. Call Robert Wood, (703) 893-9591.

Telecomm SIG usually meets after the regular WAP meeting.

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Middle East Mac

by Johnathan H. Ward

Saudi Arabia isn't exactly the kind of place you would expect to be in on the latest trends in computer wizardry; at least that's what I thought before I first came here in 1982. However, I've been impressed with the amount of gadgets that are available - for a price. Most of the Americans here in the Eastern Province are engineers, and a great deal of the expats have or want computers. Sales prices in the local computer stores aren't cheap, usually being at least twice the U.S. list price. Therefore, the Americans here are hungry for bargains and will go to extremes to satisfy their cravings for computers. For example, two years ago nearly 100 people in my company pooled their resources to organize a group purchase of "Hong Kong Apples"; we real Apple owners were delighted to see the kinds of problems these people had, first in getting their machines to work, and second in trying to get them back into the States. Most of us end up going on high tech buying sprees in the States on our annual vacations, but even this has its share of problems, since you frequently have to get Export Licenses to ship computers out of the country. Imagine our surprise - and delight - when we found out in March that the local Apple dealer was getting in a shipment of Macs!

The Mac package was to include the Mac, Imagewriter, security kit, MacPaint and MacWrite, and a carrying case for the unbelievable price of \$3100. Most of us here would have been willing to pay \$4000 for the same package. Good news like that travels quickly by word of mouth, and within a week of the announcement, Riyadh House had filled its reservation list (requiring a deposit of about \$300). We were told the shipment was due to May, but we were promised that the Macs would be installed in our houses by the first week of June.

After making my deposit, I went on vacation (and picked up a Mac through WAP's even better group purchase) and came back in late June, thinking all my friends would have their Macs by then. Riyadh House had told everyone that the shipment was slightly delayed, but would be in no later than July 7. On July 6, rumors spread that an Apple team was in Kingdom and was installing Macs in Riyadh. Everyone was too excited to sit still, which caused a phenomenal letdown when we found out the next day that the shipment had been diverted to a stateside dealer and had never been sent here! This caused a real outpouring of anti-Apple sentiment, which prompted a letter to each of us on the waiting list from Ron Boring, Apple's Business Manager for the Middle East. Mr. Boring stated that a high U.S. demand, coupled with "a decision by Apple's management to dramatically demonstrate the product's success to our competitors" led to a prolonged period when the Mac was allocated exclusively to the U.S. market. He also stated that this decision had seriously affected all their international marketing and sales efforts. At least we knew we weren't alone, but one wonders how serious was Apple's initial commitment to making the Mac an international machine. Mr. Boring concluded by promising us delivery no later than August 10 with a small gift to thank us for our patience. Most of us reacted to the letter with the attitude that it was just more empty promises. I put the Mac in the back of my mind.

I got a phone call on July 31 from Riyadh House that

my Mac was ready for pickup that afternoon! I ran to see my friend, who was also on the list, and by that afternoon there were 15 of us in line to pick up our machines. All the months of grumbling suddenly seemed forgotten, and watching the dealer unpack our machines and test them out made the day seem like Christmas (if you ignored the fact that it was 112° outside). The machines were standard U.S. Macs - no foreign character sets or weird voltages - and the package included the latest versions of MacWrite and MacPaint. About the only disappointment were that there weren't any carrying cases of security kits, the small gift turned out to be Click Art and not MultiPlan as had been rumored, and that the dealer had absolutely no accessories or software of any kind for sale along with the Macs.

Thinking ahead, I came back from vacation with a box of microdisks; I wonder how long it will take the other people on the list to fill up their one blank disk. Oh well, time to start answering the ads in the magazines!

So, the Macintosh is firmly established here in the Saudi sands, and we eagerly await the availability of more software. The letter of complaint I expected to write on August 11th has been rendered unnecessary, and I can spend my days Macdoodling rather than damning. By the way, in case you were wondering, I have two Macs now (in addition to my 11+): one on my mother's desk in Lorton, and one here with me. I plan to move back to the D.C. area next year and I'll probably sell my Saudi Mac before I leave - that is, unless my wife falls in love with it and decides we need two around the house!

Jonathan H. Ward
ARAMCO Box 10585
Dhahran, Saudi Arabia

MacTeas

WAP is organizing a series of informal get togethers for Mac owners. These sessions are called (what else?) "MacTeas." The following people have agreed to host such sessions within the next month. Please call the host nearest you to set up a date and time.

<u>NAME</u>	<u>CITY</u>	<u>PHONE</u>	<u>NEED A LEADER?</u>
Anthony Anderson	Mt. Ranier, Md	277-0386	N
Don Seifman	McLean, VA	298-8686	N
Mike Moore	Bowie, Md	390-6468	N
Martin Milrod	Bowie, Md	464-2154	Y
Dr. Sonya Shelley	Potomac, Md	299-9053	Y
Ralph Mullendore	Silver Spg, Md	585-4335	N
Russell H. Strange	Washington, DC	822-8168	Y

Reports from Sig Mac

Meeting Formats - New Software

by Ellen L. Bouwkamp

The July Meeting



My thanks to Steve Hunt for filling in for me May 26th so I could enjoy my trip to Charlottesville!

The unofficial start of the July 28th SigMac meeting included informal demonstrations of software in the corner of the cafeteria. This reporter overheard "excellent" as a comment about Presentation Graphics and the Apple Macintosh by Steve Lambert. This book retails for \$18.95, but it can be purchased at a discount at certain local stores. According to the enraptured commentor, the book very clearly outlines the uses of Microsoft Chart. It is published by Microsoft Press, 10700 Northrup Way, Bellevue, WA 98004.

Officially, the meeting began with an IMPORTANT ANNOUNCEMENT. Beginning August 11, SigMac will be meeting on the SECOND SATURDAY OF THE MONTH at the USUHS Auditorium. This change was precipitated by the rapidly increasing size of SigMac. (This reporter estimated more than 80 people at the July 28 meeting!) Future meetings will have the following format:

Help Session: 9:00 - 10:00 a.m.
Disk sales will also take place at this time. Don Landing and Steve Hunt will continue their invaluable question and answer session during this hour.

Program: 10:00 - noon.
Suggestions for programs are being solicited. Please direct your requests to Tom Warrick. Suggestions provided on July 28th included: a review of MacBASIC that Rich Norling will conduct, review of hard disks, pros and cons of Mac-oriented periodicals, how to hook up a file to a Mac, a brainstorming session: what do Mac users want in software??, and an evaluation of MacPaint-related software (e.g., QuickDraw, MacPic).

Programming meetings will continue on the second Thursday of the month at 7:30 p.m. However, there is a room change. Check with the guard when you enter the USUHS Building to find out which room is being used.

Our office library copy of Inside Mac has arrived. This will be available to all, but be forewarned: it is very hard to understand and harder to use! Rumor has it that an updated version of Inside Mac is due early next year.

WAP will be ordering a Mac for the office. Hopefully, we will also be able to purchase a good wide-screen video projector to use with the Mac. There are a limited number of such projectors which meet our needs. Our goal is to have one for the September meeting. For the August 11 meeting, we will attempt a video camera technique.

Plans are being readied for another Mac group buy. Details are as yet unavailable. There are several

more local-area dealers interested than for the previous buy. The contract will be negotiated separately and, therefore, may or may not go to the previous supplier.

Elections will be held in September. SigMac Offices are: Chair, Reporter, and Librarian. Anyone, including all incumbent officers, are eligible for nomination. More than one person can share the Librarian position.

NEW HARDWARE

Tecmar's cartridge hard disk is very fast compared to the Finder. It is slow, however, when compared to other hard disks. Currently, when you come out of an application, you must access the main drive before you access the hard disk. This is reportedly being changed in Version 2.0 of the Finder, supposedly due out this fall. The Tecmar disk is about \$2,000. The maximum data transfer rate is one megabit per second. Rumor has it that Apple will be upgrading the serial port to five megabits per second when the 512K upgrade occurs. The Tecmar hard disk ties up a serial port; the Davong hard disk allows you to connect a modem while the hard disk is connected.

Jay Heller of Geteco Corp., Rockville, reported that a digitizer for MacPaint drawings, called a graphics tablet, will be available from his company. Digitizers can cost from \$300-\$400 for hobbyist versions to several thousand dollars for professional versions. A digitizer uses x,y coordinates to more accurately specify pixel positions.

Okidata has announced an Imagewriter-compatible printer. Koala Technologies has a \$300 device that will connect a video camera to the Mac to digitize pictures. 47th Street Photo in New York City has advertised cable and software to turn a Brother HR15 letter quality printer into a Mac-compatible printer for \$100.

NEW SOFTWARE

David Michaelson of STSC, Inc. (formerly Scientific Timesharing, Inc.) took a poll of SigMac's membership interest in APL. He listed the advantages of this language over others and volunteered to give an APL demonstration at a later meeting. He can be contacted at (301) 984-5363.

I reviewed Transylvania, my very first game for my very first computer. Transylvania requires some knowledge of the occult to solve the quest for the damsel in distress. (I remarked that I would have preferred finding a prince at the end of my chase!) My copy appeared to have a glitch - when picking up the tangled vines at one point in the search, I looked at my inventory and found, instead of "tangled vines," what appeared to be part of a hexadecimal listing. Transylvania cost \$39.95 for about 40 hours of entertainment for this novice to the occult. (Now a confession: In response to a question, I told all of you I wouldn't buy a game again. Well, I went out and bought Deadline ... and I won't buy a game again! The adaptation of Deadline for the Mac does not use Mac's special qualities. At \$49.95, Deadline provided this user with about 30 hours of entertainment ... I'm learning!)

contd. on page 43

Reports from Sig Mac

New Books - Group Purchase - Carrying Cases - New Software

by Ellen L. Bouwkamp

August Meeting



GROUP BUYS

SigMac's first uncrowded meeting began at 9:00 a.m. with over 90 people spread out over the USUHS auditorium. Among the tidbits passed along in the first hour: You can buy a 4 by 6 inch plastic file box at a dime store or drug store for about \$3.00 to serve as a disk holder. SigMac disk 4 will be available at the next WAP monthly meeting on August 25th. Value Line has just come out with an investment survey on the computer industry that rates Apple's future very positively.

Our formal meeting began with a request by Donald Kornreich for volunteers to lease their Mac's, along with available printers and external drives, to the Federal Railroad Administration (FRA) for the Pan American Railway Congress, to be held October 3 to October 9. The FRA wants to use the Mac's to record, via Multiplan, data about the persons attending the conference. Donald also is interested in hiring persons for a 1-1/2 to 5-1/2 day period. Appropriate compensation will be provided. Donald can be reached at (h) 292-9225 or (w) 472-5840.

The Montgomery County Hotline is automating its resource file. It needs assistance in setting up the new database in the most effective way. Volunteers for the Hotline are not trained in the use of computers, so the system will have to be very "user friendly." If you are interested in helping, contact Kevin at the office.

Smaller groups help each of us to get to know one another better. To that end, a sign-up sheet was passed around to begin "Mac Teas." See the article on this topic elsewhere in this Journal.

On Thursday, August 16, at 7:00 p.m., Mac owners in the Reston area will meet at the Community Center. Contact C. Greenspan at (703) 860-1284 for further information about this group.

#REMINDER# SigMac meetings have changed to the second Saturday of each month. The next meeting will be on Sept. 8. See July's SigMac column.

Mitchell Jaffee will provide a lecture at a future meeting on the utilities in the Inside Mac supplement. There are currently 2 disks in the supplement. The August, 1984, version has three disks and has been mailed to a few people. Inside Mac and its supplements are described in previous columns.

LIBRARY

The WAP office is the proud owner of a new Mac. This Mac may be used to review business software in the WAP Library. Only Multiplan, by Microsoft, is available now. In order to assure that this one and only Mac is not in use when you come to the office, #phone for an appointment# before you come. The Library will not handle nonbusiness-related software. Donations will be welcomed with joy!

At the suggestion of a member, Mac languages will be put in the WAP Commercial Software Library if cooperation from their producers is achieved.

SigMac members who bought MacFORTH through the group buy were treated to receipt of their purchase at the meeting. In response to complaints about the lack of information about procedures for and types of items being procured by a group buy, members were told that information can be obtained only from the office or the ABBS, or by attending meetings. Group buys will be held open two weeks after announcement. If you have an interest in an item, call the office and let them know the manufacturer's name, address, and phone number and information about the item.

Sunrise Computers sells second disk drives for a substantial discount. Their address is 2625 Philadelphia Avenue, Norland Shopping Center, P.O. Box 462, Chambersburg, PA 17201, (717) 267-1341. Frederick Computers has a sale, 20 percent off, until the end of August. Since the second drives can be bought at a reasonable price, there will not be a group buy for these.

If you are interested in buying a Mac, contact Kevin in the office, who is maintaining a list. You must have been a member for 90 days to be eligible for group buys of computers.

There are plenty of SigMac disks 1 to 3 available. If your copy of any WAP disks are defective, please return them to the office for exchange. A new member Mac disk will be out at the end of the year.

SERVICE CONTRACTS

Members who are considering service contracts should obtain them before their warranty runs out so they will not be charged an inspection fee by the service company. One can expect to pay \$70 to \$100 per year. Problems with dealers should be reported to the Apple Tech Support Center in Charlotte, North Carolina. A dealer is supposed to repair your computer, even if you did not buy it from that store, if it is an authorized Apple dealer.

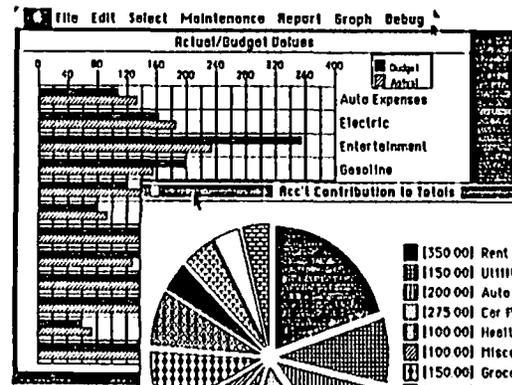
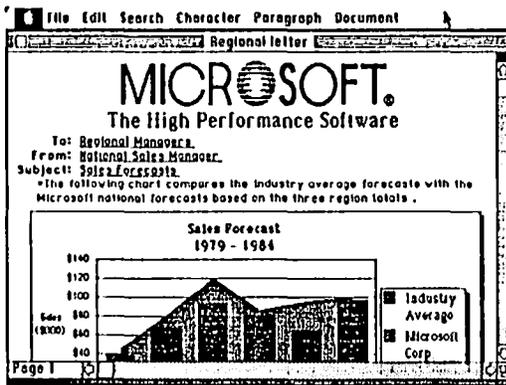
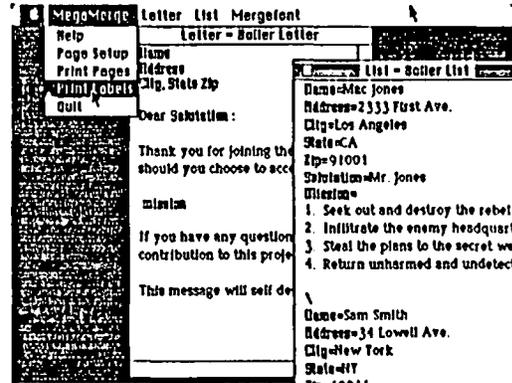
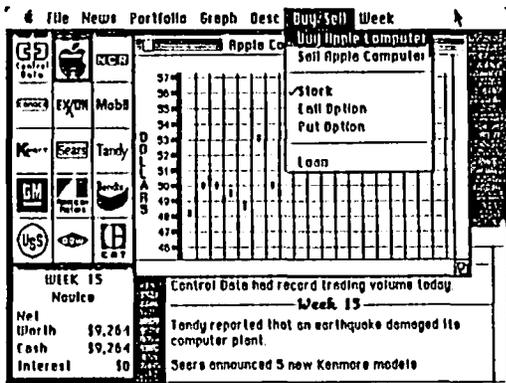
COMPARISON OF MAC CARRYING CASES

A flamboyant fashion show displayed four styles of Mac carrying cases. In order of smallest to largest, they were: Apple, list \$100; MacTote, list \$100; MacPak, list \$79; and the Scottie MacCase, list \$114. The Apple carrying case is stylish and soft; it is sprayed with an anti-static chemical that is supposed to last two years. It is acceptable for airline carry-on luggage. The MacTote had external pouches and a hard top and bottom. MacPak has a rigid frame but the top and sides are soft. A separate case for the printer can be placed on top of the MacPak. The MacPak is worn on the back. The Scottie MacCase is the most expensive but also the most rigidly protecting of the Mac. It is a formfit case. Members were warned not to use styrofoam for carrying cases as this material retains static electricity and is, therefore, dangerous to Mac's health.

THINK TANK

A demonstration of Think Tank illustrated the limitations of this organizing tool. Think Tank

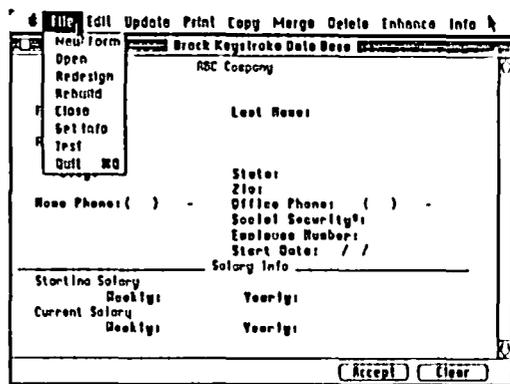
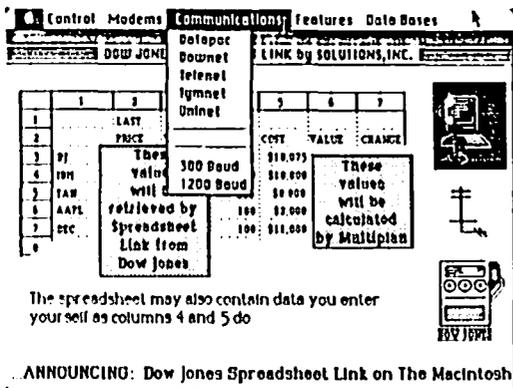
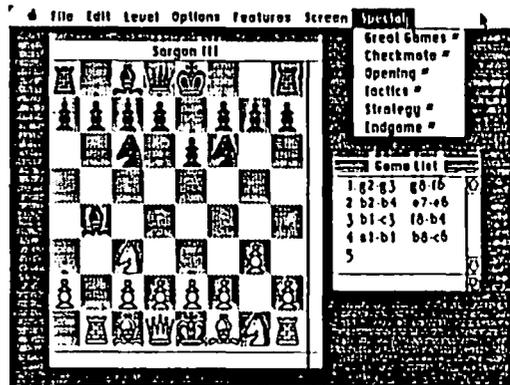
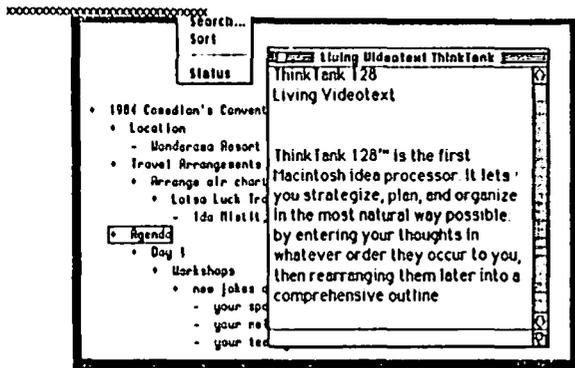
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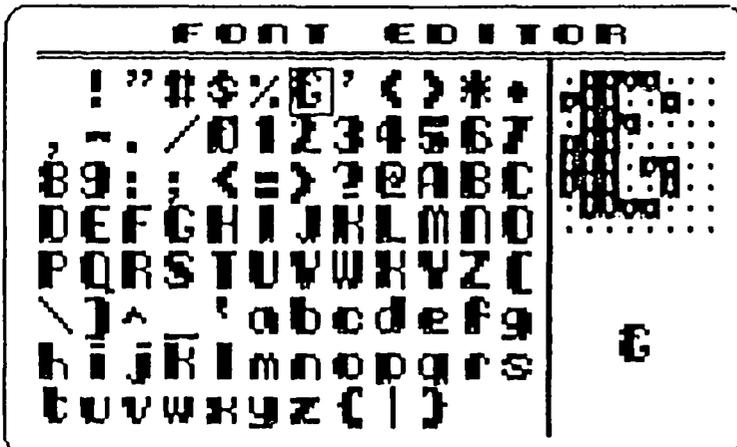


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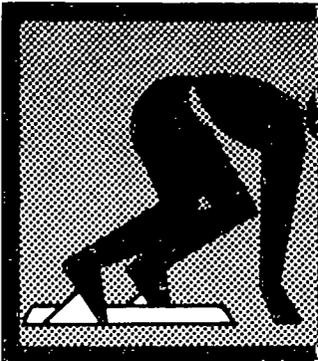
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- J K CHARACTER SELECT
- M
- <RTN> MOVES CURSOR TO NEXT CHAR
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Anatomy of an Apple II Pascal Code File

by Brother Tom Sawyer, CSC

My dream is to write an Apple Pascal decompiler (unpiler?). I have always been curious about the programs that come in coded form only. Sometimes I would like to modify them but most of the time I would just like to see how the pros write their programs. My dream is half way to being fulfilled and if you've already written such a program let me remain ignorant of it because working toward my goal is teaching me a lot about Pascal and particularly how the Apple version works.

About CODE FILES - Text, in general, is whatever is typed into the Editor (a program). The text file in this case is something that is in Pascal. This human readable form of a program must be changed into machine readable form because the machine is more limited than we humans are. The compiler is the program that performs this task. In Apple Pascal it produces a version of the program in a language called p-code. In other systems the compiler produces actual machine code. P-code is intended to be a universal language, like Pascal itself, which can be run on many different machines. Apple Pascal has an interpreter which translates p-code into machine instructions and then executes them. Thus, even though it is compiled, the code must still go through another step (interpreting) before it can do anything.

Pascal code files may also contain machine language procedures which are produced by the Assembler (another program) and tied into the Pascal program as it is being compiled. They may also be linked (by the Linker, of course) with p-code later on. When p-code and assembly code are mixed in the same code file the system puts in markers so it "knows" whether the instructions are to be interpreted or executed directly.

About SEGMENTS - most large programs are broken into sections or segments. As programs grow in size it becomes necessary to collect a number of procedures (functions) and treat them as a single procedure (function) called a segment. The advantage of doing so is that this block of code will be loaded into memory only when it is called by the main program. This makes more memory available for the program's use. Since the segment doesn't reside in memory unless in use (you can make it stay if you want it to) it should be a mini-program. That is, be able to do everything it is supposed to and then get out of the way. Declaring the title page, initializing procedures and optional instructions as a segment procedure is a good example of segmenting. Why clutter the memory with a few K of "one-shot" procedures? Pascal also has UNITS which have the same purpose but these should be routines which have wide application. Segments are usually program specific and do not have to be installed in a Library or linked into a program.

Now for my "dream" program.

The main algorithm for my decompiler is as follows:

```
PROGRAM Unpile;
BEGIN (*a good way to start*)
  Get segment info from codefile block zero;
  (* one block = 512 bytes of code *)
  Locate each procedure in the codefile;
  IF p-code THEN
    decode into human readable form
  ELSE
    BEGIN
      transfer code to disk;
      Get out of Pascal (*into BASIC*)
      load code into BASIC Monitor
    END
  END.
END.
```

The first step in the program is to analyze block zero. This is the first block of a Pascal code file and is really a segment dictionary. Its structure is described in the Pascal OPSYS Manual (p266ff). The dictionary contains the name, location, size and type of each segment in the program. For example, the Pascal Compiler contains 15 segments. The Editor has 7 segments and the Filer is made up of a single segment (13.3K in length!). For my purposes, the location and size are the important numbers. The location is always a single number since a segment must begin with the first byte of a block. The sum of start and size locates the segment's last byte, which may be anywhere within a block. It would seem that knowing the first byte is enough but actually the last byte is more important. This "last shall be first" idea is central to the way Pascal code is executed.

About STACKS - These are data structures on which data is piled as it enters so that the last piece in is the first out (there are no rear or side doors). LIFO (last in, first out) is a member in good standing of the programmer's alphabet soup diet. Although we conceive of stacks as having a top and a bottom, they are really stored "upside down" in the memory. The top of the stack is at the lowest address in the memory. Since a codefile (program) is loaded into the memory from the top down, the last byte in is at the "top of the stack." I didn't design this method of the bottom is the top so suggest you mentally turn the codefile upside down to see that the last byte is where it all begins.

Backing up to the beginning - The second step in the program is to locate the procedures in each segment. So far, the program has read the segment dictionary and found the starting address and the length of each segment. Add the two and you have the location of the last (first) byte in the segment's code. That byte tells the number of procedures in the segment. The byte just before it is the segment number. This is preceded by a pair of bytes for each procedure in the segment. These are the offsets and tell you where each procedure ends (remember, the end is what counts). If you count backward to the end of a procedure, the byte you arrive at is the program level and the one preceding it is the procedure number. This is true of p-code but not machine code. The latter contains zeros in these locations. This is the "marker" the system uses to tell the difference between the two kinds of code. The next two bytes in either code give the offset to the beginning of the procedure. Once we're there the procedure can be executed, this time from the "top" down. There are

cases of forward offsets (in System Pascal) but generally one counts from the bottom up.

About numbers - When you compile a Pascal program the main program is segment #1. All of us who have gotten runtime error messages (remember the one time it happened to you?) have seen ERROR S# 1 P# 2 I# 242 or something like that. System errors show S#0 or S#20 (Turtlegraphics) or a number of others. The S stands for the segment in which the error occurred. The P stands for the procedure number. In your program (segment #1) the main program is procedure #1. The first PROCEDURE (or FUNCTION) is #2 and so on. Thus, in the codefile, the main program is considered procedure #1 of segment #1. So far, so good?

About levels - A third number that is associated with every procedure is its program level. The system needs a way to tell where it is with reference to the main program. The convention is to consider the main program as level 0. Each procedure within that program is at level 1 and procedures within a procedure level 2 and so on. The numbers are equivalent to the nesting level of a given procedure. They are analogous to the lexical levels you see when you get a compiled listing of your program. If you haven't done it, just type (*\$L CONSOLE:*) somewhere in your text file and then compile it. That will produce segment #, procedure #, lexical level, and byte number of each line in the program. Figure #1 gives a schematic of a program with its levels.

Notice that procedures are numbered as they are DECLARED, not when they begin. This fact makes it easier to locate runtime errors and helps one arrange procedures in a logical order. I can say this with only some evidence (and welcome any corrections) but the more active a procedure is going to be in the program the closer to the top (lower proc#) it should be. Little used, or "one shot", procedures like initialize and sayhello should be put toward the bottom of the segment. Of course, the rule of declaring before calling must be observed and note that if you declare a procedure FORWARD it is numbered as it is declared rather than when it actually appears in the program.

Procedures may be nested more than one deep. The deepest I have seen so far is in System Compiler which has a procedure at level 6 (level 6!). Knowing about levels can also keep one from making calls outside (Level 4 calling Level 1, come in Level 1). It also helps one to keep variables within their domain and can cut down on unwanted side effects. Machine code procedures do not have levels. They seem to be free agents.

This has gone on longer than I had expected so I will leave you with the skeleton of the program I wrote to analyze a codefile (the first two steps in my algorithm). The next time I'll give you the listing along with some more explanation. This may seem rather esoteric but a very useful spin-off of this program is using it as an aid to writing "tighter" code. The code of the program whose skeleton is listed (Figure #2), originally had one segment, 14 procedures and was 6444 bytes long. By using it to analyze itself (aren't computers marvelous?) it now has three segments, 14 procedures (still) and is only 5256 bytes long. It is not only 20% smaller, occupies a maximum of 3592 bytes of memory (segmenting) but it runs about 10% faster. Sound interesting?

Figure #1:

PROGRAM Levels;	Segment#	Procedure#	Program Level
	1	1	0
PROCEDURE A;	1	2	1
FUNCTION B;	1	3	2
BEGIN			
END; (*B*)			
PROCEDURE C;	1	4	2
BEGIN			
END; (*C*)			
BEGIN (*A*)			
END;			
BEGIN (*MAIN*)			
A			
END.			

Sig Mac News from page 17

allows the user to create outlines; these outlines can then be copied for use in MacWrite documents. There is no "undo" command; errors are corrected by backspacing. One cannot drag over an area to be edited, therefore editing can be a tedious task. The 1.1g version of the Finder is used in the latest Think Tank. It is available at a discount from its \$150 list price. The opinion of the members is that Think Tank has limited usefulness.

1ST BASE

This program is a relational database management system with the capability of merging two files with a common column or "field." To avoid database maintenance and integrity problems, merged files should be used only for reports. 1st Base does not support calculations or logic functions. If one sorts on a field, one must use all the records (number of entries) in that field; there is no way of defining a subfield unless you set up a separate database. Main Street Filer has the capability of sorting on either first or last name; this can occur in 1st Base if these are defined as two separate fields. Main Street Filer will do crude computations.

THE CREATOR

The Creator is an MS-BASIC-based, public domain, flat-file database management program. It is published by TNT Software, 34069 Hainesville Road, Round Lake, IL 60073, for \$35.00. Although it was demonstrated at this meeting, no member has been able to get it to work. If it can be made to operate, it will be included on a future Mac disk. A separate 100 page documentation booklet can be obtained for \$11.00.

DI VINCI

This MacPaint application program, published by Hayden Software, Inc., is a collection of three disks. The disk portrays interiors and exteriors and landscape drawings to 1/8 or 1/4 inch scales for architects or interior designers. These ready-made couches and beds and bathrooms can be cut and pasted into MacWrite or MacPaint documents. These disks can be purchased separately for \$50.00 each.

SEG#	PROC#	PROG. LEVEL	
			FIGURE #2: Skeleton of Codemap
1	1	0	<pre> (* params = parameters *) PROGRAM Codemap; (* skeleton *) (* Anatomy of a Pascal Codefile bts 7/17/84 *) </pre>
7	1	1	<pre> SEGMENT PROCEDURE Blockzero(params); (* produces segment dictionary of codefile *) </pre>
7	2	2	<pre> PROCEDURE Center (param); BEGIN END; </pre>
7	3	2	<pre> PROCEDURE Checkprint (param); BEGIN END; </pre>
7	4	2	<pre> PROCEDURE Initloc; BEGIN END; </pre>
7	5	2	<pre> PROCEDURE Initseg; BEGIN END; </pre>
7	6	2	<pre> PROCEDURE Ptoutdict; BEGIN END; </pre>
			<pre> BEGIN (*Blockzero*) END; (*Blockzero*) </pre>
8	1	1	<pre> SEGMENT PROCEDURE Analize (params); (*Calc. and output proc offsets, location, len*) </pre>
8	2	2	<pre> PROCEDURE Putoutpb (params); BEGIN END; </pre>
8	3	2	<pre> PROCEDURE Starfix (params); BEGIN END; </pre>
8	4	2	<pre> PROCEDURE Fix (params); BEGIN END; </pre>
8	5	2	<pre> PROCEDURE Putoutpa (params); BEGIN END; </pre>
8	6	2	<pre> PROCEDURE Fixnout (params); (*Driver proc. for putout/Fix procedures *) BEGIN END; </pre>
8	7	2	<pre> PROCEDURE Getoffs (params); BEGIN END; </pre>
			<pre> BEGIN (*Analize*) END; (*Analize*) </pre>
			<pre> BEGIN (*Main Program*) Blockzero(params); Analize(params) (*future segments*) END. </pre>

Strictly Forth Sort

by Chester H. Page

FORTH Dimensions, Vol V, No. 5 ("Quicksort in Forth", Marc Perkel) published a Forth program to quick sort one-byte data items. I decided to play with this for sorting dimensioned text strings, such as my mailing list. The result is a good example of using Forth, a stack-oriented programming language, with a machine-language subroutine.

For sorting bytes, the bytes are stored in a sequence of memory locations. The contents of these "primary" addresses are compared, and exchanged when appropriate. For sorting strings, another level of addressing is needed. The "primary" addresses are the addresses of an array of pointers; each pointer holds the address of the count-byte (or length) of a string. Exchanging entries consists of exchanging pointer contents; the strings themselves are untouched. Since the primary addresses hold 2-byte string addresses instead of 1-byte data, incrementing a primary address requires increasing it by 2 instead of 1, and finding the middle address requires care to avoid splitting it. Instead of dividing the range by 2 and adding the quotient to the starting address, we must divide by 4 and then double the quotient. This guarantees an even number to be added to the starting address.

The real problem is the comparison of strings which may or may not be of equal length. Two strings are compared byte by byte using a DO ... LOOP with limit N where N is the length of the shorter string (or common length). There is no problem unless the loop is completed without a decision, i.e., if the strings are identical in their first N bytes. If the question is "S1 > S2?" then the answer is YES if S1 is longer than S2 (N1>N2) but NO if N1<=N2. For the question "S1 < S2?", the answer is YES if N1 < N2 but NO if N1>=N2. We need to preset a truth-flag in such a way that if the loop is run through without a decision, the preset flag is correct. The asymmetry of the N1 N2 comparison introduces complications unless we adopt the simple trick of defining \$> and then : \$< SWAP \$> ; or the converse, \$< followed by : \$> SWAP \$< ;. In FORTH there is no advantage of one of these over the other, but if we wish to speed up the sort with a machine-language comparison routine, we note that a 6502 processor has BCC and BCS branch comparisons. These correspond to N1>=N2, giving a strong advantage to defining \$< as the basic comparison.

The EXCHANGE always involved in a sort becomes the exchange of addresses held by two pointers. We must continually distinguish between the addresses (P) of the pointers in the list and the addresses (S) of the strings pointed to. Using P1 P2 as the addresses of two pointers whose strings are being compared, and S1 S2 as the addresses of those strings, the entirely-FORTH program follows:

```
SCR # 60

0 ( STRICTLY-FORTH SORT          26 JUN84CHP)
1 0 VARIABLE $FLAG
2 : 2READ2 ( S1 S2---S2 S2 N1 N2 N1 N2)
3   2DUP C@ SWAP 2DUP ;
4 : SHORT.STRING ( S1 S2---S1 S2 N) 2READ2 < IF 1
ELSE 0 ENDIF
5   $FLAG ! MIN ;
6 : $COMPARE ( S1 S2 N---) 0 DO 1 1 D+ 2READ2
7   < IF 2DROP 1 $FLAG ! LEAVE
8   ELSE > IF 0 $FLAG ! LEAVE
```

```
9   ENDIF ENDIF LOOP 2DROP ;
10 : $< ( S1 S2---F) SHORT.STRING $COMPARE $FLAG @ ;
11 -->
SCR # 61
0 ( SORT                          (26JUN84CHP)
1 : $> SWAP $< ;
2 : EXCHANGE ( P1 P2---) 2DUP @ SWAP @ ROT ! SWAP !
;
3 0 VARIABLE MIDDLES
4 : SORT ( P1 P2---) 2DUP 2DUP OVER - 4 / 2 * + @
MIDDLES !
5   BEGIN
6   SWAP BEGIN DUP @ MIDDLES @ $< WHILE 2 +
REPEAT
7   SWAP BEGIN DUP @ MIDDLES @ $> WHILE 2 -
REPEAT
8   2DUP > NOT IF 2DUP EXCHANGE 2 -2 D+ ENDIF
9   2DUP >
10  UNTIL SWAP ROT
11  2OVER 2OVER - ROT ROT - < IF 2SWAP ENDIF
12  2DUP < IF [ SMUDGE ] SORT [ SMUDGE ] ELSE 2DROP
ENDIF
13  2DUP < IF [ SMUDGE ] SORT [ SMUDGE ] ELSE 2DROP
ENDIF ;
14 ;S
```

If a machine-language routine is used to CREATE MACHINE, then the first screen is replaced by

```
HEX CODE MACHINE
0 # LDY,
1 # LDA,
1B STA,
6 )Y LDA,
8 )Y CMP,
CS IF,
0 # LDA,
1B STA,
8 )Y LDA,
THEN,
1A STA,
BEGIN,
INY,
6 )Y LDA,
8 )Y CMP,
0= NOT IF,
CS IF,
0 # LDA,
1B STA,
ELSE,
1 # LDA,
1B STA,
THEN,
NEXT JMP,
THEN,
1A DEC,
0= UNTIL,
NEXT JMP,
END-CODE DECIMAL

: $< ( S1 S2---F) 8 ! 6 ! MACHINE 27 C@ ;

A range of strings can be printed with

: $. ( P1 P2---) 2+ SWAP DO 1 COUNT TYPE 2 +LOOP ;
```

The entirely-FORTH program took 27 second to sort my mailing list of 109 names and addresses; using MACHINE reduced this to under 4 seconds.

Forth Answers the Challenge!

by Charlie Brown

In the August 1984 Issue of the WAP Journal Bill Wurzel presented a LISP program which generates all the possible permutations of n objects (letters of the alphabet, for example). In the article Bill threw down the gauntlet and suggested the comparison of running times between his LISP program and a similar program to be written in FORTH. This article accepts his challenge by presenting a FORTH program which also generates all possible permutations, and gives the results of a speed comparison between the two languages.

For those of you who are unfamiliar with FORTH, I believe that you are missing an exciting new computer language. My introduction to FORTH was through WAP disks #105 and #700-#702 which provide a kernel for the language. I use the term kernel because of the single most interesting feature of this language - it is "extensible". That is to say, the language kernel which comes on disk #105 consists of a set of "words" (each word is somewhat analogous to a statement in BASIC, eg. DRAW, GOSUB, or VTAB), and this kernel can be extended by adding new "words" which are defined in terms of the existing "words". Therefore a "dictionary" of the language can be tailor-made to comprise a set of words for any specific purpose (GRAFORTH is an example of a commercially-available FORTH-based language for graphics). Each newly defined word can be thought of as a subroutine or procedure (to make the concept understandable to all of you who are still using antique, unsophisticated languages like BASIC and Pascal). When typed in at the terminal the subroutine defined by this word is executed, or this new word can be used in the definition of other words, thus building a dictionary of increasingly complex routines. In my opinion, this single feature makes FORTH a language well worth learning for all you programming freaks out there. But this is not the only important aspect of FORTH - it is also extremely fast. I don't know how many of you have become discouraged by BASIC's lack of speed. I had owned my Ile for only a few months when I began thinking that I wanted something that was faster. My first thought was to purchase a compiler, but my "cheap-Charlie" alter ego wouldn't let me shell out the necessary funds. My next thought was to learn machine-language, the ultimate in speed. But I quickly learned that ML was understandable to only true aficionados of this mysterious art form and I am not one of them. Then came my introduction to FORTH, speeds similar to machine-language and obtainable in a "high level" language which people like me can begin to understand. I have quickly become an enthusiastic devotee of this new language, and I hope my obvious enthusiasm for FORTH has raised some interest out there, causing some of you take a closer look. You might want to read the series on FORTH by Bill Wurzel in the May - July 1983 WAP Journal and I suggest you also look in on the FORTHSIG which meets at the WAP office at 1:00 on the third Saturday of each month.

Now let's get on to the FORTH "words" which can be used to produce all possible permutations of n letters. The first two words define a factorial function, since the number of permutations of n distinct objects is $n! = n*(n-1)...2*1$. Notice that you can define the factorial function recursively, $n! = n*(n-1)!$. This is how we shall define the factorial "word", as a word which calls itself. The two words we need are:

```
: MYSELF LATEST PFA CFA , ; IMMEDIATE
: FACTORIAL DUP < 2 IF DROP 1 ELSE DUP 2 IF ELSE DUP
1- MYSELF * THEN THEN ;
```

The word FACTORIAL computes the factorial of the number which is on the top of the stack (for people unfamiliar with FORTH: see the series by Bill Wurzel - it explains concepts of the language such as the stack). This factorial word is defined in terms of itself - in its definition the word MYSELF causes execution of the word currently being defined, in this case the word FACTORIAL. This word MYSELF is an auxiliary word which can be used to make recursive definitions (it is used again in another word). Now we shall define some words which will be used to manipulate strings.

```
: CSTORE DO 2DUP C@ SWAP C! 1 1 D+ LOOP ;
: INSERT.STRING DUP IF DUP >R 0 CSTORE R> ELSE THEN >R
>R ROT ROT 0 CSTORE DROP SWAP R> R> ROT 2DUP < IF SWAP
CSTORE ELSE 2DROP THEN 2DROP ;
```

The word CSTORE moves a group of bytes from one memory location to another, and the word INSERT.STRING uses this word to insert one string into another (eg., when inserting the letter D into the string ABC, this "word" makes each of the strings DABC, ADBC, ABDC and ABCD depending upon where the letter D is to be inserted). These words demonstrate another desirable feature of FORTH, that of being able to name "words" using understandable English. Three other auxiliary words which we shall use are:

```
: 3DUP >R 2DUP R ROT ROT R> ;
: CHAROFF OVER SWAP - 1- ROT ROT DUP ROT * ROT + * ;
: SETUP.ADD.CHAR 1- DUP ROT + 1 ;
```

These three words are used in the following words which make up the primary functions of the permutation word.

```
: ADD.CHAR >R >R R HERE 1+ SWAP SETUP.ADD.CHAR 3DUP R>
R> SWAP 2DUP 1- * WORKAREA + OVER 0 DO 1 SWAP >R OVER
>R ROT DUP >R ROT ROT DUP >R CHAROFF WORKAREA + R> R>
R> R SWAP >R SWAP >R SWAP INSERT.STRING 3DUP R> R> R>
LOOP DROP >R DROP 2DROP 2DROP 2DROP R> ;
: PERMUTE:N-->N+1 DUP 1- FACTORIAL 1- -1 SWAP DO 1
ADD.CHAR -1 +LOOP ;
: DO.PERMUTE 2DUP < IF 2DROP ELSE DUP 1 = IF HERE 1+
C@ WORKAREA C! ELSE PERMUTE:N-->N+1 THEN 1+ MYSELF
THEN ;
```

The word DO.PERMUTE performs the actual permutation beginning with 1 letter and ending with the desired n letters by executing the word PERMUTE:N-->N+1 in the following recursive manner. As an example assume that the letters ABC are to be permuted. At cycle #1 the single letter A is stored in the memory location denoted by WORKAREA. At cycle #2 the letter B is added to produce all two-letter permutations, AB and BA which are stored in WORKAREA. At cycle #3 the third letter C is added to each of the two-letter permutations to produce ABC, ACB, CAB, BAC, BCA and CBA. The word PERMUTE:N-->N+1 is used to convert all of the n-letter permutations to (n+1)-letter permutations by executing the word ADD.CHAR (this word converts a single n-letter permutation to all its (n+1)-letter permutations, eg. from AB to CAB, ACB and ABC). The final two words which tie all this together are:



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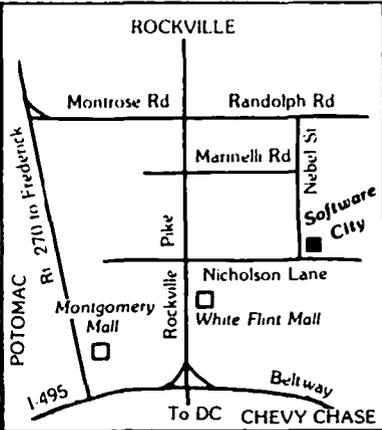
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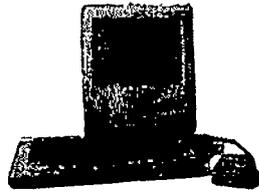
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Forth: A Sample Prime Number Program

by Kevin Nealon

It seems that every FORTH S.I.G. Chairman will at some time during his tenure write a series of tutorials for the Journal on FORTH. I imagine the reason for this is that he can't think of anything else to write about except what he knows best. Well this Chairman is different. I have seen what can be done in FORTH, but I know Di-da-lée-squat when it comes to actually writing a FORTH program. It was my original motive, when I helped reconstitute the FORTH S.I.G., to learn how to write in FORTH. So I'm going to start my tenure with a column on what I know least, writing a FORTH program. I hope that as I learn, I may spark the curiosity of some readers into exploring more about this interesting language.

The following FORTH word shows some of the good and bad points about FORTH. Bad points about FORTH in this column? Yes, that's right, every computer language has its bad points, and this one is no exception.

Writing a FORTH program is like writing an English sentence. The program's code describes its function. To start writing, the programmer makes a broad outline. Once the outline is done, the programmer then starts to define each word in the outline. He continues the process of defining until the words used in the definitions are made of "primitives"; words which have been predefined in assembly language. This is known as top-down design. You start with the general flow of the program and then take care of the details. Problems arise when a word is badly defined. A bad definition does not describe a word's function, usually by using too many primitives early in the definition.

There are a plethora of FORTH dialects. Each dialect also has its own unique primitives depending on the use for which the dialect was meant. Dialects also share many of the same words so that it is not too hard to go from one version to another.

```
: Prime ( N-- )
  CR
  DUP 4 < IF ... IS A PRIME" ELSE
  DUP 2 /MOD SWAP 0 = IF DROP ... IS NOT prime" ELSE
  3 DO
    DUP 1 MOD 0 = IF ... IS NOT prime" -1 LEAVE THEN
  2 +LOOP
  DUP 0 > IF ... IS PRIME" ELSE DROP THEN
  THEN
  THEN ;
```

The above word, called "Prime", like all FORTH definitions starts with the word ":" to begin the definition and ends with ";" to end it. All FORTH words in this definition are separated from each other by spaces.

To start any discussion of FORTH, we have to talk about the stack. The stack is an array in memory which is used to hold numbers. Its structure is much like a deck of cards, in that only the top card can be removed. Words communicate to each other by leaving information on the top of the stack (the parameter stack as it is properly known). So, one of the most important parts of the above definition is the comment in brackets which is placed immediately after the word

to be defined. This simple notation describes what the word expects on the stack, and how it will leave the stack when done. In Prime's case, it expects a positive whole number on the stack and leaves the stack empty. Prime, being a simple word, uses only primitives in its definition, however, it does demonstrate many important features of FORTH.

And now for a description of "Prime":

We already know that ":" starts a definition. "Prime" is the name of the definition and the information in brackets describes how the word interacts with the stack. "CR" is a carriage return to move down to the next line. "DUP" takes the top item on the stack and duplicates it. We then push four onto the stack, so now we have N on the bottom of the stack, then our copy of N, and finally four on top. You might try drawing the stack's contents as we walk through the definition. The word "<" plucks off the top two numbers. If the second number is less than the first then "<" will place a non-zero on the stack otherwise it places a zero. "IF" takes the top number off the stack, and, if non-zero executes what follows, it prints the top number on the stack using the FORTH word "." (dot) and prints a string using "." (dot-quote) with a "" (quote) at the end of the string. If a zero is found then the code following "ELSE" is executed. The last "THEN" at the end of the definition marks the end of the "IF the test is true do this ELSE do that THEN continue" branch. Assuming a non-zero, we again duplicate the original number and push two on the stack. The word "/MOD" (slash-mod) now takes the copy and divided it by two, returning the remainder and divisor (in that order). "SWAP" exchanges the top two numbers on the stack so that the remainder is on top, and we test to see if it is zero. If the remainder was zero then N is divisible by two; so we print N and then the appropriate message--otherwise, we continue by pushing three on the stack. "DO" marks the beginning of a loop which will repeat a certain section of code bounded by the word "+LOOP". Three will be the index and N/2 is the limit. "DO" plucks the top two numbers off the stack (leaving only N) and puts them on the return stack. This is a separate stack that keeps track of loop indexes. Every time the program reaches "+LOOP" it will increment the index on the return stack by what it finds on the parameter stack (in this case two). This process continues until the index is equal, to or greater than the limit--at which time the code after "+LOOP" is executed. Inside the loop, we "DUP"licate N. The word "!" makes a copy of the index from the return stack and puts it on the parameter stack. We then divide the copy of N with "!" with "MOD", remembering that we are only interested in the remainder. In this way, as the loop index is incremented, we start our division with three and add two with each iteration of the loop. If there is a remainder, then we continue the loop until the index reaches the limit. If "MOD" returns zero, we print the last N (leaving the stack empty) and a string saying N is not prime, push -1 on the stack as a flag for later in the program and "LEAVE" the loop, since we have found a number that divides N evenly. The last line is a little tricky. Remember that the stack will contain N, if no number has been found to divide it, and -1 if it was divided without remainder. "DUP"ing the top number we test to see if it is larger than zero. If it is, we print N leaving the stack empty and

Calling CompuServe with an Apple ///

by Hobart S. Cable, II

APPLE /// USERS: Did you know there is a very active Apple /// Section in the Micronet Apple Users Group (MAUG) on CompuServe? The original Apple Serve /// experiment conducted by Apple Computer--December 1983 to February 1984--was a tremendously successful forum for the exchange of Apple /// information. The problem was, it cost Apple too much to provide that free service. Since its termination, many of the most active participants have moved to the Apple /// Section of MAUG, and there has been a lot of activity lately. Although Apple has announced that it is suspending any future development of the ///, this fine machine is anything but dying! Software development is not being terminated, and many new programs are coming out for the ///, especially from third-party developers. Also, a number of updates are in the works, such as Pascal v2.0, an Access /// that works from its own interpreter (rather than from Business BASIC or Pascal), Business BASIC v1.2, Softcard /// CP/M update, and more. Also, Call A.P.P.L.E. is producing /// CHEERS--a disk-based magazine full of programs, articles, hints, and many special features. For example, we can get into the Apple /// Monitor, but no one has been able to get out of it without turning off the power. Well, someone at Call A.P.P.L.E. has developed a way to get out gracefully, and that technique will be shared in /// CHEERS.

Or how about hardware? There is an Apple /// mouse in existence, and someone is working on the software to get the ///e mouse to work on the ///. Speaking of the ///e, a vendor is working on a peripheral card for the /// that emulates the ///e. That will be quite an improvement over the standard Emulation Mode.

We have some real Apple /// enthusiasts on MAUG and a number of them have been very helpful. I just obtained a disk full of Public Domain programs for the /// from one such individual. I have contributed a copy to the users group, so check with the librarian to see about it. Another ///r has obtained the Apple /// Technical Service Manual with 456 pages of information, diagrams, and schematics. Through MAUG he has taken orders for copies, and he is currently having it reproduced. For those of you who have read with great interest the Apple /// articles in SOFTALK by John Jeppson, but were not ambitious enough to type in the many pages of code accompanying those articles, the Apple /// program library on MAUG now contains most of these ingenious programs.

We've just had a new member join up who lives close to Apple in Cupertino, so he is able to keep tabs on the latest developments. He is currently compiling a database of those of us on MAUG who want to stay informed of what's happening, such as how to obtain the latest updates, what's new, etc. For example, there is a /// Workbench system, operating in the Pascal environment, that sounds magnificent. I'll have more details at a later time.

The point is, a lot is happening in the Apple /// community. I, myself, am trying to pull as much of this together as possible and get as many more Apple ///rs involved as I possibly can. (A special Apple /// Bulletin Board/Public Domain Library is another item currently in the works.) This article is one example. To take full advantage of these things, you

should join CompuServe and participate in MAUG, Section 7. I realize that a modem can be a sizeable investment that not everyone can handle. But it is at least something to consider. Also, using CompuServe may not be as costly as you think. Stay tuned for the next installment to find out how you can bypass all the menus and read the Apple /// messages daily for as little as \$.25 a day!

Forth Challenge from p. 27

```
: PRINT.PERMUTE WORKAREA SWAP DUP FACTORIAL 0 DO 2DUP
TYPE CR SWAP OVER + SWAP LOOP 2DROP ;
: PERMUTE BL WORD HERE C@ 1 DO.PERMUTE 7 EMIT HERE C@
PRINT.PERMUTE ;
```

The word PERMUTE followed by a group of n letters, eg. ABCD, will produce all the possible permutations of ABCD which are then listed by the word PRINT.PERMUTE. In addition to putting these words into the FORTH "dictionary", space must be allocated in memory for the WORKAREA. This can be done by the words, VARIABLE WORKAREA 5000 ALLOT which will allocate 5000 bytes in memory (the number of bytes necessary is given by n*n!).

Now for the bottom line of this article, the results of the speed comparison between LISP and FORTH. In his article Bill Wurzel stated that LISP took 42 seconds to permute 6 letters. The FORTH words given above did the job in 17 seconds, less than half the time for a program written in LISP, a language specifically designed for manipulating lists - a clear victory for the sophisticated, forth-generation language FORTH!

Forth Primes from page 28

Inform ourselves that N is prime. If the number is less than zero (i.e., a copy of our -1 flag) it simply drops the flag, and the program is done.

As you can see it is very important to know what is on top of the stack at all times when you write a word. Many FORTH dialects supply a word that will display what the stack is doing when the word is tested. An advantage of FORTH, is that it is interpreted so that when a word is defined you are able to quickly see if it works properly. This makes for fast debugging, and instant gratification. There are many other features of FORTH that make it a good language. I will try to elaborate on them in future columns.

If I have managed to pique your curiosity the FORTH S.I.G. meets the third Saturday of each month at 1:00pm in the office.

Report from EdSig: Human Factors

by Peter Combes

EDSIG Calendar

Tuesday, September 4, at 7.30 p.m.

"Videodisks and microcomputers in Medical Education" by Dan Riorden of the Department of Radiology and Nuclear Medicine, USUHS.

Tuesday, October 2, at 7.30 p.m.

"Videodisks and microcomputers in Medical Education" by Dan Riorden of the Department of Radiology and Nuclear Medicine, USUHS.

All EDSIG meetings are held in the Auditorium, Building B, of the Uniformed Services University of the Health Sciences, on the campus of the National Naval Medical Center, 4301 Jones Bridge Road, Bethesda, MD.

Meeting Report

Tuesday, August 7, at 7.30 p.m.

"Human Factors Theory in Educational Software" - Dr. Janice Morariu.

Dr. Morariu took her degree in curriculum design at the University of Indiana, and has worked in a variety of positions dealing with the use of media with the handicapped, particularly the hearing impaired. Her speciality was "end user interaction" with the media, and she was drawn to the use of computers because of their offered versatility and interactive potential. She has worked a great deal in the design and production of educational programming, but, in her view, the goal of true interactive software has yet to be reached. Her own design work includes the program "Zondar the Wizard", a program to teach critical thinking.

Dr. Morariu made a strong case for several people, and in particular a specialist designer and a programmer, to be involved in the production of any piece of educational software. "When I program, I tend to stick with what I know I can do. What is needed is a designer who will say, 'I want to see this happen', and the programmer will go away and work out how to do it. Both programming and designing are full time occupations."

Dr. Morariu took her audience through a detailed analysis of the issues involved in software design. Questions to be asked in any design are:

What is the task/process that needs to be learned or practiced?

What are the required skills?

What are the expected outcomes?

What has been the traditional approach to the teaching and acquisition of the task/skill?

How is the task presented within an interactive computerised environment?

How is it similar to the traditional approach?

How is it different from the traditional approach?

What cognitive, perceptual, motor skills are required of the learner? (Dr. Morariu quoted the example of a program to teach remedial math that assumed typing skills of the learner.)

Dr. Morariu distinguished clearly between the use of computers in "embodiment" and "disclosure" relationships.

In the Embodiment relation, with the world experienced through the instrument, the tool becomes an extension of the human senses, and transforms the "in-the-flesh" experience.

2. In a Disclosure relation, events are experienced with the tool, and the instruments disclose an event outside our normal experience. The experience is limited by the characteristics of the instrument.

In ways that have yet to be fully explored, new technologies affect the concepts that are taught. As an example, the group discussed the various concepts of time suggested by digital and analog watches.

With the above in mind, educational software needs to be approached with the questions - what is the concept? - is this the best way to approach it?

Dr. Morariu gave examples of programs that were "a lot of fun, but not a cost-effective way to approach the concept."

As a further classification, Dr. Morariu distinguished between "utility" software, in which the user provides the input, and the computer improves the output by overcoming user limitations - and "instructional" software, in which the computer provides the input to the user. The user does the thinking, and the aim of the software is to enhance user potential.

Problems with "utility" software can be that the new techniques require too much learning, that the program is too constrictive, or that the program is too complex.

In instructional programming, it may be that the method or strategy is inappropriate, that the new tool actually becomes a barrier to effective learning, or that the program is unable to handle creative responses. In an example shown by Dr. Morariu, a program asked questions in words, but would only score as "correct" answers that were given numerically.

Considerable study is being given to the motivational effects of video game arcades, which seem to be immune to conventional theories about "length of attention span". Some factors which appeared to be relevant were the existence of clear-cut goals, the fast pace/high response rate ("so much for the line about 'computers have infinite patience'"), the variable levels of challenge (ultimately you never win - so where is Mastery Learning now?), the infinite possibility of improvement, the direct manipulation of visible objects on the screen, and the minimising of errors based on "improper" input.

contd. on page 31

Apple II Text Page Bomb Threat

by Tom Vier

[Editor's Note: This article discusses the "scratchpad" memory found in the Apple II, II+, IIe and IIc. These memory locations are a normal part of the Apple's RAM. They are assigned for use by programs stored on ROM chips that reside on certain peripheral cards. The article explains how programmers attempting to modify page 1 for text or lo-res graphics may accidentally affect the operation of their peripheral cards.]

In last month's Q & A column, Bruce warned of the dangers of PRINTing outside of screen area. Also to be avoided, is BLOADing or doing block memory moves into text page 1! These all can overwrite the I/O scratchpad areas with potentially disastrous results! Invalid data placed in these areas can wreck havoc. See pages 51, 125 and 156 in the new Reference Manual or pages 31 and 82 in the old one. A safe alternative to this is to BLOAD the text into text page 2 (or "3" or whichever) and then move only the screen areas into view on page 1. In the Monitor, there is a very useful subroutine for many text functions, labelled BASCALC, which when entered with the line number (\$0-\$17) in the A-register, places the the base address for that line in \$28L AND \$29H. To move page 2 to page 1, you could use the following:

```
$xx00- A2 17 LDX # $17
$xx02- 8A TXA
$xx03- 20 C1 FB JSR $FBC1 BASCALC
$xx06- A0 27 LDY # $27
$xx08- A5 29 LDA $29 BASH
$xx0A- 29 03 AND # $03
$xx0C- 09 08 ORA # $08
$xx0E- 85 29 STA $29 BASH
$xx10- B1 28 LDA ($28),Y BASL
$xx12- 48 PHA
$xx13- A5 29 LDA $29 BASH
$xx15- 29 03 AND # $03
$xx17- 09 04 ORA # $04
$xx19- 85 29 STA $29 BASH
$xx1B- 68 PLA
$xx1C- 91 28 STA ($28),Y BASL
$xx1E- 88 DEY
$xx1F- 10 E7 BPL $xx08
$xx21- CA DEX
$xx22- 10 DE BPL $xx02
$xx24- 60 RTS
```

To change which "page" you are moving to and from, just poke in the appropriate values into the bytes \$xx0D and \$xx18. In Applesoft, a very slow alternative, it could be done like this:

```
20 PAGE = 2:REM FROM PAGE
30 OFFSET = (PAGE-1)*1024
100 FOR LINE = 1 TO 24
110 VTAB LINE:BASE = PEEK(40)+PEEK(41)*256
120 FOR COLUMN = 0 TO 39
130 CHARACTER = PEEK (BASE + COLUMN +
OFFSET)
140 POKE BASE + COLUMN, CHARACTER
150 NEXT COLUMN,LINE
```

Also, you can make each text page file five sectors long, instead of six, by BSAVEing L1019(\$3FB). And to relocate your program past page 2, you could make the first line read:

```
10 IF PEEK(104)< 12 THEN POKE 104,12:POKE
3072,0:PRINT
CHR$(4)"RUN this program"
```

If you use a lot of machine language subroutines in your program, or one that is long, and you don't want to wait to POKE in all that data, you can make the subroutines relocatable by using relative or forced branching. Then move the code to just after the end of the program and reset the pointer (\$AF,80) past the end of the subroutines. Now they will be loaded along with your program! To call them just do the following:

```
20 ND=PEEK(175)+PEEK(176)*256
100 CALL ND-(offset back into code)
```

You can edit your program and the code will float on the end. This frees up memory page three, ampersand vector, and overwriting worries. One caveat, however, is that some renumbering programs reset the pointer back to where it "belongs". I have found these techniques very useful in a data base I have constructed that previously defied all commercial program applications. This way I have unformatted, full screen editing and display, fast search (using BASCALC, of course) and update capability. Back to the subject of scratchpad, DOS use of scratchpad locations is one small thing Worth/Lechner left out of their very comprehensive book, "Beneath Apple DOS". Here is the list gleaned from the code. Hope you find it useful! By the way, the problem encountered with that Hello program will occur anytime the disk slot scratchpad locations get clobbered, causing the drive to re-calibrate.

DOS Scratchpad Usage

=====

```
$478 - Current track
$4F8 - No. of re-seeks before error
$578 - No. of re-reads before error
$5F8 - Current slot * 16
$678 - Last write slot * 16
$6F8 - No. of re-calibrates before error
```

```
$478+slot - Current track D1 * 2
$4F8+slot - Current track D2 * 2
```

Note: Slot 0 locations not always valid with other cards active.

EDSIG from page 30

It may be that the keyboard is a barrier to "direct" manipulation, and devices such as the Mouse offer more promise.

A most stimulating discussion emerged from these ideas - "Is failure a key motivator in arcade games?" - one that seemed to last long after the meeting was officially over.

Disabled Sig News: New Hardware

by Jay Thal

NEW! NEW! 1st THURSDAY MEETING! NEW! NEW!

DISABLEDSIG SEPTEMBER MEETING
THURSDAY, SEPTEMBER 6, 1984, 7:00 P.M.

Chevy Chase Community Center
Connecticut Ave. & McKinley St., N.W., D.C.

The August meeting resulted in a spirited discussion, led by Roger Petersen and Jim Turril, on the subject of Transparent Screen Emulation. For the non-sighted and visually impaired the CRT, which most of us rely on, has little meaning. However, the CPU "cares" not at all what output device it drives, and speech synthesizers or a braille printer for examples, are equally acceptable to the CPU.

Both Roger and Jim are so thoroughly knowledgeable in the field, and conversant with the products and their developers that anything I could write in detail would be inadequate. However, Jim and Roger have promised detailed articles for future issues.

What I can tell you, at this point, is that Jim demonstrated the quality of speech attainable through currently available speech synthesizers and discussed the PRINT-IT card which he is now working with and will review in his future article.

The PRINT-IT card is not slot dependent, and allows a direct screen dump to a printer or other output device. The advantages of this for the vision impaired are readily apparent, though the card was not designed specifically for those with disabilities. Many commercial programs are "locked" and do not allow for screen dumps, etc. -- mainly to prevent pirating. However, that also "protects" against their use with speech synthesizers. The card is "intelligent", has memory, and a glue-on keyswitch which allows one stroke dumping.

Roger discussed efforts to develop programs which allow speech synthesizers such as the ECHO II, to operate. The problem is that the text to speech algorithms must be loaded into DOS, and any program diskette which requires subsequent booting wipes out the synthesizer's capabilities.

Other problems which don't occur to the sighted include items such as "screen clutter", of which the lines of asterisks at the top of this column are an example. This clutter is visually useful for the sighted, but distracting to the person relying on other forms of output. The synthesizer will faithfully read out incessant strings of such clutter. Programs are being developed to filter out such clutter, and numerous control characters, etc. which can appear in text files.

Mentioned were the developments of Bill Grimm, Ron Hutchison, Dave Halliday, Doug Moore and other legendary figures developing products for the visually impaired. Also, discussed were hardware and software such as: TALKING TRANSCEND, a terminal program; BRAILLE EDIT and DOCUMENTS, word processors for the blind; VERT, the ZERO CARD, etc. But, I'll rely on

Jim's and Roger's forthcoming articles to do them justice.

AN APPEAL!

As noted in the past, the WAP offices limit access to the physically impaired because of their location. The executive board is concerned about this problem and desires some expression of the unfulfilled need that exists among WAP members.

IF YOU, OR OTHERS WHO, WOULD FREQUENT THE WAP OFFICE FACILITIES AND USE ITS SERVICES FEEL LIMITED BY ITS LOCATION, LACK OF HANDICAPPED RESTROOM FACILITIES, OR OTHER PROBLEMS FEEL STRONGLY ABOUT IT -- WRITE. ADDRESS YOUR LETTERS TO THE WAP OFFICE. WE NEED TO KNOW. WE NEED YOUR EXPRESSIONS OF DESIRES, AND SUGGESTIONS.

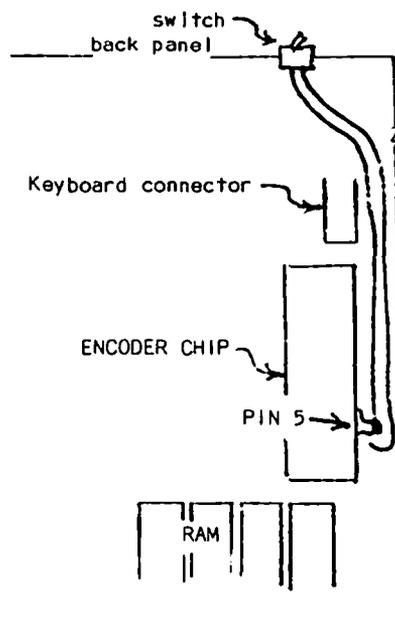
In fact, if you know of actual examples of people who would join the PI, save for the lack of facilities for those with handicapping conditions -- tell us that also.

DISABLING THE //e's AUTO REPEAT - UPDATE

In the June issue of the newsletter we diagrammed how the //e's auto-repeat function can be defeated. We suggested that a test-clip could be used to reestablish the auto-repeat. After that article we received an even more practical suggestion to attach a SPST switch instead of the test clip.

Therefore, one switch lead can be soldered (carefully) to pin 5 of the encoder chip and the other lead inserted into the 5th socket. The switch can be mounted in one of the output holes on the back panel.

For detailed information on the modification you are referred to page 16 of the June 1984 issue. A diagram is shown below:



Undocumented Spreadsheet 2.0 Commands



by Leon H. Roesly, L.C.S.W.

I have learned some rather neat CURSOR movement commands on The Spreadsheet 2.0 that are not documented in the manual (at least in my original version!). As you may know, The Spreadsheet 2.0 is written for both the II+ and the //e. The up and down arrows work on the //e.

However, since the up arrow generates a Control-K, you can use Control-K on the II+ as well to get an up arrow (moving the cursor up one row!).

Thus, since the down arrow generates a Control-J, you can get both the up and down arrow with Control-K or Control-J on the II+!! And this is without reference to the Cursor Movement Indicator (CMI) which can be either ! or - . Thus, if you place the CMI as horizontal (-), the left and right arrows go left and right (of course!), but the Control-K and Control-J will move up and down, respectively. So if you always leave the CMI as -, and use Control-K and Control-J for UP and DOWN, and the LEFT and RIGHT arrows for LEFT and RIGHT, you never will find yourself moving in unexpected directions!!!!

There are five additional major cursor moves available (at least I think that they are major).

HOMES!

The first is Control-E . This will "HOME" the cursor in the left-hand top corner of your spreadsheet model. Try it, it's neat!!

Next, I like Control-C . This will "END-HOME" the cursor to the Rightmost, lowest cell with data in your spreadsheet model! This is particularly if your ready to print your full spreadsheet model. Just go Control-C Control-E /P and you will know the lowest/rightmost corner for printing, return to the "HOME" position, and go to the print menu, all with only three keystrokes!!

JUMPS!

Have you ever wanted to go down several screenfuls, but not exactly sure of where you needed the cursor to be? Have you then wished you could jump a screen, or half-screen? Well, you can! Just depress Control-X to jump down 10 Rows (a half-screen movement) or 2 Control-X real fast for a full 20 rows (a full screen movement!).

To move the same half-screen jump, but in an upward direction, just depress Control-W (and there you are!).

UNIQUE!

Another of the unique cursor movement commands is Control-I . This moves the cursor one column to the right until you reach the end of the screen, and then "WRAPS" to the first column of the next row below on the screen. Kinda neat!

IN ADDITION!

There are seven additional cursor movement commands, but I don't find them quite as useful as these. Let's look at them anyway. Since the right arrow generates a Control-U, and the left arrow a

Control-H, the CONTROL letters will move the cursor 1 column right, and left, respectively.

Five additional CONTROL commands will move the cursor in four directions. They are - left one column: Control-Y and Control-A ; right one column: Control-S ; up one row: Control-Q ; and down one row: Control-Z .

So try these the next time you boot The Spreadsheet 2.0, I think you'll like them.

The Spreadsheet 2.0 Update



by Leon H. Roesly, L.C.S.W.

New features are available for your earlier version of The Spreadsheet 2.0 . I talked with Patti at Apple Puget-Sound Program Library Exchange (A.P.P.L.E.) today, and she confirmed the up-date offer.

The primary new feature is the the up-date will use the expanded 64K on the //e Extended 80 Column board. Thus, for many people with the //e, you would immediately get a template memory of 96K!.

The procedure is as follows:

Send you ORIGINAL disk, along with a check for \$10.00, your A.P.P.L.E. membership number, and a request for the up-date to:

ART-SCI, Inc.
10432 Burbank Boulevard
North Hollywood, California 91601

They will make a copy of the up-date onto your disk, and return it to you. I was also told that there was some minor "cleaning-up" of the program, to make it even more functional than it is (which I think is great).

In addition, the new version has been modified to be able to use the "FLASHCARD", a memory expansion board available for the II+ and //e.



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Fixing WAPABBS 1.1 To Work on An Apple //e

by Thomas Warrick

WAPABBS 1.1, a version of the program that runs Washington Apple PI's Apple bulletin board system (ABBS) that is available on W.A.P. disks 121, 135 and 136, was written, debugged and run on two of the oldest Apple II's on the East Coast. When WAPABBS 1.1 began to be used on Apple //e's, a heretofore-unknown problem arose: characters would not be translated from lower case to upper case.

Normally, lower-case characters sent to the bulletin board system are translated into upper-case characters except when a user is entering the text or the summary of a message. On an Apple //e, however, lower-case characters were not always being translated into upper case. Since the program handled commands in the form of upper-case characters, untranslated lower-case characters were regarded as invalid commands.

The cause of this difference was in the Monitor ROM routines between the Apple II+ and the //e. The former attempted to change all lower case into upper case, whereas the latter welcomed lower case as such. In order for DOS 3.3 to get the Apple II+ monitor to accept lower case at all, DOS had to change the value of all lower case characters from the 224-255 range to the 96-127 range, which made them temporarily flashing numbers and special symbols. DOS 3.3 then knew to change them back to lower-case characters.

The solution to the WAPABBS 1.1 problem is to make a change in the ABBS1.OBJ0 routines that handle case conversion. In the T.ABBS1 file that comes on Disk 136, these routines read:

```
355 SKIP15 LDA CHAR
356 CMP #E1 LOWER CASE 'A'
357 BLT NOTLC2
358 CMP #FB OPEN CURLY BRACKET
359 BGE NOTLC2
360 LDY ALLOWLC
361 BEQ NOTLC2
362 EOR LOCSE MAKE UPPER CASE
363 CMP #E1
364 BLT SKIP16
365 AND #7F FOOL SYSTEM MONITOR
366 SKIP16 STA CHAR
367 BNE ECHO
368 NOTLC2 CMP #A0
369 BLT CONTROL TAKEN IF CHAR IS A
CTRL-CHARACTER
```

To make this work on either a II+ or a //e, replace lines 360-367 with:

```
360 LDY LOCSE DOES THE USER NEED LC?
361 BNE UC IF SO, GIVE IT TO HIM
362 LDY ALLOWLC CAN THE PROGRAM ACCEPT LC?
363 BEQ UC IF NOT, CONVERT IT
364 AND #7F FOOL SYSTEM MONITOR
365 STA CHAR STORE CORRECTED CHARACTER
366 BNE ECHO ALWAYS TAKEN
367 UC EOR #20 CONVERT LC->UC
368 STA CHAR STORE CORRECTED CHARACTER
```

Old line 368, which begins with the label "NOTLC", would then become line 369. Note that old lines 360-367 assemble into 17 bytes of machine code whereas new lines 360-368 require 20 bytes. Thus, simple POKE fixes will not suffice to make these changes. Reassembly of the source code is required. When

reassembling source code, remember that the modem slot number must be set to the appropriate value for your hardware configuration. Most people today use slot 2 for their modem, not slot 3.

A new version of WAPABBS, which will be known as WAPABBS 1.2, is now in the works. Changes currently planned for WAPABBS 1.2 include:

1. Support of Hayes Smartmodem command-compatible modems. (This will require a particular type of serial card, but which one will be supported has not yet been determined.)
2. Capacity for about 255 messages, not 138.
3. More program space, as DOS 3.3 has been relocated into the 16K card space and the USERS.OBJ file has been reduced in size. Notwithstanding this reduction, WAPABBS 1.2 will be capable of handling users with I.D. numbers up to 9,999.
4. Guests will be able to sign on as "GUESTS" with limited access to system features.
5. Some form of conferencing for messages.
6. Correction of the case conversion bug described above, and a few others.
7. Two people can be co-equal SYSOPs with access to all SYSOP features and commands.

WAPABBS 1.2 will be sold as a single disk at the usual price for Apple II disks, and probably will require that you have the three WAPABBS 1.1 disks. A final decision on this has not yet been made by Disketeria staff. A release date for WAPABBS 1.2 has not yet been set, but it is unlikely to be before the October 1984 W.A.P. meeting.

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Telecom Sig

by George Kinal

The Telecom SIG was held after the WAP meeting on July 28th and because George Kinal was out of town the meeting was conducted by Dave Harvey. The meeting topics that were discussed were ideas on what the future direction should be with the WAP ABBS and a general question and answer session.

In regard to future BBS requirements, in past discussions the use of the MOLECULAR Computer was suggested and in answer to the question whether anyone had heard of these Molecular Computers, someone answered that a CP/M BBS in Laurel was using such a computer and had about six lines for the BBS. I got the name of the person to contact, (Wayne Hammerly of Hammerly Computing Services and I will try and contact him to get some more details. One person cautioned me about using a multitasking minicomputer and stated that it is subject to long delays if too many people get on the system. Someone also brought up the suggestion that power line backup should also be considered because of the uncertainty of power outages in this area. I suggested that this requirement varies depending on where you are in the Washington area and that maybe in the Bethesda area where the WAP office is the power is dependable.

The remaining part of the meeting was for question and answers. One question concerned the use of the Demon Dialer with the Hayes Smartmodem and how, by using AE PRO, the commands were sent to the Dialer. I said that Macros were used and that by using these the Demon Dialer could be used. I cautioned, however, that you must make sure that the character used, such as the "!", was not a Macro command. In such an instance, the command must be preceded by the "@" so that AE PRO does not think it is a command it should act on.

Someone also asked what the best modem to buy was and what to look out for. There was much discussion about this and everyone had their own opinions on this subject. The main consensus was that an internal modem gave you more overall control of the modem but that because it is internal not switchable to another computer. The external modems have that advantage over the internal modems.

Other questions asked mainly pertained to CP/M communications. One question was how do you unpack files that have been packed for download. There were a number of answers to this question. One was that there were files on the WAP CP/M disks, such as "UNSCQUEEZE", that could be used to do this. Someone else suggested a program called "M-SWEEP" that did a better job. This program is available for downloading from the Laurel CP/M BBS at (301) 953-3753.



Tutorial Outline

Continued from page 46

- b. In color
3. Shape Tables
4. Printing graphics

C. Limitations and Restrictions

1. Precision
2. Garbage collection
3. PEEK, POKE, CALL, &, and USR
4. Graphics memory, LOMEM, HIMEM
5. How to use a Language card with Applesoft

D. Using DOS from Applesoft

1. Reading/Writing data to disk
2. Sequential text files
3. Random text files
4. Why you shouldn't use PR#1

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Hacker Arithmetic: A Short Hexadecimal Course for the Neophyte User

by Dr. Rowdy

Someday, in order to slay a program bug or rescue some lost data, you may have to go behind the user friendly interface of your application programs and venture into an alien world, the world of the machine language programmer, the world of the computer hacker. Of course, everyone understands that user friendly interfaces are created by paranoid programmers in order to keep a user on his side of the interface and prevent him from messing around with their perfect programs. Naturally these egoistic programmers never really take care of all the eventualities and usually leave large traps in their works for unwary users to fall into. For example, when CP/M users accidentally attempt to save WordStar files to a full disk, does WordStar politely inform them that they need to put in a different empty disk before their long hours of work can be saved? No, instead it complains about a BDOS ERROR, hangs up, and all those pages of text go up in electronic smoke. All this tends to make users feel a bit paranoid when they see the term user friendly.

Before you start off on an exploration into the hacker's world, you must understand that hackers are not normal. They are quite different from the rest of the human race. Chief amongst their abnormalities is that they have eight fingers on each hand and thus are forced to use base 16 or hexadecimal arithmetic whenever they have need for numbers, which is almost all the time. Thus, to be successful in adventures behind the user interface, one must understand arithmetic, hacker style.

In your explorations, when you stumble across a four digit code (often preceded by a dollar sign) that has both letters and numbers in it, it's a safe bet that it is a hexadecimal (hex for short) number left by a hacker to trip you up. Each digit in the hex number runs from 0 to 9 followed by A to F where A is equivalent to 10 and F equals 15. That is, each hexadecimal digit can have 16 values. As in base 10 decimal numbers where placement of the digits represents powers of ten, the places in a hexadecimal number represent powers of sixteen. Thus, the right most place corresponds to 1's which are 16's to the zero power, the second place from the right is 16's, the third place is 256's or 16's squared, and the fourth place from the right (or the leftmost place in a four digit number) represents 4096's or 16's cubed.

Consider that fourth digit representing 4096's. It so happens that 4096 equals 4 times 1024. Now in computerese, 1024 is known as 1K (one-kay). Now everyone knows that 1024 is not actually equal to 1K (meaning 1 Kilo or 1 Thousand or 1,000); however, 1024 is the power of two (two to the tenth power) closest to 1000. Since computer designers can't count past two and must count in binary powers rather than in powers of 10, they have decided, as a matter of convenience, that 1024 is equal to 1K. This means that a 64K Apple //e actually has 64 times 1024 or 65536 memory locations numbered in decimal from 0 to 65535. Now, 65535 in hexadecimal is \$FFFF. Multiply out $15 * 4096 + 15 * 256 + 15 * 16 + 15$ to check this. It is a whole lot easier for the average computer freak to count from \$0000 to \$FFFF in hex than from 0 to 65535 in decimal.

Now consider how much data can be stored in each of those 64K memory locations. You may recall seeing

somewhere that the Apple //e is an 8 bit machine. This means that each memory location in the Apple //e has 8 places where it can store a bit of information. What is a bit of information? Well, frankly not very much. A bit is a binary digit, and it can only store binary information, for example, on or off, positive or negative, charged or uncharged, one or zero. Thus, having eight bit memory locations really means that each memory location can store an eight place binary number. How big is that? Multiply out 2 to the eighth power and the result is 256. Thus each memory location can store 256 distinct memory states. In binary, these memory states are numbered from 00000000 to 11111111; in decimal, from 0 to 255; and in hexadecimal, from \$00 to \$FF.

In order to make things even more confusing, true hackers have arbitrarily decided that an eight bit number or two hexadecimal digit number is to be called a byte. In other words, each memory location in an eight bit Apple //e can store a byte of information or data. Naturally, different kinds of data can be stored in these memory bytes. One of the most common types of data is text. Most microcomputers use ASCII (ask-key) code to store text data. There are 128 ASCII codes commonly used. One for each upper and lower case letter, one for each numeral, one for each of 34 special symbols, and one for each of 32 control codes with names like BEL (for ring the bell) and ESC (for escape). These codes are designated as seven bit numbers and stored in the seven rightmost bits of a byte. The eighth bit, the leftmost high order bit can then be set as a flag to designate something special like the end of a word or a switch to an alternative character set. Most often these ASCII codes are displayed in hexadecimal. Thus you will find a hacker saying \$57 \$6F \$77 \$21 instead of Wow!

If all you wish to do is store integers from 0 to 255, then a Apple //e could keep track of 65536 such integers in a 256 by 256 matrix. But you're probably more interested in storing some decimal numbers. Programs frequently require 5 bytes to store a decimal number that can range from 10 to the minus 37th to 10 to the 37th with 7 or 8 places of precision. Now if memory is used only for storing five-byte decimal numbers, the hypothetical storage matrix is reduced to 256 by 51. And of course, a program is needed to manipulate that matrix. Program, memory management, and disk operating system overhead can typically eat up two-thirds of a 64K memory, leaving memory storage only big enough for a decimal matrix of about 80 by 50. If formulas, etc. are needed to define relationships between numbers in the matrix, they take up additional memory. Is it any wonder that you are always running out of room in spreadsheet programs?

Now that you understand true hacker arithmetic, don't be afraid to arm yourself with an ASCII code conversion chart and go adventuring into the realm of the hacker.

* Dr. Rowdy is the pseudonym of a part-time hacker who wishes to hide from fellow hackers his concern for lost-in-the-jargon beginners.

Software Piracy & Users Rights from the Capitol PC Monitor

by Don Withrow

There's been a lot in the news lately about copy protection schemes, software piracy, and users' rights. Two months ago I wrote about the software pirate who shares copyrighted and licensed software with others illegally, thereby adding fuel to the vendor community's fire that copy protection is necessary. Last month I spoke of some problems caused by vendors' copy protection schemes for the honest user attempting to take full advantage of his PC investment.

It should be apparent, even to the casual observer, that both the vendor and the user have rights that are being violated. What is not apparent is what's being done about it in a constructive manner that will be of mutual benefit to both the vendor and the user. If you've not seen evidence of a coordinated vendor/user effort to solve this apparent dilemma, don't rush to get your eyes checked. Until recently there has been none. Sure, the vendors have banded together and chipped in money and pledges to their software protection fund to seek legal remedies to the problems of piracy and copyright infringement, but no one has stated the users' case. It's about time someone did just that. If the vendors are reasonable people, and I for one think they are, they'll listen to what we have to say, because after all, who do they suppose is going to buy their next generation of software systems?

Vendors cite user ignorance of the law as the true problem and say that education is the solution. They are going to venture out among the users to spread the word. I agree, ignorance is a big problem, but users don't have a corner on the ignorance market. The more that CPCUG officials look into this matter of copy protection and deal with vendors about it, the more I am convinced that most vendors are truly ignorant of the basic needs of their users. If you've read the license agreement and warranty disclaimers that accompany the software you've purchased, you'll discover quickly whose rights are being considered: the vendor's. I can't blame the vendors for watching out for themselves. Given the chance, users should, too. I think that chance has come and the time is now to take advantage of it. We need to draft a list of users' rights and present them to the vendors for consideration and resolution. We (users) can't force the vendors to accept our Bill of Rights, but they would certainly benefit by listening to us.

Editor's Notes

Headaches by Doug Thompson

"He was caught on Nov. 21, 1718, near Ocracoke Inlet, off the North Carolina coast. He fought desperately with sword and pistol until he fell with 25 wounds in his body. His head was taken back to Virginia and exposed on a pole." (William Bonner in *The World Book Encyclopedia*).

Like Captain Kidd, Blackbeard (Edward Teach) met a rather unromantic end. Both suffered permanent cerebral

damage for their acts of piracy. Their modern counterparts are still getting away with murder and so far the penalties have been few and far between for the micro-corsairs. Browning and Schneider are both reporting on the piracy problem in this issue. Through their efforts the club hopes to present a user group viewpoint to the Association of Data Processing and Service Organizations (ADAPSO) and its Software Protection Fund committee. One of their goals will be to educate the committee—Why are users pirates? Another goal might be to determine how many copies of Lotus 1-2-3 are floating around Ashton Tate, and how many copies of dBASEII have sailed down the hallowed halls of Lotus. Many of the original pirates took up their trade because they were oppressed. Could it be that many users have followed the same course?

Some software publishers complain that club bulletin boards or newsletters provide code breaking programs yet they never complain that all computer magazines publish full page ads for software that will do the same job. That's editorial oppression against a very small minority. The industry has romanticized the role of the pirate, in fact it encourages code breaking exercises. John Dvorak in the June 25th *InfoWorld* notes that Defendisk Inc. is offering \$10,000 to anyone who can produce a duplicate Defendisk protected diskette. That's like dangling gold doubloons on the yard arm and then giving Blackbeard a reward for retrieving them. In that same issue Dvorak encourages another type of piracy—using MCI Mail as a free upload/download utility. Let's not kid ourselves, it isn't user groups that are promoting piracy, it is the publishing industry itself. Browning and Schneider could provide valuable input to the Fund's committee. Their liaison role should be supported by the club and by ADAPSO. The computer industry, which is heading for \$1.35 billion dollars in advertising expenditures this year, can certainly come up with more than \$200,000 for the Fund. The industry as a whole should support the Fund and its goals. This is a problem affecting every computer company; those who don't support the Fund will be walking the balance sheet plank. That's about as romantic as having your head propped up on some Virginia pole.

Vendor Relations: User's Rights and The Software Protection Fund

by Dave Browning

Elsewhere in this issue Jerry Schneider reports on the microcomputer software industry's "Software Protection Fund" that has been organized to fight software piracy. At the Atlanta COMDEX in May, Jerry, Jimmie Faris and I attended a meeting of the SPF at the invitation of David Cole, one of the co-chairmen. Jerry describes the background, purpose, and direction of the SPF, so I won't discuss them here. I do want to let you know what I feel this activity means to us as end users, and what I think we should be doing about it.

The three of us were invited to the SPF meeting as representatives of CPCUG because of our group's philosophy and policies against software piracy. We were the

only user group representatives there. The attendees of the meeting were primarily members of the vendor community, industry trade journal reporters, or members of ADAPSO, the Association of Data Processing and Service Organizations. At this point in time, the SPF is entirely made up of vendors, vendor organizations, or trade journal publishers.

Despite several statements made by the co-chairmen about the rights of end users, the need for the industry to clean up its own act, and "social contracts" between software publishers and purchasers, I am very concerned about the lack of user representation in the SPF. I recently spoke with Ronald Palenski, the Associate General Counsel of ADAPSO, who is working to improve the laws concerning the rights to software and protection of ownership. I asked Mr. Palenski if the rights of end users were actively considered as part of the effort to modify the laws. It was clear from his response that the effort is directly oriented to improving the protection available to the vendor of the software, and that end user considerations were not a major part of their activity.

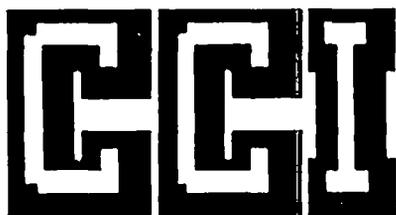
The SPF is going to be very powerful. Its initial gathering of contributions is \$200,000, with a goal of \$500,000. This money will be spent in the SPF's "war against software piracy," directed by vendors, reported by trade journals fed by vendor advertising, and supported by vendor organizations. If we end users want to be a part of shaping the future of software protection and related user rights issues, we better get involved now.

As the Director of Vendor Relations for Capital PC, I intend to get CPCUG involved with the SPF to represent the end user point of view. I will be meeting with ADAPSO

President Jerome Dreyer later this month to discuss our involvement, and CPCUG will probably wish to join ADAPSO to gain entrance to the SPF as a legitimate member. We will also need to define "user rights" positions and work with ADAPSO and the SPF to develop these within their activities. We certainly must educate the vendors of our needs as users, rather than stand by and let them impose their views of our needs on us, no matter how benevolent their motives.

I don't want this to become a "we vs they" confrontation, as that type of fighting is generally non-productive. Besides, we probably don't have the resources to win very many battles. I have met David Cole several times, and am impressed with his sincere desire to "do the right thing." He also seems to realize that it is in everyone's best interest to incorporate both vendors and users needs as solutions to issues are sought. We have the opportunity to be a part of the solution. Right now I am working to establish CPCUG as a recognized participant in the SPF efforts, and to put together an end user's position to work from. I also have to work out arrangements for communicating with the SPF members, including participation in selected meetings. I am very interested in your views on this. Please call me or drop me a letter to express your opinion or to share your thoughts as to how we should proceed.

In a related development, Jimmie Faris is in the process of organizing a fall "moderated panel discussion" of these issues in front of the CPCUG with panel members from the SPF and CPCUG. At COMDEX, both David Cole and Mitchell Kapor indicated their support of such a discussion, and Jimmie will be working with their representa-



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lives to set it up. You will be hearing more about this from Jimmie.

Software Industry to Users— Help Stop "Softlifting"

by Jerry Schneider

At a meeting of the Software Protection Fund at the Spring COMDEX in Atlanta, representatives of the microcomputer software industry asked users to join with them in condemning and stopping the illegal copying of software. David Cole, president of Ashton-Tate and co-chairman of the SPF stated, "We don't want to punish anybody. What we're trying to do is create a climate of opinion in which people will not tolerate software piracy, in which the piracy of software will have the same moral and ethical impact as shoplifting." The other co-chairmen, Steve Ballmer of Microsoft and Mitchell Kapor of Lotus Development Corporation, echoed these sentiments.

At the same time, Mitch Kapor called upon software publishers to acknowledge a "social contract" between purchasers of software and the publishers. Under such a contract, publishers have an obligation to provide users with:

- Quality products, with a strong warranty guaranteeing that they will function, as advertised;
- Helpful and understandable documentation; and
- Timely service and technical support to registered users.

As their part of this social contract, users are obligated to:

- Honor any licensing and site agreements, particularly in making sure that all software in use has been properly purchased; and
- Discourage software piracy by not sharing software with others.

What is the Software Protection Fund? What is their purpose? What do their activities mean to CPCUG and to computer users? Because I believe the SPF will have a serious impact on the microcomputer software industry during the next few years, I think it important to bring this organization and its activities to the attention of the CPCUG membership.

Background

The Software Protection Fund is a standing committee of ADAPSO, the Association of Data Processing and Service Organizations. Its purpose is "to establish and implement a realistic, action oriented program to frustrate illegal copying of microprocessor software." The roots of the SPF can be traced to informal discussions among representatives of the leading microcomputer software companies on the issue of software piracy in November,

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1983. As a result of these discussions, a steering committee was appointed to pursue the initial phase of the Fund's activities. Steering Committee members were: David Cole, Mitchell Kapor, Steve Ballmer, and Richard Frank of Sorcim Corporation.

SPF was formally introduced in February at Softcon in New Orleans. At that time, the Fund identified four action areas to be addressed. These included:

- **Technical Protection**—The software publishing industry must pursue some form of technical copy protection.
- **Government Activity**—The software publishing industry also must actively seek to influence and initiate government activity related to software protection, particularly with emphasis on tailoring the copyright laws to respond to the problems of software publishers.
- **Education**—Through advertisements, articles, speeches and forums, users—corporate and casual—must be educated to the need for software protection and the high costs of software development.
- **Visible Enforcement**—Visible enforcement must be undertaken in situations that highlight industrywide problems, such as actions against visible Fortune 2500 users; actions against "aiders and abettors" which market programs or products intended primarily to break technical protection methods; and actions against companies which create emulations of existing software products through decompilation or disassembly in possible violation of the copyright laws.

The first two action items—Technical Protection and Government Activity—would be addressed by the Microcomputer Software Association (MCSA), a section of ADAPSO. The Software Protection Fund would be responsible for Education and Visible Enforcement. Towards these ends, the SPF requested contributions from members of the industry, establishing an initial goal of \$500,000.

Current Activities

At the Spring COMDEX meeting, it was announced that the Software Protection Fund has already raised \$200,000.

The organization will formally be introduced to its target audience, the endusers, at the National Computer Conference in Las Vegas in July. Organizers hope to have available, at that time, a "User's Bill of Rights."

Most of the contributed funds will be used to carry out the educational activities of the group, which will include a public relations and advertising campaign. Several computer periodical publishers, including Ziff-Davis Publishing Company, publisher of *PC Magazine*, *PC Week* and other computer-related publications and Dun & Bradstreet—owned Technical Publishing Corporation, publisher of *Datamation* and *Software News*, have committed advertising space at no charge.

While Fund supporters admit that software piracy is prevalent at all levels, the initial target areas will be corporate and national account users. Mitch Kapor indicated that the public relations and advertising campaign

will be informative, emphasizing how serious and deep-rooted the problem has become. "Any sort of heavy-handed approach is bound to fail," he said. "It is imperative that we educate the users, not threaten them."

The Fund will aid its members in the area of visible enforcement by establishing an expert witness program and filing *amicus curiae* briefs in appropriate cases.

Before beginning their activities, member organizations were warned that their first order of business is to make sure that their own company has a written, enforceable anti-piracy policy in place for its employees and that any illegal copies of disks be destroyed.

The Software Protection Fund indicated that user groups could take a leading role in stemming software piracy. Mitch Kapor asked that all user groups adopt policies similar to those initiated by the Capital PC User Group, including:

- Take all copy-protection "break" schemes off any user group sanctioned Bulletin Board Systems (BBSs);
- Do not publish copy-protection "break" schemes in user group publications;
- Do not sell copy-protection "break" software; and
- Educate your users about the seriousness of the issue.

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The VALUE of STRings \$\$\$

by J.T. (Tom) DeMay, Jr.

It has been quite some time since we last heard anything about the FILE CABINET programs. Could it be that they have been cast aside in favor of new, more glamorous software? I'm not so sure. I suspect there are many WAP members who still use them, and probably some newer APPLE owners who don't even know what they are. For the latter group, FILE CABINET was originally distributed free by APPLE COMPUTER, INC. as part of VOLUME 3 of the APPLE SOFTWARE BANK OF CONTRIBUTED PROGRAMS in 1978. The only catch was, you had to have a disk drive to use it. At that time most APPLE computer users were still storing programs on cassette tape. Only the hardcore users spent the extra money for a disk drive. At any rate, it was a very useful program for storing and retrieving data. As its popularity grew, so did its variations. There are many versions of FILE CABINET available today, including SUPER FILE CABINET on WAP library disk #37. Let's use SFC (SUPER FILE CABINET) to learn about the Applesoft VAL and STR\$ functions, while adding another feature to this already useful program. First, a few basics are in order.

Applesoft stores data in locations called variables. These variables can contain letters, numbers or combinations of letters and numbers. If we want to store the number 123, a simple BASIC statement would be:

```
100 NUMBER=123 or 100 NUMBER%=123
```

The variable name NUMBER is used to denote the location in memory that 123 is stored at. In the second example, the variable is of a special numeric type called an INTEGER variable, and must only be used to store whole numbers. Please note that NUMBER and NUMBER% are two separate names. It is also important to remember that only the first two characters in the variable name are significant. For example, NUMBER and NUMERAL are considered to be the same name to Applesoft. If the data we want to store is not numeric, then it must be stored in a string variable denoted by a dollar sign after the name, as in:

```
100 NUMBER$="123"
```

After this line is executed the variable NUMBER\$ holds the characters 123, not the value 123. Although they may look the same on the screen, they are most definitely different. It is not possible for the computer to perform arithmetic operations on any characters stored as string variables. Applesoft will not let a string be assigned to a numeric variable. They must first be converted to integer variables or floating point variables. In some cases it is desirable to convert string variables to numeric variables and vice-versa. VAL will fetch the string and convert it to a numeric and STR\$ will fetch the number, and convert it to a string, or character variable.

Consider the following example:

Choose one of the following:

- (1) READ data
- (2) WRITE data
- (3) PRINT
- (4) QUIT PROGRAM

Which:

The program statement to get the user's response could be written as:

```
330 VTAB18:HTAB18:INPUT "Which: ";CHOICE
340 ON CHOICE GOTO 500,600,700,800
```

or as:

```
330 VTAB18:HTAB18:INPUT "Which: ";
CHOICES$:CHOICE=VAL(CHOICES$)
340 ON CHOICE GOTO 500,600,700,800:GOTO330
```

Can you determine which would be the better of the two? My choice is always the latter. Looking at the first example, if the user accidentally enters a character other than a number, a ?REENTER error would be issued by Applesoft. The second example stores the character typed as a character string, converts it to a numeric value, and then stores the numeric value in the variable CH. If a non-numeric character were entered, it would return a value of 0, and could be handled by the subsequent program line. No ?REENTER error would be encountered.

For this exercise, a SFC database of the following format will be used:

```
FIRST NAME:
LAST NAME:
STREET:
CITY:
STATE:
ZIP CODE:
AMOUNT DUE:
```

This could be a list of club members and amount of dues paid, or a customer list depicting the total-to-date purchases, etc. It would be helpful if SFC could add the new AMOUNT DUE to the existing AMOUNT DUE, or subtract the AMOUNT PAID from the AMOUNT DUE. The important thing is that SFC (with a little modification), can be used to do arithmetic operations.

Let's look at the program listing for SFC. WOW! Eleven pages of program. Don't be intimidated by that. There are several REM statements to help us find our way through. Since we want to change the input routine to incorporate our new features let's look for a REM statement which locates the INPUT ROUTINES. They can be located at line #'s 4720 thru 4800. From these lines, it is readily apparent that SFC uses string variables to store all data. Also take a close look at line #4740.

```
IF COMMA$="NO" THEN INPUT " ";!$:RETURN
```

If the variable COMMA\$ is equal to "NO", then use the standard Applesoft INPUT routine to accept the data. If it is anything but "NO", then use the Applesoft GET command to build a character string. In other words, it is possible to enter data including commas into fields of SFC if the COMMA\$ variable is not set to "NO". This can be done by deleting line #1080, or by changing it to offer a choice by the user.

On closer inspection, we discover that this is the initial entry input routine, and there is a different input routine used to change the value of previously stored data. It can be found at line #'s 2080 thru 2230. Add or change the following lines to implement the new feature:

```
2180 PRINT "TO "H$(RQ)": ";:GOSUB 4730:
A1 = 0:A2 = 0:A3 = 0
```

```

2182 IF LEFT$(I$,1) = "+" THEN A1 = VAL
      (N$(J,RQ)) + VAL (I$):
      N$(J,RQ) = STR$(A1): GOTO 2190

2184 IF LEFT$(I$,1) = "-" THEN A1 = VAL
      (N$(J,RQ)) + VAL (I$):
      N$(J,RQ) = STR$(A1): GOTO 2190

2186 IF LEFT$(I$,1) = "*" THEN A2 =
      (LEN(I$) - 1):A1 = VAL(N$(J,RQ))
      * (VAL(RIGHT$(I$,A2))):
      N$(J,RQ) = STR$(A1): GOTO 2190

2188 IF LEFT$(I$,1) = "/" THEN A2 =
      (LEN(I$) - 1):A3 = VAL(RIGHT$(I$,A2)):
      IF A3 > 0 THEN
      A1 = VAL(N$(J,RQ)) / A3:
      N$(J,RQ) = STR$(A1): GOTO 2190

2189 N$(J,RQ) = I$

```

Line #2180 has been changed to redirect the program to the initial entry routine to take advantage of the possibility of entering commas in the data. The additional lines are required to inform SFC what to do if we want to do arithmetic operations on the new data entered. Examine them and see if you can determine how they work. Here is a hint: If you want to add a new amount, say 100, to the amount stored in a particular field, just enter +100 as the "CHANGE TO" data. Similarly, if you want to subtract the new amount from the stored value, enter -100. SFC will do it for you. It will even multiply or divide by the new amount.

Here's how it works. Line #2180 prints the heading (H\$(RQ)) of the field to change, then redirects program flow to the input routine at line #4730, which gets the new data and saves it in I\$. On returning, the temporary numeric variables A1, A2, and A3 are set to 0. The next lines check the first character of I\$ using the LEFT\$ command to determine if it is a +, -, *, or /. If not, then program flow is to line #2189 and everything works as before. If one of the special characters (+, or -) is detected, then the original data stored in N\$(J,RQ) is converted to a numeric variable and added to or subtracted from the value of the remaining characters in I\$. The last step is to convert the value of A1 back to a string variable to be consistent with SFC format. It is deposited in N\$(J,RQ) just where SFC expected it to go before we started messing around.

Since only the + and the - are evaluated by Applesoft as numerics, a little extra programming is necessary to use the * and the / as identifiers. In other words, if the character string being evaluated begins with anything but a numeric character, VAL will return the value of 0, ignoring every character following it. In line #'s 2186, and 2188 RIGHT\$ must be used to extract the actual value of the data entered excluding the * or the /. As in the previous two lines, the arithmetic operation is performed on the numeric variables, then the resulting answer is converted back to a string and assigned to N\$(J,RQ). N\$(J,RQ) is the two dimension array in which SFC keeps track of the actual data. J is the RECORD NUMBER and RQ is the FIELD within the RECORD.

I hope you find this a useful addition to the FILE CABINET series of programs. If you would like to learn more about the FILE CABINET programs, here's where to look:

FILEHANDLER	- WAP JOURNAL 9/82
Inspecting Text Files...	- WAP JOURNAL 12/82
FILE CABINET REVISITED	- WAP JOURNAL 4/83
FILEHANDLER REVISITED	- WAP JOURNAL 4/83

Think Tank is an outline organizer that interfaces with MacWrite. Members had mixed opinions about this product; several believed it had major drawbacks, such as not being able to write paragraphs within the outline. An August 20, 1984, InfoWorld review gives it three disks.

Three database packages are available now for the Mac. Omnis 2 is not Mac-like. Main Street Filer (MSF) is reviewed in August 6, 1984, issue of InfoWorld. It doesn't have merge capability. A second disk drive is recommended for optimal use. Habadex and MSF are reviewed by Brooks Leffler in the August WAP Journal. Brooks prefers MSF for mailing list management. 1st Base, PFS:File, and PFS:Report are also available. 1st Base is a relational database management system and lists for \$195.

Microsoft BASIC Version 1.1 is out. If you have Version 1.0, call (206) 828-8088, and, for \$25 and the name of a bug in Version 1.0, you can get 1.1. Three bugs in Version 1.0 are:

-- During a save, if you accidentally press the mouse or hit RETURN, you will abort the SAVE and truncate the file.

-- If you have an odd number of string arrays or if you dimension string arrays before you dimension integer or real arrays, they won't work.

-- If you try to double click a program icon from the second disk, Mac will say it can't find the disk.

Multiplan Version 1.02 is out and will be upgraded free if you are a properly registered owner of 1.0. The 2.0 version of MS-BASIC is due out soon.

MAC RESOURCES

In July, a random survey of local dealers revealed two stores with a good supply of Mac materials: The Computer Store on K Street in the Esplanade Mall and Bethesda Computer. The Software Center in Rockville had a nice selection of products, but its sister store in Springfield did not. Local stores had Habadex, the Infocom games, Transylvania, Think Tank, Main Street Filer, Megamerge, and MacPic, among others. Software Specialists, on K Street downtown, offer a 20 percent discount on software. I visited this store on August 10; at that time it had much of the available software, including new releases, on its shelves. I was not impressed with its sales force, however.

LATE BREAKING NEWS

The August 20, 1984, issue of InfoWorld relates two rumors of interest to SigMac members: Apple is planning to enable Mac software developers to program on the Mac instead of on the Lisa by October. Also, COLOR MACS are coming. Remember ... these are rumors!

YOUR HELP REQUESTED

I'd love to pass along your experiences with the Mac. If you have any news you'd like to see in this column, you may drop me a line at P.O. Box 19142, Washington, DC 20036, call me at home before 9:00 p.m. at (703) 765-4303, or call me at the office at (202) 475-4940. I'll also take information at meetings (that's me up there taking notes). Thanks!

FILE CABINET FIXES	- WAP JOURNAL 6/83
FILEHANDLER UPDATE	- WAP JOURNAL 12/83
File Cabinet Goes to the Races	- WAP JOURNAL 12/83

As always, if you have any comments or suggestions I can be reached at 779-4632, or by mail through the Washington Apple PI office.

APPLE TECH NOTES

by Richard Langston II

In the second installment of this column, Applesoft notes will be presented.

HCOLOR= AND HLOT TO

HCOLOR immediately followed by an HLOT TO X,Y will draw a line using the previous color. This is because HLOT TO assumes that the internal color mask has already been set up by HLOT. An HLOT is required to plot with the new color.

NUMERIC COMPARISON PROBLEMS

When two numbers print as equal but an IF statement doesn't think that they are equal, then the least significant bits in the internal binary storage format of the numbers is probably different. Applesoft's PRINT statement will truncate a number that is extremely close to being an integer. For example, 3^2 and $3*3$ will both print as 9, but they won't compare as equal. Printing 3^2-3*3 will result in 3.7252903E09 and the expression (3^2-3*3) will be false.

On page 18 of the Applesoft Reference Manual, there is a formula to round Applesoft real numbers to a specified number of decimal places, and on page 22 there is a program to limit the number of digits to the right of the decimal point.

OVERFLOW ERROR ON FIRST LINE OF PROGRAM

If the first number in the first line of the first program run after booting DOS is a negative number, Applesoft might return an OVERFLOW ERROR. This usually occurs when the first statement is "CALL -936", which can be replaced with "HOME."

DIRECTLY PRINTING THE TEXT SCREEN TO A PRINTER

The exact contents of the text screen can be sent to a printer with the following program. It uses the VTAB command to find the starting address of each line and adds a character counter to index across the screen. This can easily be included as a subroutine in an application program.

```
10 FOR V= 1 TO 24
20 VTAB V
30 P=PEEK(40) + PEEK(41) * 256
40 FOR H= 0 TO 39
50 PRINT CHR$(PEEK(P+H));
60 NEXT H
70 PRINT
80 NEXT V
90 END
```

Decreasing the limits of V and H in lines 10 and 40 will limit the program to send only part of the screen.

FRE(0)

PRINT FRE(0) can cause the Apple to hang if it is done in command mode immediately after loading a program from disk or after using Applesoft RENUMBER, because the variable pointer aren't all reset properly. Typing CLEAR before the PRINT FRE(0) will return the expected results.

SHAPE TABLES

Applesoft will allow you to draw shape number zero with unexpected results. It will end up interpreting part of the shape table as the address of the desired shape and try to draw what it finds there. Since this isn't a shape table, the result is a random assortment of lines.

FLOATING POINT NUMERICS PACKAGE

Sometimes Applesoft's math package doesn't give the exact answer that is expected. This is caused by the fact that Applesoft does all of its calculations in a 32 bit binary floating point format, and there are no exact equivalents to most numbers. Also, Applesoft uses natural logarithms to calculate many of its transcendental functions, which also adds small errors to the results.

HLOT TO AFTER A DRAW

The Applesoft DRAW command doesn't leave the internal pointer for the last plotted point where the HLOT TO command can use it. HLOT TO X<Y will draw a line from a random point to X,Y. The following program contains a machine language program that will decode the position and set up the HLOT pointers. Then HLOT TO X<Y will draw from the last plotted point of the shape.

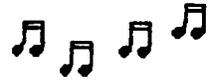
```
10 FOR J=768 TO 780
20 READ A
30 POKE J,A
40 NEXT J
50 DATA 32,203,245,166,224,166,224,164,225,165,226,
        76,17,244
110 HGR
120 HCOLOR=3
130 SCALE=1
140 DRAW 1 AT 100,100
150 CALL 768: REM LTHIS IS IT!
160 HLOT TO 10,10
170 END
```

APPLESOFT'S HI-RES COLLISION COUNTER

The collision counter byte located at \$EA is a byte that is incremented when a shape is drawn and it crosses a non-black dot on the screen. Applesoft does not initialize this byte, so it should be set to zero before using it.

The collision could be used, for instance, to detect when a lunar lander hits a mountain, by first setting it to zero and then checking it for non-zero values each time the lander is drawn. &

Music Construction Set: A Review



by Dan Robrish

For a while now, Electronic Arts has been advertising Music Construction Set as the music program that's easy to use and doesn't sound "...like so many burps." MCS is a nice program, and it does sound nice. However, it has poor controlling with a joystick. Without a Mockingboard, you cannot control sound quality or volume and the beat counter doesn't function. Also, using the tunes in your own program is Mockingboard dependent. Now that I've tarred and feathered it, let me go on to the good points.

It's affordable. It supports printing of the music. It uses standard musical notation. Standard musical notation is important if you're copying music because that's the way the music will be written. Songwriter uses a "player piano" notation--high pitch notes are higher on the screen whole notes look longer than 36th notes, et cetera. If you want to copy music, you must hear the music than trial-and-error away until you either a) get the tune, or b) go insane trying. MCS, on the other hand, is easy to copy music into and supports two voices without a Mockingboard, and six voices with one. Six voices are only used with a canon, or round. For those of you who've forgotten what a round is, that's what your second grade music teacher made you sing. Three groups sing in unison:

- G 1: Row row row your boat gently down the stream..
- G 2: Row row row your boat gently..
- G 3: Row row row your..

- G 1: Throw your teacher overboard and listen to ..
- G 2: down the stream, Throw your teacher overboard ..
- G 3: boat gently down the stream, Throw your tea..

This goes through three to five times, usually. MCS is capable of doing this if a Mockingboard is installed. Unfortunately, MCS will not allow lyrics in the song although the Mockingboard is capable of singing. With a Mockingboard, the music scrolls across the screen as it is played. A very nice feature of the program is the icons. To move the music toward the beginning, use the left arrow icon. To move towards the end, use the right arrow icon. To move the music straight to the beginning, use the home icon. To play the music, use the piano icon. To cut a measure, use the scissors, and to put it somewhere else, use the glue. To save or load music, point to the floppy disk. A nuisance of the program's package is that the manual and reference card are somewhat hidden. In the left flap of the package, not over it but in it, is the manual.

All in all, this seems to be a nice program. If you play in the National Symphony Orchestra, or if you know about music from your cat walking across the piano keys, then this program is for you. If you're interested in getting a Mockingboard for \$25.00 off, it's also for you. (Don't buy MCS just to get a good deal on the board. MCS costs more than the discount.) In other words, this program is for anyone with an Apple and any interest in music.

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Tutorials for New Apple II Owners

Course Outlines by Bruce Field, Tom Warrick and Bob Platt

Our series of four monthly tutorials will be beginning again in September on Tuesday evenings from 7:30 to 9:00 PM at the office. We have revised the tutorials somewhat to better serve our membership; Session 2 now includes ProDOS, and Session 4 has been completely changed from Bits, Bytes, and Nibbles to Intermediate Basic. These tutorials are designed for beginners. They can be taken individually or in any order, although we suggest that you take Session 3 "Welcome to Applesoft Basic" before Session 4 "Intermediate Applesoft" if you have no experience with Applesoft. A registration form is in the back of this issue.

SESSION 1. Introduction to Apple Computer Hardware

A. Welcome to the World of Apple

1. Hooking It up: disk drives, printers TVs & RF modulators, game paddles
2. Inserting and removing cards
3. The keyboard

B. Handling Floppy Disks

1. Read a catalog
2. Running a program
3. Using the back of the disk

C. Handy Features

1. Added memory boards
2. Eighty columns
3. Lower Case
4. Fans

SESSION 2. How to Use Your Apple Software

A. Booting a Disk: PR#6 and Friends

1. The Autostart ROM
2. The Disk Drive
3. Run the "HELLO" Program
4. The Worst That Could Happen: There Goes \$2,90 Down the Drain

B. CATALOG: What's on This Disk?

1. The File Name (30 characters)
2. Locked or Unlocked?
3. File types: A, I, B, T, R
4. File Size I: Sectors

C. Other Important DOS 3.3 Commands

1. General DOS Syntax
 - a. The command word
 - b. The filename
 - c. Other Information (e.g. new filename, loading/saving address)
 - d. Slot, drive, volume
 - e. Must start at the "left margin"
2. INIT filename: Initializing a Disk
3. LOAD filename: for Applesoft and Integer
4. RUN filename
5. SAVE filename
6. BRUN, BLOAD, and BSAVE
7. DELETE filename
8. LOCK and UNLOCK
9. Text Files: a Very Brief Introduction

D. Useful DOS 3.3 Utilities

1. FID: File Developer
2. COPYA
3. BOOT 13 and MUFFIN
4. INTBASIC and INTEGER BASIC-DISK
5. The WAP New Member Disk
6. Disk Recovery Programs

E. Introduction to ProDOS

1. Pathnames
2. - (Smart run)
3. FILER
4. CONVERT

F. For Further Reading

1. The DOS Manual(s)
2. Beneath Apple DOS
3. All About DOS

SESSION 3. Welcome to Applesoft Basic

A. What Is Programming?

B. The PRINT Statement

C. Variables

1. \$ means string
2. % means Integer

D. INPUT statement

E. Arrays

F. Immediate Mode vs. Stored Program

1. Line numbers
2. LIST, NEW, DEL

G. Changing a Program Line

H. Running a Program

1. RUN
2. CONT
3. CLEAR
4. END

I. Looping

J. Branching

SESSION 4. Intermediate Applesoft

This is a continuation of "Welcome to Applesoft Basic".

A. Subroutines

1. GOSUB, RETURN
2. POP

B. Graphics

1. Low-resolution graphics
2. High-resolution graphics
 - a. In monochrome

contd. on page 35

The Internist: A Review

by Bob Oringel

The Internist is a human disease diagnosis program, reviewed here for the WAP membership (especially the MD's and RN's reading this). It consists of a three sided, two disk, non-copy-protected program. The disks supplied include the program disk and the reference disk. N-Squared Computing, of Silverton, Oregon urges the purchaser to back up the disks and work with the back-ups.

The program is completely menu driven and can easily be used by physicians with little computer literacy. It is a fast operating program, employing Divers!-Dos, with an Applesoft version also included on the two-sided program disk.

Upon booting the Internist program disk, the Main Menu permits the entry of medical symptoms, allows editing of symptoms to screen out the least important, and permits analysis of the symptoms entered.

Choosing symptom entry, produces a screen with a Body Part/Function/Product Menu. This screen permits the choice of specific body parts or functions for diagnosis. Choice from this menu produces another menu which lists specific symptoms from a necessarily limited list. Choosing from this menu, then progresses to an editing function screen which permits the physician to narrow the choice of symptoms. One then arrives at an Analysis Menu, providing the physician with either an exclusive analysis, or a pooled analysis.

The exclusive analysis lists only the diseases which include all of the symptoms entered. The pooled analysis lists all diseases which have at least one symptom in common with those symptoms chosen.

From the exclusive analysis screen, the physician may proceed to the reference disk, after identifying in which drive it is resident. In the reference mode, the program will display all of the symptoms of a referenced disease.

The pooled analysis lists a ranking of diseases or conditions in which the symptoms occur, in the order of number of given symptoms per diseases can exceed 200. The Internist program can diagnosis 331 conditions or diseases.

Both References and Diagnoses may be viewed on screen or sent to a printer.

The Internist includes a 26-page instruction manual which is clearly written and professionally printed.

This reviewer is not trained in medicine and so can only attest to the program's working as advertised. It did.

A couple of closing thoughts aside, triggered by The Internist, and again as a layman. Even with the understanding that medicine constantly updates prescribed drugs, wouldn't it be even more helpful to the physician if the diagnosis was followed by prescription(s) of medicines to accompany diagnosis? And lastly, one wonders if programs of this type will be the forerunners of do-it-yourself medicine. I for one, truly hope not.

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Apple Mouse //: A Review

by Bernie Benson

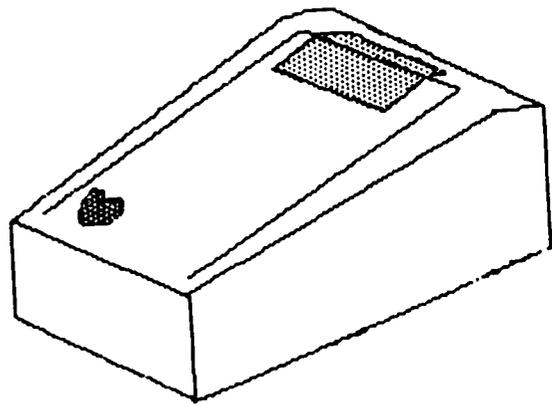
So you'd like to mouse around a bit, but you can't afford a Macintosh. The AppleMouse // may be for you. Soon after introducing the Macintosh last January, Apple announced that the same mouse used with the Mac would be available for the Apple // family. I first saw the mouse in April and ordered one in May. The AppleMouse // product comes with a mouse (the very same one used with the Mac or Lisa), a controller board that will go in any slot, a disk that contains MousePaint, and of course a user's manual. The mouse can be used in an Apple II, II+, IIe, or IIc. The controller board is not needed in the IIc, the controller is built in. The price ranges from \$115 to \$150.

The mouse is a hand held device that is moved on a flat surface in order to control a cursor on the screen. Software must be designed specifically to work with the mouse and take advantage of its natural features. MousePaint is the only program I've seen to date with this mouse interface for the Apple // family. It was written by Bill Budge of Raster Blaster fame. It is based on MacPaint by Bill Atkinson. Bill Budge does an excellent job of emulating the Macintosh's user environment with pull down menus, movable windows, icons and all. The smooth cursor movement and overall speed of the program is very impressive. The only major items I've noticed that MousePaint lacks over MacPaint is the lasso, brush mirrors, and selectable patterns in the air brush. I can not describe the entire MousePaint program here. If you have not seen MacPaint or the Macintosh in action please do so soon. It will change the way you think about computers. The user manual is not very technical but does document MousePaint very well and contains a few sample Basic and assembler language programs.

Writing programs that use the mouse as an input device is really quite easy, if you've ever programmed for a joystick. Programming pull down menus, windows, cursors, and icons is a completely different matter. As an input device the mouse provides an x and y co-ordinate similar to a joystick and a button status. Firmware on the controller board interfaces nicely with Applesoft basic and assembler language. With Applesoft one can use 4 paddles and 3 buttons. The mouse provides only 2 paddles and 1 button. However the mouse will return a co-ordinate from 0 to 1024, 4 times that of a regular paddle. This makes the mouse nice for use with double hires graphics. Also, I wonder if one could put more than one mouse board in a //e?

The following program produces a standard etcha-sketch type screen using the mouse in slot 4 and double hires graphics..

```
10 HGR2
20 HCOLOR = 3
30 HPLOT 0,0 TO 0,0
40 PRINT:PRINT CHR$(4);"PR#4":PRINT CHR$(1)
50 PRINT CHR$(4);"PR#0"
60 PRINT CHR$(4);"IN#4"
70 INPUT "";X,Y,B
80 IF B < 0 THEN 140
90 IF B < 2 THEN 10
100 IF X > 559 THEN X = 559
110 IF Y > 191 THEN Y = 191
120 HPLOT TO X,Y
```



```
130 GOTO 70
140 PRINT CHR$(4);"IN#0"
150 TEXT : END
```

The only real change in the program is in line 70 where an INPUT command is used to get values for x, y, and B from the mouse controller in Slot 4. With a joystick PDL(0) and PDL(1) would have been used. Lines 40 - 60 initialize the mouse as input and the screen for output. Line 80 will force the program to end if a key has been hit. If the button on the mouse is pressed, line 90 will direct control to the beginning of the program which clears the screen. Out of range coordinates are covered in lines 100 - 110.

Programming in assembler is not as easy, however the controller will generate interrupts when the mouse is moved. This is what allows for the smooth motion on the screen. Apple Pascal 1,2, released this spring, has the mouse driver routines included with it. This means Pascal programmers can easily include the mouse in their nicely structured programs. MousePaint stores pictures as regular HIRes BSAVED files on the disk. This allows MousePaint pictures to be manipulated and printed with other graphics utilities. Pictures from other programs can be used with MousePaint.

I must mention a few problems with the mouse and MousePaint. The mouse controller card seems to be affecting my CP/M softcard. Attempting to warm boot CP/M often locks up the machine forcing a reset. MousePaint presently can only send output to the Apple dot matrix printer or the ImageWriter. This I think will change soon. A separate file on the MousePaint/ProDOS disk is called PRINTDRIVER and I have been somewhat successful in modifying it to drive a C.Itoh 8510 printer.

Other software for the AppleMouse // will be available soon (I hope). AppleWorks would sure be nice with a mouse interface. I'm sure many games could be easily converted to use the mouse, including many on our WAP library disk. The MouseHouse (environment) Construction Set would make a wonderful programming tool. Are you listening Bill Budge?

Who should buy the AppleMouse ///? Programmers, software developers, and those like the early Macintosh buyers who are adventurous and see a lot of potential but are willing to wait for end user, turn key software products to appear.

Just think, for just over a hundred dollars you could be airbrushing, rubber banding, and polygon filling on your own computer.

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More On Wordstar File Recovery

97

by Rudie Slaughter

In his July 84 WAP Journal article "Recovering Crashed WordStar Files", Peter Jones made reference to the fact that his file recovery method left some garbage at the end of a recovered file as it was padded to make up a full 256-byte page. This garbage can be avoided by appending the standard end-of-file marker, Control-Z or hex 1A, to the WordStar text before exiting DDT and saving it.

The following command sequence will accomplish this. Determine DBGN (Document BeGIN) and DEND (Document END) in hexadecimal as described in the Jones article, and move the text from the WordStar buffer to the standard CP/M buffer at \$0100. Then from within DDT:

command line	remarks
-HDEND,DBGN<cr>	H)hexadecimal arithmetic
abcd efgh	will be returned
-Hefgh,0101<cr>	using efgh from prior line
Ijkl mnop	will be returned
-Sijkl<cr>	S)substitution at Ijkl
Ijkl wx 1A<cr>	complete line with
Control-Z EOF	
Ijk+ yz .<cr>	exit S with period
-Control-C	exit DDT
A>SAVE q d:filename.ext<cr>	q = i * 16 + j

One should note that WordStar files exceeding about 18,000 characters or 5 full pages are partially saved on disk using a virtual memory storage technique. What is left in the WordStar buffer from \$784A to \$BFFF is that part of the text which is "closest" to the current cursor position and may be discontinuous or scrambled especially if block editing commands have been used. In cases where the buffer appears to contain several bits and pieces of a long file rather than a contiguous short file, it is best to save the entire buffer as the salvaged file. Then replace the .BAK extension on the backup file with something like .OLD and reenter WordStar to edit the old backup file. Use the block read command, Control-KR, to append the salvaged file onto the backup file and the edit and rearrange the result as necessary. This should recover almost all the text that had been entered prior to the BDOS ERROR provided that the backup file was not more than 3-5 pages out-of-date with respect to the file that was lost. Of course, you do save your work every 3-5 pages using Control-KS Control-OP, don't you? After all, an Act of God (read PEPCO) can turn off your computer at any time, and if it ain't on disk, it ain't anywhere when the power comes back on.

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by Leon H. Roesly, L.C.S.W.



I have just received a copy of a News Release from Shawn Fogle of LJK Enterprises, Inc. They have a SPECIAL offering good until December 31st, 1984. They will allow you \$50. (Trade-In) on any of their Apple programs for ANY used program you have. The details are as follows: First, you must send ORIGINAL Disk and ORIGINAL Documentation. They will allow a "Trade-In" of \$50. towards the price of any of their Apple programs.

The programs towards which you may apply the "Trade-In" (and their list price) are: Letter Perfect (a full function Word Processor with integrated Spelling Checker - \$104.95); Data Perfect (A powerful Data Base/file manager, and interactive with Letter Perfect - \$129.95); Spell Perfect (A complete spelling checker - \$89.95); Simply Perfect (which combines all three programs above, and runs in the //c or loads into the extended 80 Column card on the //e - \$189.95); and Gnome (An extremely powerful Assembler/Editor for the 6502 - \$99.95).

Each of these programs would then have their price reduced by \$50. They state that it is limited to one "Trade-In" per family (or business).

I talked with Shawn, to be sure of what the News Release said. He confirmed that the "Trade-In" was \$50., not the value of your "Trading" program. Thus, if you had an old game you never used any more (and it cost, let's say, \$24.95 new), that would be quite O.K.!! Any program, regardless of cost (such as Apple Writer II+, or even version 1.1!), would be allowed \$50. towards the price of the above products, as long as you send them the ORIGINAL Disk, and ORIGINAL Documentation with your order; and check for the balance, after "Trade-In"!

Their address is:

LJK Enterprises, Inc.
7852 Big Bend Boulevard
St. Louis, Missouri 63119
Telephone: 314+962-1855

This is the kind of policy that I would like to see more companies have!

Incidentally, you can tell any of your Atari friends that it applies to them, also, since all of these programs have an Atari version!

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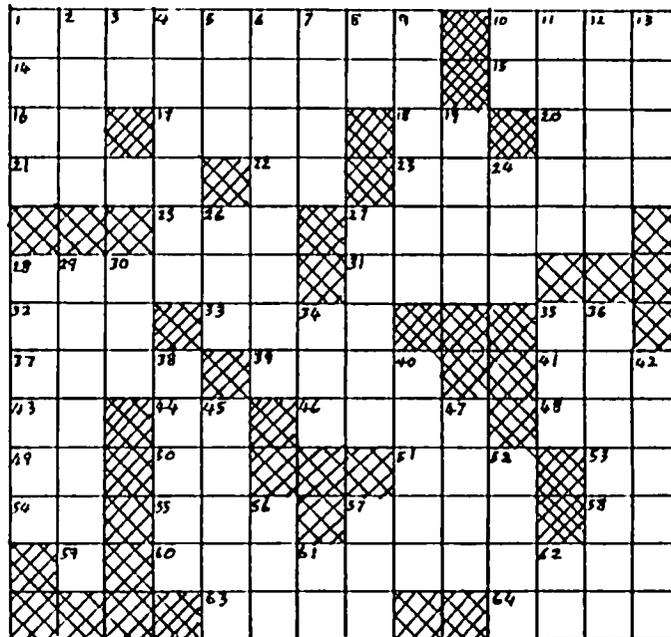
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A WAP Crossword Puzzle

by Peter Combes



Across

1. Best place for a long term program.
10. Free lion.
14. CTRL-M sends the cursor.
15. When 57 down didn't.
16. Light and sound for Education.
17. Common In Virginia.
18. Budget for a new computer?
20. Chest protector.
21. New software is often.
22. Allen in reverse.
23. 9 down produces them, Screenwriter prints them.
25. Computers coupled together.
27. Produced by Sarah or Paula.
28. Mac lookout.
31. Text goes ASCII characters.
32. RIGHT\$("PLATO",3)
33. Mac character set.
35. Town near Cupertino.
37. New math entities.
39. Intelligent program.
41. Where the sums are done.
43. Superior to the Peanut?
44. Limit of FOR/NEXT loop..
46. Silver printer.
48. CP/M catalog.
49. 6502 NOP.
50. Train set.
51. Atkinson at WAP.
53. Exist backwards.
54. Early CB.
55. First non-zero for Integer Basic.
57. Russian city for demo temptation?
58. Quick British thank-you.
59. Base of Applesoft LOG.
60. WAP 001
63. CP/M monitors a movie.
64. Sharpen.

Down

1. Roman (abb.)
2. TV's biggest star.
3. Indefinite one.
4. Integer Basic changes the finish?
5. Fem. sheep.
6. Bob with Steve.
7. Annoy
8. Applesoft multiple branch.
9. Assembled for King Arthur?
10. MID\$("HEBREW",2,2)
11. A modest wager by a hacker?
12. Service with this at the office.
13. Domain of Warrick.
19. Member lister.
24. S-100.
26. Text ends here.
27. VA CAI pioneer.
28. German water starts Group Purchase leader?
29. Go round and round to some purpose.
30. The statement is negative.
34. Not and.
35. Monitor alternative to CRT.
36. Container for Steve's present.
38. 28 down continued.
40. Office Worker Goes Forth.
42. The office and the magazine are this.
45. "Believe It"
47. Archeologist looks into program.
52. Way for PRODOS or Graphics Magician.
56. Cassette loaders were used to this.
57. The program started, at least.
61. Japanese game for two.
62. Vice President is this on the board.

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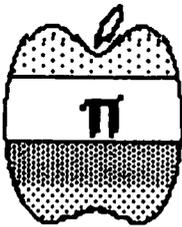
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Brief Description (or attach any documentation):

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Does this program contain materials which you did not write yourself?

Yes: ___ No: ___ If yes, what is its source? (If the program was typed from a magazine, which magazine and issue?)

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- | | | | | | | |
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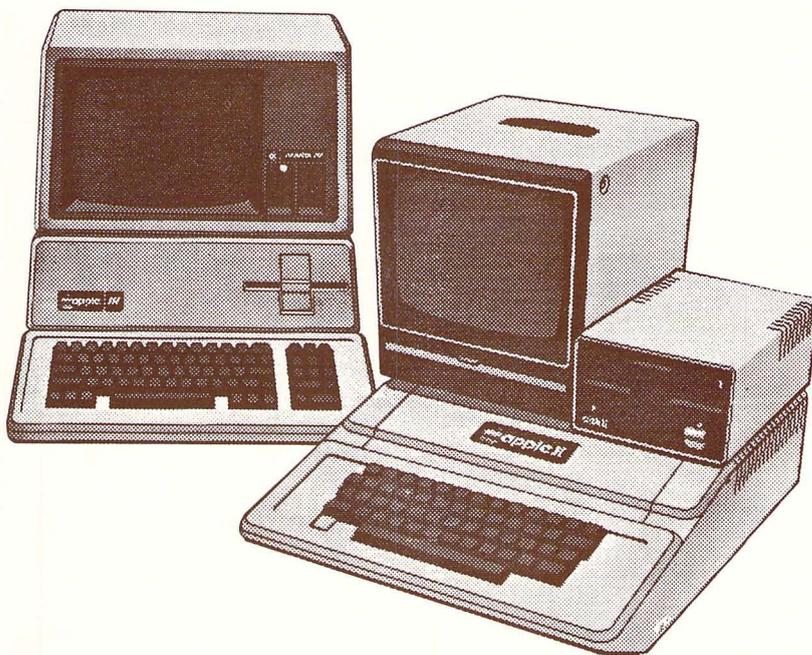
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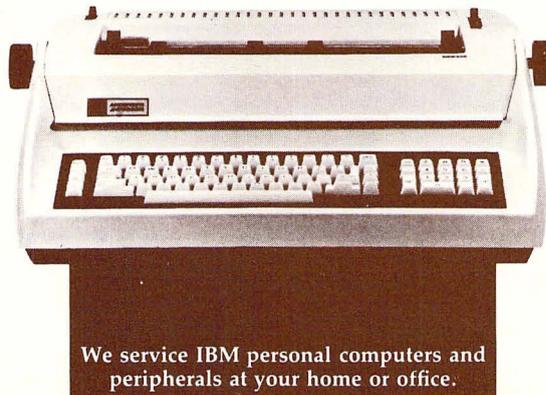
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