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Washington Apple Pi

Volume 4 July 1982 Number 7

Highlights

EDITING APPLESOFT BASIC

FINDING UNDEFINED LINE NUMBERS

SIGNED COMPARISONS

ANALYSES OF GRAPHICS ALGORITHMS

In This Issue

		Page
MEMBERSHIP INFORMATION, EDITORIAL, EVENT QUEUE		3
MINUTES, NOTICES, WAP HOTLINE		4
SIG-NEWS, IAC CORNER, CLASSIFIEDS, JOB MART		5
PRESIDENT'S CORNER	DAVID MORGANSTEIN	6
TREASURER'S REPORT		6
EDSIG NEWS	PETER COMBES	8
SOFTVIEWS: RECENT RELEASES	DAVID MORGANSTEIN	9
Q & A	BRUCE FIELD	10
VISICOLUMN	WALT FRANCIS	12
TID-BITS FROM NEWSIG	BERNIE BENSON	15
EDITING APPLESOFT BASIC	J. T. DEMAY JR	16
THE IAC AND THEE	DAVID MORGANSTEIN	18
THE NEW ABBS	TOM WARRICK	20
THE AUTHOR REPLIES	TOM VAN FLANDERN	23
FINDING UNDEFINED LINE NUMBERS IN APPLESOFT	PAUL A. SAND	26
LETTER TO THE EDITOR	VAL GOLDING	28
A PAGE FROM THE STACK	JILL & VANCE GIBONEY	30
SIGNED COMPARISONS	ROGER KNIGHTS	32
A PROPOSAL FOR A READING LIBRARY	JESSE WAGSTAFF	36
DATABASE SYSTEMS	PAULA & BERNIE BENSON	38
SPACE/TIME ANALYSES OF HI-RES ALGORITHMS	C. K. MESZTENYI	40
ON CIRCUIT AVENUE AND ALL ABOUT THE TOWN: A REPRINT		45
LIBRARY ORDER FORM, TUTORIAL RESGISTRATION		47, 48
ADVERTISER'S INDEX		48

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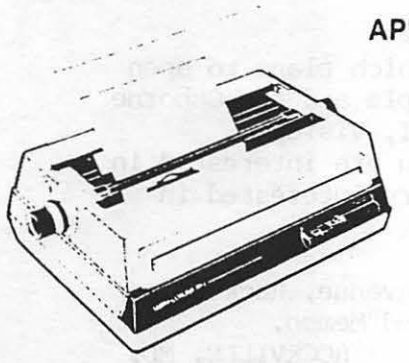

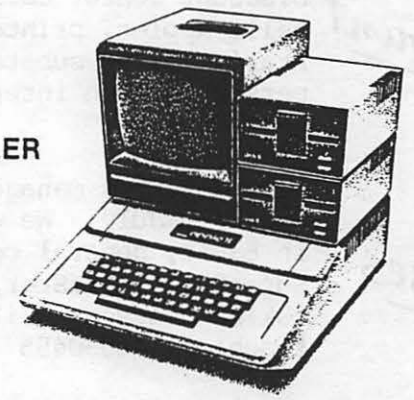

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~New at The Computer Workshop~

The Computer Workshop is the oldest computer store continually run under the same ownership on the East coast. Betsy and Larry Chinnery started The Computer Workshop in 1975, selling computer systems from their home. Larry had played major roles in such system developments as :

- o This country's first semi-automated air defense system (SAGE)
- o NASA'S GEMINI and Apollo programs
- o Automated Business Accounting Systems
- o Naval tactical,surveillance, and weapons systems

Larry Chinnery is now the president of the firm, managing it and choosing the systems The Computer Workshop will carry. Betsy is the Treasurer and Purchase Order department. They have now expanded to a group of 5 stores in the 1776 Shopping Center.

System Design

John Plumlee is Manager of Software Development and the Systems Center, working mainly with the Alpha Micro computer. He has been involved in software design for local government and commercial clients since 1972 and has on his staff, among others, Ron Bartelt, a computer consultant and a CPA. 468-2399

Sales

Tommy Ligon, general manager of The Computer Workshop, has his office in the retail store where Apple II and III, Osborne, and Panasonic computers plus a wide range of dot matrix and letter-quality printers are sold. All computers and printers are tested before being sold, and two free hours of lessons are given with each system sold. Tommy was the Apple distributor for the East coast for several years, and has on his sales staff two members of Apple Pi, Larry Humphreys and Jane Mason. 468-0455

Repairs

Alan Weisman is manager of The Service Center. He has been with The Computer Workshop for a year and somehow manages to keep a smile as he gets most repairs in and out in one day. 468-0901

Discount

Belle Harton, originally with CompuShop, is manager of the new Discount center called The Personal Computer Center. Here she sells Apples, printers, disks, North Star systems, Commodore, Atari, all at substantially lower prices. This store is for the person who can interface his own machines. 984-9292

Classes

Jane Mason is manager of The Education Center which plans to open in early July. We will have classes for the Apple and the Osborne in Basic, general computer orientation, dBase II, VisiCalc, SuperCalc, WordStar, and others. Call us if you are interested in taking classes; write with full resume if you are interested in teaching. 468-0455

The Personal Computer Center is at 178 Rollins Avenue, Rockville. All other divisions are in the 1776 Plaza behind Memco.
THE COMPUTER WORKSHOP 1776 EAST JEFFERSON ROCKVILLE, MD.

OFFICERS & STAFF

President	-David Morganstein	(301) 972-4263
Vice President	-Mark Crosby	(202) 488-1980
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Head Librarian	-Gordon Stubbs	(703) 750-0224
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	-Bill Bowie, Van Kozak,	
	-Sarah Lavilla, Jerry Waller	
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Disk Documen.	-Boris Levine	(301) 229-5730
	-Tony Untied	(301) 241-8678
Group Purchases	-Rich Wasserstrom	(703) 448-0984
	(7:00 - 9:30 PM, Mon - Fri)	
Arrangements	-Jim Carpenter	(301) 371-5263
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	-Joe Silverman	(301) 384-1285
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APPLE ///	-Charles Dow	(301) 460-3911
ASMSIG	-Robert Palus	(301) 776-3075
Business	-John New	(301) 577-7959
CP/M	-Dave Neumann	(301) 776-6133
EDSIG	-Peter Combes	(301) 871-1455
FORTH SIG	-Bill Wurzel	(301) 593-2258
NEWSIG	-Bernie Benson	(202) 546-0076
Pascal (PIG)	-Tom Woteki	(202) 547-0984
SIGGAMES	-Jim Eatherly	(202) 232-6046
SIG/DISABLED	-Curt Robbins	ABBS WAP428

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

EDITORIAL

This is the Urbans' last issue until October. We are taking our usual vacation of two months. Betsy Harriman, Mark Crosby and Jane Mason have graciously volunteered to put together the next two issues, and they can use all the help they can get from you.

First, please continue to send in those wonderful articles to our P.O. Box, Attention Editor, so they won't have to worry about a lack of materials. Second, send in your article(s) on diskette wherever possible. They can process your text files (or binary files from Apple Writer) through Superscribe II (now called Screenwriter II) into final camera ready copy form. Third, try to get the material in as early as possible so they will not be pressed for time. We shall be taking our computer with us and will prepare in Massachusetts as much of the next issue's copy as we get prior to our departure.

About this issue. We have some heady stuff this time. Roger Knights, a guest contributor all the way from the State of Washington, has set us straight on how the 6502 handles overflow bits. Charles Mesztenyi starts a multi-part series on Hi-Res graphics algorithms. We leaven this with a host of fine articles and throw in a dash of VisiCalc information in our new column, "Visicolumn", by Walt Francis. Read on - see you in the fall. Peace.

EVENT QUEUE

Washington Apple Pi meets on the 4th Saturday 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. Sales, library transactions, newsletter pickup, etc. are from 8:30 - 10:00 AM. From 9:00 to 10:00 AM there will be 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 those volunteers can attend the meeting.

Following are the speakers and topics for the next few months:

July 24 -

August 28 - Bruce Field & Bill Wurzel
FORTH

Sept. 25 - Jim Burger & Ken Hautman
Copyright

Subscriptions to the Washington Apple Pi Newsletter are not available. The newsletter is distributed as a benefit of membership.

MINUTES

EXECUTIVE BOARD MEETING

Washington Apple Pi Board met on May 12, 1982, at 7:30 PM at the Urbans. President Morganstein presided with 18 people present.

A hardcopy library was discussed; a presentation was made on incorporating the club; a budget for next year was proposed which would raise dues to $24 and provide for a club office; typesetting the newsletter was discussed; a motion passed that the President's hotel bill at the Boston Applefest be paid; and a motion passed that ballots received in envelopes sent to WAP members be accepted as official ballots.

GENERAL MONTHLY MEETING

Washington Apple Pi met on May 29, 1982, at USUHS at 10 AM. President Morganstein presided with about 385 people present.

Announcements were made regarding SIGs, ballots being distributed, the new SYSOP is Tom Warrick at 657-4507, the answering phone for the club store is working, a VisiCalc tutorial will be given in July, interest in a consumer advocate, need for new programs for club disks, and Bernie Urban was elected Chairman of the Board of IAC. An amendment as published on page 25 of the June 1982 Newsletter was approved by the membership present.

The presentation was made by Ernie Forman and others on database management programs.

NOTICES

CHANGE OF ADDRESSES
****

With such a large membership (pushing 1700!), keeping up with change of addresses of our members is becoming quite a chore. Please notify us as soon as you know your new address. Our newsletters are sent out by bulk mail distribution, and are NOT forwardable. If we then have to send another copy, we must pay full postage rates. This is becoming quite an expense. If you fail to send us a change of address, and then request the missed issues, please send postage and handling of $1.00 per issue.

PRINTER ERROR IN JUNE NEWSLETTER
****

Due to an error at the printers last month, some of our June issues had missing pages. We regret this error, and if you check your pages and find some missing, please let us know.

BACK ISSUES
****

Due to the fact that the keepers of the back issues are going to be away for the next two months, please hold any request for mail orders of back issues until the end of August. There will still be some back issues for sale at the summmer meetings.

WAP HOTLINE

Have a problem? The following club members have agreed to help. PLEASE, respect all telephone restrictions, where listed, and no calls after 10:00 PM.

General		
	Robert Fretwell	971-2621
	Dave Harvey	527-2704
	Robert Martin	498-6074
Operating Systems		
APPLE DOS	Richard Untied (weekends only)	241-8678
CP/M	Robert Fretwell	971-2621
Languages (A=Applesoft, I=Integer, P=Pascal, M=Machine)		
A	Peter Combes	871-1455
A,I	Jeff Dillon	422-6458
A	Mark Pankin	370-9219
A,I,P,M	Bill Schultheis (except Tue.,Thurs.)	538-4575
A,I,M	Richard Untied	241-8678
P	Robert Fretwell	971-2621
DB Master	Dave Einhorn	593-8420
Printers		
General	Walt Francis	966-5742
MX-80	Jeff Dillon	422-6458
Silentype	Bruce Field	340-7038
IDS 460	Jeff Stetekluh	521-4882
Word Processors	Walt Francis	966-5742
Apple Writer	Bruce Field	340-7038
Letter Perfect	Bill Schultheis	538-4575
Superscribe II	Peter Combes	871-1455
Supertext	Peter Rosden	229-2288
WordStar	David Inouye	422-8926
VisiCalc	Walt Francis	966-5742
Time-Sharing	Chuck Reinbrecht	299-6810
	Dave Harvey	527-2704
Graphics	Bill Schultheis	538-4575
Games	Jim Eatherly	232-6046
Mem. Expansion	Fred Schulz	223-1397
Other Disk Drives	Fred Schulz	223-1397
Modems-Telecom.	Ben Acton	428-3605
Pers. Fil. Sys.	Ben Ryan	469-6457
Paddles	Tom Riley (evenings)	340-9432
Communications Packages		
Data Capture	Howard Simkowitz	882-4645
VISITERM	Steve Ildstrol	933-7728
Compilers		
Expediter	Peter Rosden	229-2288

SIG-NEWS

SIGAMES is the special interest group of computer hobbyists interested in using their APPLEs for entertainment. They meet immediately following the monthly meeting of Washington Apple Pi.

PIG, the Pascal Interest Group, meets on the third Thursday of each month at 7:30 PM at the Uniformed Services University of the Health Sciences, Bldg. A, Room 2054 (2nd floor), on the campus of the National Naval Medical Center at 4301 Jones Bridge Road, Bethesda, MD.

EDSIG - the education special interest group - will meet on Tuesday, July 13, at 7:30 PM in Lecture Room A, Building A, USUHS. For details of this and other meetings, see the EDSIG Page elesewhere in this issue.

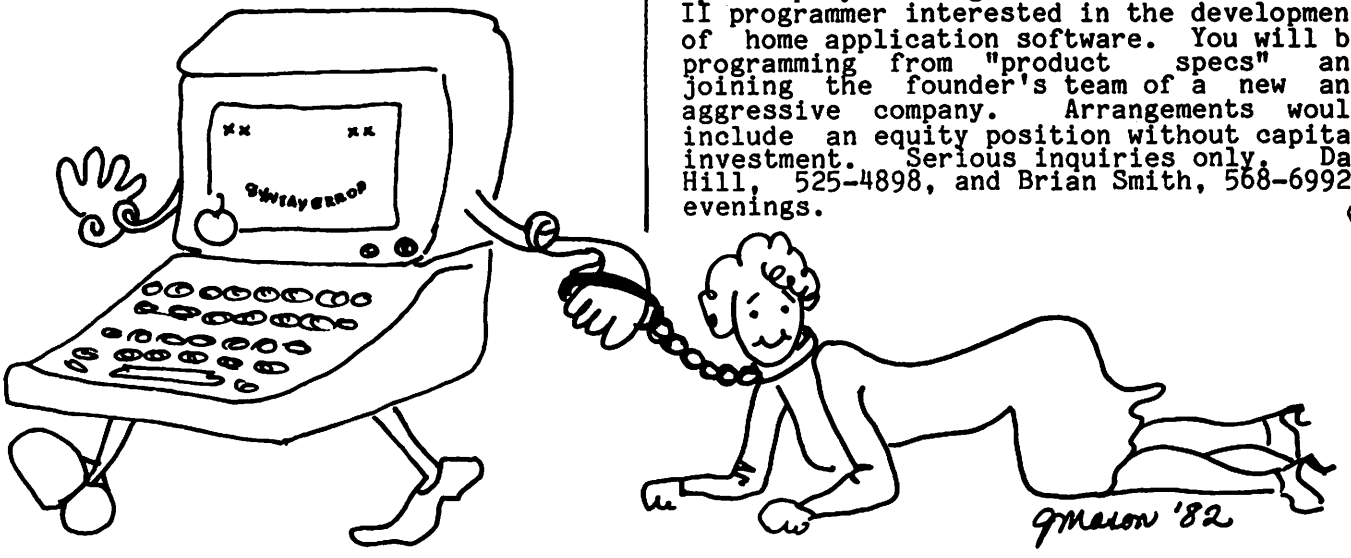
ASMSIG meets immediately after the regular Washington Apple Pi meeting.

The APPLE /// SIG meets on the second Thursday of the month at 7:30 PM. The meeting place alternates between the Walter Reed Medical Center and Universal Computers.

NEWSIG will meet just after the regular Washington Apple Pi meeting. We will answer questions and try to help new owners get their systems up and running. We will also explain how our club operates.

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

Bob Chesley	560-0120
Paul Hoffman	831-7433
Sarah Lavilla	926-6355
Boris Levine	229-5730
Steve Sondag	281-5392



IAC CORNER

by Bernie Urban

Just a short report this month. IAC and Apple Computer, Inc. have about reached a contractual agreement whereby IAC will be acting as distributor of over 400 pages of Technotes, prepared by Apple, to IAC member clubs and to computer stores for sale to individuals. These will replace the IAC ApNotes and be packaged in high quality format typical of Apple Computer's publications.

Lou Milrad, our Vice President for Special Interest Groups, has established a SIG hot line in his home in Toronto. The phone number is (416) 222-8447.

I will be working with the Officers of IAC on our business plan in July, and will have more on the Technotes and other items, hopefully by the next issue of the Pi.

CLASSIFIEDS

FOR SALE: Epson MX-80 FT Printer with Epson 8131 parallel board and cable. 5 months old. $680. Call 596-9119.

FOR SALE: Super Text II - cost $125, will sell for $50. Dan Paymar Lower Case Adapter, never used - cost $65, will sell for $30. Call Mike Lynch at work 632-5120, or at home after 7:30 PM, 243-3336.

FOR SALE: Original diskettes - Crossfire, Gorgon, Decathalon, Sargon II, Threshold, Red Alert, Epoch, and others - $12 each. APPLE S.O.S. - Agenda Files $20. P-Sort, $20. Call Hal, 384-7875 (evenings).

JOB MART

APPLE II PROGRAMMER WANTED: PPE is a start up company looking for a first-rate APPLE II programmer interested in the development of home application software. You will be programming from "product specs" and joining the founder's team of a new and aggressive company. Arrangements would include an equity position without capital investment. Serious inquiries only. Dan Hill, 525-4898, and Brian Smith, 568-6992, evenings.

PRESIDENT'S CORNER

by David Morganstein

After months of effort and resubmissions, the WAP has been granted non-profit status by the IRS. While this status does not allow for the deduction of contributions, it will allow us access to less costly postal rates and permit certain tax free purchases. Many thanks to Rich Wasserstrom, Dana Schwartz and Ken Foor for their seemingly unending patience with the wheels of government. I will add that we continue to seek a different non-profit status, one which does allow for deducting contributions made to the WAP.

• • • • •

At a recent Exec Board, our General Counsel recommended that we proceed with the incorporation of the WAP. The Board supported this action and it appears that the required legal steps are being taken.

• • • • •

At last month's meeting, I discussed interest in the WAP performing a consumer advocate function. This might include resolving problems with purchases made locally or with hardware and software flaws inherent in products. Two volunteers (Mark Pankin and Fred Schulz) stepped forward. Since neither volunteer has any legal experience, a third person with such a background would be helpful. If you are interested, please contact me, Mark or Fred. Look for a discussion of plans and the assistance you can expect in a future article.

• • • • •

Many people have expressed great interest in a library of articles and periodicals. Jess Wagstaff has volunteered to begin the process of gathering materials and organizing them. Jess will be writing a few words proposing a system for the library and asking for contributions. His idea of a lending library (for only those materials available in duplicate) would allow access by almost anyone. In addition, Paul Hoffman has volunteered to collate other club newsletters and articles into a bibliography. Another excellent service which would benefit many. If anyone is interested in helping in these projects, please contact Jess, Paul or me.

• • • • •

During May, Dr. Wo held a Pascal tutorial. The two dozen attendees received some twelve hours of Tom's excellent and informed teaching style. Many thanks to you, Tom!!! Next month, Ernie Forman will be teaching an advanced Visi-Calc tutorial. Contact Steve Stern, one of the Tutorials Chairmen, for the details.

• • • • •

Several years ago, WAP had a medical SIG. For reasons unknown to me, the SIG did not catch on and is currently not active. Is there need for one? Are there any physicians interested in getting together for the discussion of common Apple-cations? If there are one or two volunteers to act as catalysts, step forward. We'll see if the second time around is more successful....

YEAR-TO-DATE 01/01/82 - 06/01/82

DEPOSITS

GROUP	(T)	63219.35
LIBRARY	(T)	15656.00
DUES		14652.00
ADVERTISING		4579.00
DISKS	(T)	4465.00
INSIDE	(T)	4413.00
NEWSLETTER		2781.20
TUTORIALS		2447.50
MAILING		952.54
INTEREST		257.14
MISC	(T)	2737.17
TOTAL::::::::		116159.90

WITHDRAWALS

GROUP	49619.67
DISKS	13477.30
PRINTING	9376.38
REFUNDS	3806.95
DISK COPYING	2388.76
MAIL	2326.18
SALES TAX	1055.96
SUPPLIES	595.16
PHONE	331.25
MISC	1426.86
TOTAL::::::::	84404.47

The above is a summary of the transactions to the Washington Apple Pi checking account for the first five months of 1982, and as such, quantitative conclusions should not be drawn without more detailed information about the deposits and withdrawals. "T" signifies that tax has been included in the figure.

Dana Schwartz, Treasurer

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EDSIG NEWS

by Peter Combes

EDSIG Calendar

Tuesday, July 13th at 7.30 p.m.

Language Arts on the Apple.

Demonstration of a new and exciting language arts package developed by two of our members - Karen Berlin and Mary Brown. The package is for elementary school pupils, and can be used by students, teachers or parents with no previous experience on a computer.

Tuesday, August 10th at 7.30 p.m.

Pilot.

Do we need a special programming language for Computer Assisted Instruction?

Peter Gruneau of the Institute of Applied Technology explains the advantages and disadvantages of Pilot and its latest development - Super Pilot.

Meeting Reports

Tuesday, June 8th

Battleproofing Apples.

Jim Bruno of RAC was unable to be with us, but Jerry Siok most ably took his place, at short notice.

RAC installs Apples in high-risk situations such as public libraries, and has made a particular study of "battleproofing" Apples.

In a controlled environment, some means of bolting the equipment to a table is all that is needed, and Jerry demonstrated how this could be done for a computer, a disk drive, and a printer. In other cases, part of the solution is encasing the Apple, and sometimes disk drives and printer as well, in a metal case. These can cost up to 10% of the value of the Apple.

RAC has not had to replace a lot of keyboards, but avoids using paddles at all. The power switch of the Apple continues to cause trouble, and in all their applications, RAC leaves this switch in the "ON" position and interrupts the power by other means. Interestingly, though, they have no qualms about switching the Apple on and off, and even use this for "Super Reset" when necessary.

In his clear presentation, Jerry showed a lively awareness of the real problems of using micros and of the real needs of the users - do your students really have a good place to put their books when they are working? Jerry's do.

Ros Stern has been working to select the best educational programs from the WAP disks and assemble them together into "EDSIG - 1". Once the final bugs have been removed and the disk has been made suitable for both standard Apples and Apple Pluses, it will be made available as a club disk.

Ros demonstrated the programs in detail.

They are:

Elementary Math	(Grades K-2)
Music Math	(Grades 1-4)
Color Math	(Grades 3-6)
Long Division	(Grades 4-6)
Fractions	(Grades 4-6)
Prime Numbers	(Grades 4-6)
Coin Tossing	(Grades 4-6)
Bar Graph Maker	(Grades 4-6)
Denominators	(Grades 5-6)

These are relatively simple programs, but all are of proven use in the classroom.

Forthcoming Events (Dianne Lorenz)

* WORKSHOPS AND CONFERENCES *
* ADULTS ONLY *

COMING ATTRACTIONS IN THE WASHINGTON AREA

1. JUNE 24-25 Second Conference on Microcomputers in Education and Training. Arlington, Virginia. Presentations and teacher-assisted applications for learning in schools, instruction and training management programs, industrial applications and new types of microcomputer learning systems. Call (703) 347-0055.

2. JULY 28-30 Software/Courseware Conference. Arlington/washington,D.C. Information on new technology - microcomputers, video responders, disks and courseware. Seminars, sales training, exibits, and product information workshops.

3. JULY 18-22 World Future Society's fourth General Assembly - Communications andthe Future. Sheraton-Washington. $70 forone day - $200 for the week. For more information call 656-8274.

* COMPUTER CAMP FOR ADULTS *

Why should kids have all the fun?

Computer Camps Inc. of Zaca Lake,California is offering one week winter sessions at the Mexican beach Club Med resort in Ixtapa located 100 miles north of Acapulco. Thirty six hours of hands-on instruction on Apple, Atari, Commodore, and Texas Instruments computers. General business courses plus special workshops for doctors, lawyers, architects, and other professionals.

contd. on page 37

SOFTVIEWS: RECENT RELEASES

by David Morganstein

ELECTRIC DUET. Until recently, the alternatives for generating music on our Apples seemed to take one of two extremes. At one end, the low cost software-only end, single part music could be created, played, stored and played back at a later time. At the other end of the spectrum, music boards could be added to your Apple to obtain 3 or 9 part music at costs in excess of two hundred dollars. The boards create lovely, intricate sounds which, however, had to be played through external amplifiers and speakers.

Those readers who are familiar with the name Paul Lutus may know of his creative program Musicomp, an example of the first method. Musicomp allowed for the entry of notes into an editor and for their replay, accompanied with a marvelous hi-res display of their dance across the score.

By using a high frequency carrier (centered on middle A) and duty-cycle modulation, Paul now brings your APPLE 2-part music with no added hardware. In addition, several voices are provided, also using duty-cycle modulation, but at a lower frequency. The package includes a fairly easy to use editor for creating and playing your own tunes. Music created and saved can be played back in your own BASIC program using the technical information provided in the 17-page manual and a machine language routine provided on the disk. The music data is stored in standard DOS 3.3 binary files.

The disk is copy-protected but contains a back-up on the reverse side. Insoft will replace the disk for $5.00, if damaged.

If I had any complaints at all they would be the difficulty of deleting a line once entered and Paul's choice not to include the hi-res dancing notes display found in Musicomp. Notes can be deleted while editing, its just that it takes a few key strokes to do it. (Insoft, 10175 S,W, Barbur Blvd., Suite 202B, Portland, OR., 97219. (503)244-4181. $29.95)

THE MANAGER. Several utilities have appeared recently to allow additional uses of 16K memory cards besides merely storing the "other" BASIC. This package provides two features: HIDOS to provide memory managament of two 16K cards and SOLIDOS to utilize a 16K card as a high-speed mini-disk with 45 sectors. The HIDOS program is similar to other utilities which perform the function of determining if other slots contain memory cards. It does feature two new modifiers for the BLOAD & BSAVE command. These parameters identify the slot and bank of a memory card you are referring to when the BLOAD or BSAVE refers to an address mapped onto a card. In addition, the disk includes a program which will automatically modify the standard Apple utilities like FID and RENUMBER which will otherwise not perform correctly under the modified HIDOS.

Perhaps SOLIDOS is the more interesting though less described of the two utilities. While the manual contains 16 pages, only one-half page is dedicated to SOLIDOS. (Omega Microware, Inc., 222 South Riverside Plaze, Chicago, Ill. 60606 (312)648-1715. $34.95)

LEGEND UPDATE. Several months ago, I mentioned some mind-expanding surgery conducted on my Apple using a 128K memory card. At that time I pointed out that the utility of these new cards was limited by the available software and possible problems interfacing the new hardware with existing (sometimes locked-up) software. Several new programs have been added to the Legend line which expands the use of their 128K card. First, a Visi-Calc package, appropriately called VC Plus, gives you an almost three times larger spread-sheet than available with a 64K Apple. Upon running the Legend disk, then inserting the usual VC disk, you will be amazed to see an "81" in the upper right-hand corner indicating the size of the worksheet. (Why adding a 128K card increase the worksheet from 34 to only 81, I'm not sure. But you'll enjoy the extra memory anyway...) The second new product will interest owners of Z-80 cards. You can now have a device "E", a high-speed ram-disk, for use with all your C/PM software. (Legend Industries, 2220 Scott Lake Rd., Pontiac, MI. 48054)

SOFT-STEP. Writers of Applesoft programs have several common criticisms of their favorite micro. For one, the lack of a print-using feature for the neat display of calculated results. Perhaps of greater hindrance is the limited program development utilities. Programs like Call-APPLE's Program Line Editor are very helpful for editing single lines. Programs like Soft-step make the debugging of Applesoft programs an order of magnitude easier. Typical debugging involves the use of the TRACE command to display (only) the line number of the statement being executed (this can result in a screen-filling and mind-boggling array of numbers interspersed with the results of PRINT statements). In addition you can insert, then remove, STOP statements to pause program execution to enable the printing of intermediate results. Wouldn't it be nice if you could:

STEP - single step through the program

BREAK - set breakpoints at the line of your choice

DO - predefine a command to print or define quantities or variables during a pause

LIST - see the entire line about to be executed not just the line number

TRACE - all lines or just selected ones

contd. on page 34

Q&A

by Bruce F. Field

Q. I have a 28 sector program that uses page 1 of hi-res. It does not fit into the work space below page 1 of hi-res. David Morganstein's method (December 1981 WAP newsletter) of splitting the program does not work. Any suggestions?

A. David's method actually does work if you make the changes to the program in memory and don't load it from disk. The problem comes from changing the link address of the program line before the hi-res page. You are supposed to change this address to point to the first line of the program that resides above the hi-res page. Unfortunately if you save the program to disk and then load it back in, Applesoft resets this link address effectively erasing the last part of the program. The solution is conceptually simple but a little tricky in practice. When you load the program in, the entire program is in memory and the program pointers $67.68 and $AF.B0 are set correctly, all that needs to be done is to fix the link address Applesoft destroyed. The first line of the program should poke the "proper" values into memory where the link address is, so that the link address points to the last part of the program. The problem comes about because if you add or modify the first line of the program it changes where the link address is in memory. My suggestion is to first add a dummy line to the program such as:

```
1 POKE 8192,00:POKE 8193,00
```

Then go into the monitor and find where to split the program and follow David's instructions. Once you have finished splitting the program and you know where in memory the link address is, go back and modify line 1 and replace 8192 (and 8193) with the address of the link address and the zeros with the low byte and high byte of the address where the last part of the program starts. Caution, you must not change the number of characters in line 1, if you do the addresses will be wrong. If for instance the last part of your program starts at $6001, the zeros should be replaced by 01 and 96 respectively. If we had left the leading zero off the 01 it wouldn't work. This also means that you can't make any modifications to the first part of the program after you have split it.

Q. We bought an RF modulator for our computer that says we will get video on UHF channel 33. We get it on VHF channel 10. Our Apple is revision C, the RF modulator is the Sup'R'Mod II by M & R Enterprises. The only problem this causes is some interference from channel 9. Our main reason for asking the question is one of curiosity as to how this could be producing VHF instead of UHF. Also, we wondered if anybody else had noticed this with a similar product.

A. Judging by the response I got to this question at the last meeting, it is very common to receive an additional signal on channel 10 when using the Sup'R'Mod. However you should also receive the proper signal on or near channel 33. The modulators are not tuned very accurately and some fine tuning of your TV set may be necessary. The answer as to why it does this is because sub-harmonics (multiples) of the desired signal are also generated by the circuit and it is cheaper to forget about them than to eliminate them.

Q. We would like to find a word processor which a) produces mathematical equations with a minimum of fuss and b) will type a line twice, first entering all the text from one font, then from the other (so some characters are "labeled" in some fashion as blanks on the first pass, and to be the only characters printed on the second pass). Is there a word processor or text editor for the Apple designed for producing equations?

A. I do not know of any word processor that will do exactly what you want, however you might look at some of the capabilities of Graphtrix which allows you to imbed hi-res symbols etc. in your printed output with a dot matrix printer. I know this works with Applewriter but I am very sketchy about any other details. Graphtrix is available from Data Transforms, 616 Washington Street, Denver, CO 80203.

Q. How do I remove the program segments from Appleplot relating to the Silentype and Qume printers? I have a mod to Appleplot which adds the option of an EPSON printer (utilizing a Grappler board). Upon entering data into the program for printing, I have experienced (out of memory) #77 ERROR when I collect over 2 sectors of data. It seems that the added program uses too much memory. Any suggestions?

A. From your enclosure documenting the changes you made, you indicate that you changed the program by using the Monitor to directly modify the program. This appears to be necessary because part of the program disappears if it is modified normally by typing in new lines. In fact part of the program can easily be modified. The problem is that the program is split to fit around hi-res page 1. (See question 1 above and David Morganstein's writeup in the December 1981 WAP newsletter to see how this is done.) For Appleplot the dividing line

contd.

number is 232. Lines 232 and below cannot be modified without re-splitting the program. Anything above this line number can be modified by performing a simple trick. Applesoft does not like to modify programs that have been "split". The way around this is to reset the start of program pointer to ignore the first part of the program. This is done by finding the start of the first program line after the split which for Appleplot is $4971 and setting locations $67 and $68 to this address. For example from the Monitor do '67:71 49'. Now you can modify the last half of the program all you want and when finished reset $67 and $68 to $801 the normal start ('67:01 08'), save the program and you're all done. I made the modifications you included and found that only 506 free bytes of memory remain before entering any data. Space for the data values themselves has already been allocated via DIM statements but as you define the graph parameters other variables are assigned that apparently exceed the available storage. The solution is to remove the unneeded program lines dealing with the other printers and to rewrite your modification to conserve space by combining several statements on one line and using subroutines for common code.

Q. In program listings found in different publications including your own, the printer port is accessed in two different ways. One way is to simply issue the command PR#1. The other way is to put 'PRINT CHR$(4);"PR#1" ' in the code. I thought that prefacing a command with a CTRL-D meant that it was a disk command. Why are they used interchangeably? Could you please clarify this confusion for me?

A. PR#1 is a BASIC language and a DOS command. If you are not using a disk, putting the command PR#1 in a program is perfectly valid. If you are using a disk you should instead use the DOS command PR#1 which is accomplished by prefacing the command with a CTRL-D, i.e. PRINT CHR$(4);"PR#1".

The reason for this is as follows. All standard Apple input and output flows through two "hooks" in the Monitor ROM software. These are nothing more than two memory addresses in read/write memory (one for input, one for output) that tell the Apple where to go to output or input a character. Without DOS these addresses point to a keyboard reading routine and video screen printing routine in the Monitor ROM. When DOS is present it modifies the "hooks" to point to routines inside DOS. Thus when you are printing stuff from a program, DOS looks at all the output and if it sees a carriage return followed by a CTRL-D it tries to interpret the following characters as a DOS command. Executing a PR#1 from within a program directs all the output directly to slot #1 and bypasses DOS so that any DOS commands that follow will be ignored. However CHR$(4);"PR#1" signals DOS to pass the output character along to slot #1 instead of the video output after it gets done with it.

Fortunately DOS is fairly tenacious and if disconnected by PR#1 will reconnect itself the next time it gains control when any input is requested by the program. However if you disconnect both the input and output, DOS is "lost" and to reconnect it execute a CALL 976 from Basic or 3D0G from the Monitor.

Q. This question relates to the Apple Pi Word Processor. If I want to create tabular data, I have to use the No-Fill (.nf) command. This allows me to enter text exactly as it will be printed on my printer. My question is if I have the printer and the formatter set for 132 columns across the page, how do I enter 132 columns of 'no-filled' data?

A. To enter up to 132 columns of data using Apple Pi Word Processor, enter a shift-M character when you get to the end of the line. The left bracket (Applesoft prompt) will be printed on the screen and you can continue on the next line. At the end of that line use another shift-M and continue again. The shift-M character signals the formatter to supress the normal line feed.

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VISICOLUMN

by Walton Francis

This is the first in what the editors and I hope will be a monthly series in WAP devoted to the interests of VisiCalc and other spreadsheet users. I will author some columns but the column name will be available to members who have something of interest to pass on to our membership. In fact, I will not write this monthly, so without other contributors we will not have a regular column.

Contributions can range from descriptions of interesting applications to hardware reviews (e.g., ramcards) to software reviews (e.g., the Consolidator) to user tips to actual models. A good example of the kind of article needed is Jack Warner's little piece in the April, 1982 issue on "VisiCalc as a Word Processor". Heretical as it may seem, reviews of competing spreadsheet programs are also welcome.

To kick things off, this month's column will review some of the VisiCalc literature--after all, WAP can't do it all.

SPREADSHEET

SpreadSheet is a bimonthly publication devoted to anything and everything of interest to VisiCalc users. It is published by a VisiCalc users' group. Its first issue was in late 1980 and there have been nine issues to date. It started as a four typewritten pages newsletter and is now up to 8 typeset pages.

SpreadSheet contains a full range of VisiCalc-related information, ranging from hardware and software reviews to complex applications programs to "visitips" on simple, effective ways to get things done. For example, an early visitip was the idea of placing the lower right coordinates of a model in the upper left hand label, positioned so that the coordinates show on the edit line but not on the printed model. This saves whizzing down and across the screen to check the model size every time you print out a model.

In addition to lots of short tips, SpreadSheet publishes one or two substantial models in each issue. Each of these models contains innovative features which are likely to be useful in a number of applications. One recent example was a check register and general ledger used by a club. This model uses double entry techniques to provide a serious audit trail, maintenance of accounts, and the like. It also uses the DIF feature of VisiCalc to accumulate and carry forward totals. Another approach to updating and totalling large amounts of data is called "datagramming". It uses the /PF function as well as the /X command (which is not even mentioned in the VisiCalc manual). Numerous articles have covered almost every conceivable VisiCalc function and technique, from overlay techniques to improving formatting of models. A disk is available for $15 to save you the trouble of typing in the applications models presented to date.

I recommend this publication highly for the serious user in search of techniques for handling complex problems and ways to circumvent VisiCalc limitations.

Subscriptions (including membership in the users group) are $25. Back issues are $2.50 each to members (I recommend purchase of all back issues). Address correspondence and checks to InterCalc, P.O. Box 254, Scarsdale, New York 10583.

SATN

SATN (Software Arts Technical Notes) is published by the creators of VisiCalc. It is also bimonthly, with five issues to date.

SATN is similar in scope, purpose, and content to SpreadSheet. It contains fewer tips, but generally more complex applications programs. It leans less toward pressing VisiCalc to its limits, and more toward mathematically tricky but elegant models using not so obvious powers of VisiCalc commands (e.g., using INT to create remainders which can be used as identifying numbers for inventory). Most SATN applications are oriented to business users, and it is especially strong on simulation and modelling approaches useful in financial contexts (e.g., calculating rates of return from investments). It is slicker than SpreadSheet.

I recommend SATN highly, also for the serious user. Annual subscriptions are $30, with back issues $6 each (and recommended). The address is SATN, P.O Box 494, Cambridge, MA 02139.

VISICALC HOME AND OFFICE COMPANION

This book contains over 50 VisiCalc models, covering a full range of applications such as loans and investments, general business, inventory control, personnel, personal finance, and household aids.

Most of the models presented are simple, straightforward applications which do not involve complex modelling techniques. The entire program for each application is listed, which makes it simple to type it in.

This is an excellent source of ideas and applications for the novice user. Its main value to the VisiCalc pro is the time and trouble it will save in developing precise formulas and formats for particular applications. For example, rather than develop a stock portfolio model from scratch, a job which can be done crudely in a few minutes but which might require a couple of hours to get the format "just right", one could simply copy the format shown in this book.

contd.

The VisiCalc Home and Office Companion is published by Osborne/McGraw Hill. It costs $16 and is available in a number of local computer stores.

VENTURES WITH VISICALC

"Ventures with VisiCalc" is a monthly column in Softalk, most recently authored by Joe Shelton. It usually presents complex applications models, few of which involve, however, highly sophisticated modelling techniques. It takes two or three of these articles to equal the coverage of a single issue of SATN or SpreadSheet.

VISULATING

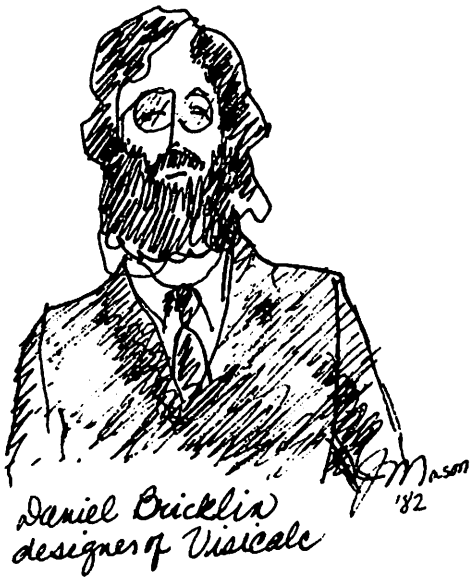
"Visulating" is a more or less monthly column in Desktop Computing, authored by Barry Bayer. It is roughly equivalent in scope to SATN articles, though somewhat easier going.

THE APPLE VISICORNER

"The Apple Visicorner" is Nibble's monthly column, authored by Jim Englander, who is one of the editors of SpreadSheet. Most of the material is already covered by SpreadSheet. So if you're not sure if you want to subscribe to SpreadSheet, check Nibble for a sampling.

CONCLUSION

Taken together, these publications provide an awesome range of VisiCalc applications and tips. While most of the models and algorithms presented are nothing startling to the experienced user, any VisiCalc user will find something of value in each. If you are undecided as to whether you want VisiCalc, or are just starting to use it, I strongly recommend the VisiCalc Home and Office Companion. The VisiCalc pro will find both SpreadSheet and SATN invaluable sources of ideas on handling both routine and sophisticated applications.



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TID-BITS From NEWSIG

by Bernie Benson

This month some reflections on the Boston Applefest, InfoWorld, and what it all might mean to a new personal computer owner. Back to technical info next month.

The fest was exciting and well worth the time and money. I recognized much of the advertising on the display floor. At one point I felt as if I were walking through a live Byte Magazine. There were some refreshing new products displayed along with the usual business software, games, and discount houses. Many of the prices were good deals. I talked to one person who said "I've saved so much money I'm broke". I was disappointed in the level of knowledge of many of the salesmen.

The seminars were different. All the ones I attended were well presented. The speakers were knowledgeable and understandable. The audience questions were worthy of consideration, and there was a real exchange of ideas and information. Topics included personal finance, education, graphics and animation, languages, business software, and laboratory equipment. Steve Jobs and the Woz gave the keynote address. I get the feeling from hearing them and reading about them that they are still interested in promoting the APPLE for creative reasons; not just for the money.

I recently subscribed to InfoWorld (a weekly micro computer newspaper). I recommend it if you are interested in trying to keep up with the latest products as they appear in the micro market. New hardware and software products are announced almost daily and it is impossible to keep up with all of them. Unfortunately, the main emphasis of a recent article on how to select a micro computer seems to be, "let the buyer beware". Steve Wozniak, in an interview, said that he tries to buy most new products for the APPLE but only about 10% of them are by people who do it well. The creative innovative products are out there; but they're often a little hard to find amidst the garbage.

If you are a new computer owner you must educate yourself. You must learn what a K and an I and an O and maybe even a DOS is. You should expect complete, knowledgeable product demonstrations from your dealer before a sale and full service after a sale. If you don't, you may be very disappointed after spending several K dollars and many hours with products designed mainly to O your bucks and I their profit. Your Washington Apple Pi club is here to help you learn about the APPLE and the many products available for it. Please use the meetings, SIGs, newsletter, ABBS, tutorials, library, and hotline to ask questions and exchange information. The only dumb computer question is the one not asked.

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EDITING APPLESOFT BASIC

by J.T. DeMay, Jr.

When I first started programming, I was impressed with the editing features of the APPLE. To replace a line that was typed incorrectly, all that was necessary was to retype the line, and the APPLE would forget the original line. Now that was easy enough. Then I learned that the cursor could be positioned at the beginning of the line, with ESC ABCD, or the IJKM diamond, then pressing the right arrow key for each character to be copied. This also works with the repeat key. It's getting easier all the time. Just when things were going so well, I discovered that copying program lines with the cursor had some unsuspected problems. The cursor copies everything except control characters (which are not normally printed to the screen). This included the extra spaces at the end of each line that were mysteriously added to my print statements. The solution to the extra spaces problem was to shorten the screen width to 33 characters, and then edit the line in the normal manner. This can be done by typing POKE 33,33 <RETURN>, before listing the line. It's a little inconvenient, but easier than retyping the whole line. It's becoming more of a chore than I first expected.

Then one day, while re-reading NIBBLE, I came across a machine language program which could make the editing process more efficient. The article, called "Poor Boy's Line Editor", was on page 67 of Vol. 2/ No. 7. Following the instructions by Dean Kay, I had no trouble getting the program to work. Now, instead of POKE 33,33, I can type ESC-P to shrink the screen width before listing the line to be edited. Another feature, CTRL-O, will move the cursor to the end of the line in the blink of an eye, copying all that it passes over. ESC-N restores the normal 40 column screen. The last BLOAD address and length can be found by pressing CTRL-A. Some of the other useful features are for controlling the listing of a program. During a LIST, any key can be used to stop the listing, and then pressing any key again will continue the listing. The RETURN key can be used at any time to abort the listing. The other features allow clearing the screen with ESC-H, jumping to Monitor with ESC-L. I recommend this program highly. It is the best dollar value around in the editor category.

If you are willing to spend $40.00 to make editing even easier, I would recommend PLE, "Program Line Editor", by Neil Konzen. It has all the features of "Poor Boy's Line Editor", plus several more very helpful commands. My copy of PLE came on a disk that required MUFFINing to 3.3. This means that the disk is not copy protected. Some of us may consider that a selling point.

PLE loads itself between DOS and the DOS file buffers so that it is not affected by FP, INT, MAXFILES, etc., or most Integer or Applesoft programs. Yes, you can edit Integer programs too.

Once PLE has been run, it clears memory of any Basic program and then waits quietly until called by any number of control characters. For example, after loading a Basic program, list it. The listing can be suspended with ESC or CTRL-S, then resumed with any key. CTRL-C cancels the list, and returns to Basic. The main use of this program is to edit program lines, and it's easy to learn. Suppose you are debugging your latest masterpiece, and there is a syntax error in line no. 5555. To correct the error, press CTRL-E and the word EDIT will appear on the screen. That is PLE's way of asking which line you are dissatisfied with. Typing 5555 and pressing RETURN will result in the offending line being presented on the screen with the cursor placed over the first character after the line number. From here, the commands are similar to those used in the DOS TOOLKIT EDITOR. CTRL-I (insert), CTRL-D (delete), CTRL-O (override) allows direct keyboard entry of control characters, CTRL-F (find) positions the cursor over the first occurrence of the next character typed. CTRL-Z (zap) is similar to delete and find, in that it will delete all the characters up to the character entered directly after the CTRL-Z. There are several other CTRL codes: P, B, C, N, Q, etc. Lower case can be entered directly into your programs from the keyboard, with the use of CTRL-A or CTRL-S as lower and upper case shift locks respectively.

Besides the CTRL codes, PLE allows user definable keys. Now it is possible to set up any key to perform several functions. A program is included on the disk to allow the creation or modification of these key functions. Run this program, and you will be able to customize PLE to do those multi-key functions, like CATALOG, PEEKs for address and length of the last BLOAD, program length, etc. There are about fifteen ESC key functions supplied. These may be used 'as is', changed, added to, or deleted. After the initial setup, these commands can be accessed with the ESC key and then the programmed key. For example, one of the ESC key functions supplied causes a CATALOG of the disk in drive no. 1 by pressing ESC 1.

For all its features, PLE is very easy to learn. I found the manual thorough but not intimidating. The only problem I am aware of is that there may be a conflict with a program that also uses the ESC key.

There are two other Basic Program Editor programs. CRAE (CO-RESIDENT APPLESOFT EDITOR) is reviewed in the August 1980 issue of the WAP newsletter by H. S. Pilloff. A more recent entry is reviewed in the April 1982 issue of AAL. It is called AED II (Applesoft Editor).

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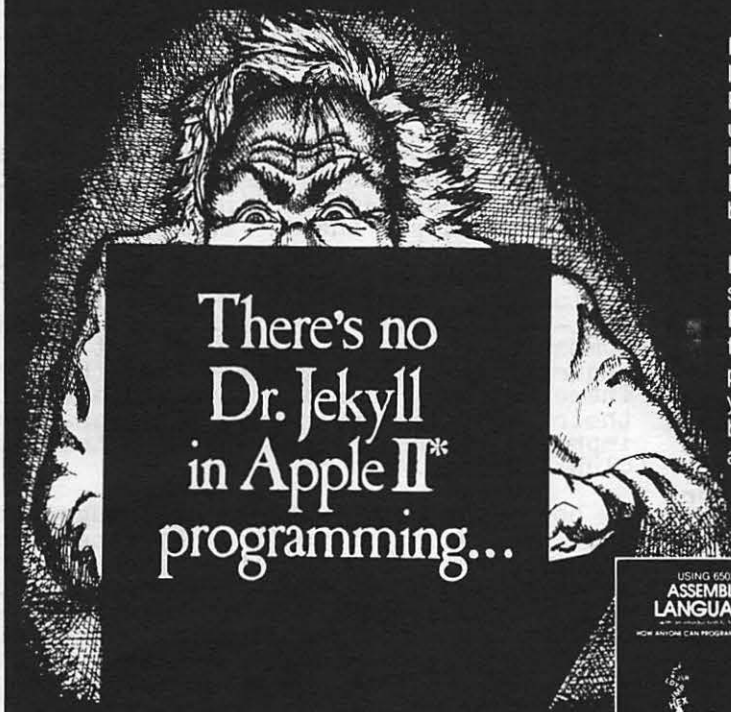

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The IAC and THEE

by David Morganstein

Many members of Apple clubs around the country have asked the question, "Who is the IAC anyway?" The following comments are aimed at changing a situation I believe exists, excessive distance between the International Apple Core and its members. The number of clubs which participated in the recent election of Directors spotlights a glaring problem.

In my opinion the current condition has been brought about by an attitude typified by the following thoughts expressed to me during the Boston Applefest by people active in the IAC. One Exec Board member felt that the IAC is in "competition" with trade magazines, specifically Softalk. (This notion seems to be supported by a recent Apple Orchard editorial). Another IAC staffer, when asked why the Apple Orchard did not have more member club newsletter articles, suggested that he preferred to see a "higher caliber" article in the AO.

My interpretation of the situation is that some people active in the IAC view the organization as somehow apart from the member clubs. The concept of "making the IAC more professional" may be pushing the IAC toward becoming a separate business which is struggling to compete rather than represent and serve. The Apple Orchard, some maintain, should contain nothing but fresh new articles paid for out of the IAC budget. Obviously, this would put the AO in direct competition with all the other magazines paying for fresh new articles.

As the President of the Washington Apple Pi, I would be delighted to see a unification of club efforts around the country. The WAP is glad to share its magazine articles and library disks with other clubs in a mutual exchange of efforts. Since a single club cannot afford the cost to mail its magazine to all clubs, the opportunity of reading articles selected from other clubs for inclusion in the AO has great appeal.

Unfortunately, what has happened instead is that local club talent is being drained off, away from supporting local clubs, to write new material for the AO. After all, the IAC can afford to pay handsomely for its "fresh new" articles. Two of the WAP's very active members and authors wrote half of the material in a recent issue of the Orchard. (To my dismay no mention was made of their WAP affiliation. As you may be aware, the affiliation of most authors has not been given in recent Orchard articles. As a matter of fact, although at least one regular columnist includes his club affiliation with his by-line, it is removed before printing).

I believe that all clubs would be delighted to see their members articles found in the pages of the Orchard. A certain amount of healthy rivalry might even be stimulated. If only one article was reprinted from each club magazine each year we'd have enough articles to fill a monthly Orchard!!! We might also get to know each other and perhaps initiate more direct information exchanges. I encourage the AO Editor to borrow more heavily from the member clubs magazines and to show the club affiliations of the authors.

At the annual meeting in Boston, it was mentioned that the IAC has a collection of 800 disks of public domain software (that's right, not 8, not 80, but 800...) While most clubs have seen only 15 of "the very best", I suspect that many clubs could make good use of some of these programs. Clearly, the reproduction and distribution is no easy task. It currently falls on the shoulders of only a few dedicated but totally volunteer individuals. These folks need more help, help which I believe is available from member clubs. I encourage the Exec Board to reach out to member clubs and seek help in the distribution of this impressive collection of public domain software, a collection that was assembled so as to be available to IAC member clubs.

As I mentioned earlier, very few clubs participated in the recent election of Directors. Many clubs at the Boston show indicated that they had not been informed of the election, had not received the ballot or were not aware that the ballots were to be sent in before the show. While some of the responsibility must be accepted by clubs for not being aware or asking for clarification, there are several steps that the Board could authorize which would help.

Whenever important communications are sent to clubs, they could be sent with a return receipt requested. In this way, the Board could be sure that the material was received. The package could contain a return post-card to be sent by the Club indicating receipt of the material. The post-card could contain a simple message summarizing the expected action and requesting acknowledgement from the Club. These steps are inexpensive and are worth their cost if they result in dramatically improved communication between the local Club and the IAC.

I hope the above remarks and suggestions are seen as constructive. My intention is to propose several positive steps which I believe can bring the IAC improved recognition and support from its members. When only a few clubs participate in the election of representatives, an unhealthy atmosphere exists. I believe that situation can be changed.

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THE NEW ABBS

by Tom Warrick

On May 29, 1982, the Washington Apple Pi Apple Bulletin Board System (ABBS) moved to 657-4507 in Chevy Chase, Maryland. The area code remains (301). Because the new location is closer to Washington than the former number, which was in Potomac, the call is "local" for more exchanges, particularly to the south and southeast of Washington. Barring problems, the ABBS is on twenty-four hours a day, seven days a week.

Any member of Washington Apple Pi with access to a modem (a contraction of "modulator-demodulator") can obtain a password for the ABBS by calling the club phone listed in this magazine. (Also, because of elections, the club phone may change numbers this month.) Callers to the club phone, which is connected to an answering machine, should leave their names, WAP numbers and telephone numbers. Members may also contact Tom Warrick, the new SYSOP (System Operator), directly at any Washington Apple Pi meeting or at the NEWSIG meeting following the main meeting. Members without passwords may also leave a request for a password on the ABBS with your name, WAP number and phone number, even though you do not have a password. See step 3, below. In the changeover, some applications for passwords may have been lost. Members who requested a password but have not been assigned one should call the club phone or contact the SYSOP.

As this article went to press, a new ABBS program was in the final stages of debugging and should now be operational. The new program has several new features and commands, and even experienced users should use the "H" (Help) command to learn about them. In the description of the ABBS that follows, these new features and commands are indicated as "(new)".

To Use the ABBS:

1. After you have obtained a password, set up your modem to send and receive in Full Duplex, so that you do not see characters until they are echoed back to you, no parity, 1 start bit, 8 character bits, 1 stop bit and 300 baud. This is the standard Full duplex setting on the D.C. Hayes Micromodem II, and can be activated by doing:

```
IN#slot of modem
{Ctrl-A} {Ctrl-F}
```

2. Dial the ABBS at 657-4507 (new). When connection is achieved the ABBS will respond:

```
ENTER A CARRIAGE RETURN:
```

Your particular configuration may require linefeeds or delays after carriage return, both of which are needed by CP/M systems and by some printers. At this point you can enter a number, which will be used as the delay (in hundredths of a second) that will occur after each carriage return whenever linefeed insertion is enabled (new). If you enter:

```
{Ctrl-N}XXX
```

where XXX is a number between 0 and 255, you will enable linefeed insertion and set up delays of XXX-hundredths of a second. Thus "{Ctrl-N}255" will insert linefeeds after each carriage return and will wait 2.55 seconds before beginning the next line. This delay should be enough for even the slowest of printers.

3. The ABBS will then say:

```
ENTER WAPNNN.PSWD OR WPNNNN.PSWD:
```

You should enter "WAP" if your Washington Apple Pi number is less than 1000, and "WP" if it is 1000 or greater. Members of the NOVAPPLE group should enter "NOV" followed by their three-digit identifier. You have three tries before the ABBS stops you, because it thinks you are a guest without a password. Once your password has been verified, the machine will then log you on and proceed to step 4. If you did not log on successfully by this point, a brief message will be printed, and you will be allowed to leave a 255-character message for the SYSOP (new). In entering this message, use the carriage return only at the end of the message.

4. The ABBS will then tell you the current date and the date of the most recent bulletin:

```
SYSDATE:  0626
LAST BULLETIN UPDATE:  0624
```

where "0626" means June 26. The date is set manually -- the ABBS does not yet have a clock card -- and may occasionally be off by a day. The bulletin is a short message from the SYSOP on matters of general interest, which all users should read.

5. You will then be told the message numbers of all messages for you:

```
THE FOLLOWING MESSAGES ARE FOR YOU:
 10 30 73
```

6. The "COMMAND?" prompt allows the user to enter any of the ABBS' commands. These commands are:

B - (Bulletin boards) Lists the telephone numbers and locations of other computer bulletin boards, principally in the Washington, D.C. area. This list is kept as current as possible, but computer bulletin boards -- particularly private ones -- are often ephemeral. Users are asked to let the SYSOP know of any changes that should be made.

C - (Chat with the SYSOP) (new) Occasionally the SYSOP will be available to

contd.

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come to the ABBS to chat with users, to give help, advice, opinions, or just to chat. When you use this command, you will be told whether the SYSOP is "in" or "not in." These do not necessarily correspond with the SYSOP's physical presence, because often he may be in but unable to come to the keyboard. If the SYSOP is in, you can "call" him by causing the ABBS' Apple speaker to sound. Continue using the ABBS, and the SYSOP will come to the keyboard and cut in. Chat mode can be exited at your command by entering Ctrl-C or Ctrl-K.

D - (Delete a message) Once you have read a message directed only to you, you will be asked if you wish to delete it. Deleting messages frees up the space for yourself and other users. Also, if a message of yours has gone unanswered for a month, delete it yourself. Only the sender of a message, the recipient (in the case of a private message), and the SYSOP can delete messages. Periodically the SYSOP deletes all messages over 30 days old.

E - (Enter a message) When entering a message, you will first have to designate the recipient. You can send it to the SYSOP, in which case the ABBS will convert it to the SYSOP's WAP number (currently WAP538), to a particular individual, using the standard form WAPnnn or WPnnnn (for WAP numbers 1000 or higher), or NOVnnn, to ALL, or to cancel the entry of the message (CANCEL). You then enter a short summary of the message, not to exceed twenty characters. This summary may be entered using lower case characters (see Ctrl-L, below). The summary of private messages, i.e., those not sent to "ALL," is available for public viewing by the "S" command. You then enter the text of the message, which may be up to 10 lines of 39 characters (new). You will be prompted with the line number before each line. To end the message before the 10th line, just enter a return. After you have entered the message, you will be given a chance to start over if you respond "N" to the question "SAVE TO DISK?" (new). Further editing features will be incorporated after the initial shakedown is complete.

G - (Goodbye) "G" will disconnect you from the system. Whereas in the old ABBS program failure to enter "G" would allow the next caller complete access to all of your messages, the new program automatically disconnects whenever a user hangs up (new).

H - (Help) Enter "H" to see a short list of available commands and control characters. This list is also printed in response to any non-legal command. Like other messages, it can be terminated with Ctrl-C.

I - (Instructions) The "I" command gives explanations of available commands much like this listing, but with more detail than in the "H" command listing.

K - (Knowledgable user) Users who are familiar with the system can use the "K" command to shorten the printing of many prompting messages. Thus, for example, "COMMAND?" becomes "?".

L - (List messages) To review all messages sent to you or to ALL without having to write down the numbers from the "S" or "Q" command, you may use the "L" command to list all messages within a certain number of days of SYSDATE. Zero days would retrieve messages entered on the same date only. You need not specify whether you want to see only those messages to you or only those messages to ALL (new). After each message is listed, you will be given the opportunity of entering a message, quitting and returning to the COMMAND? prompt, and, if the message is to you alone, deleting it.

M - (Meeting notices) "M" lists all meeting dates, times and places for Washington Apple Pi and the Special Interest Groups. Meetings of NOVAPPLE, the Northern Virginia Apple users group, are also noted.

N - (Nulls) As discussed above, some systems require the insertion of linefeeds, which move the cursor down a line without returning to the left margin. Some systems also require "nulls," which are delays after carriage returns in order, for example, to allow printer heads to return to the left margin. Insertion of linefeeds and the number of nulls may be examined and set by the "N" command. You must have linefeed insertion "on" in order to have delays after carriage returns.

P - (Print bulletin) The "P" command prints the bulletin you would have seen if you had responded "Y" to the question asked immediately after signon, "REQUEST BULLETIN?" "P" also prints the numbers of the messages for you.

Q - (Quick summary of messages) "Q" lists only the numbers of messages to you, to ALL, or from you, and the total number of messages currently in use. The maximum number of messages currently allowed is 200.

R - (Retrieve a message) To see one message, you may enter "R" and, when the ABBS asks you for the number, enter the number of the message. Entering "R" is not necessary, however, as you may enter the number of the message in response to the COMMAND? prompt. You will see a two-line summary of the message number, the sender, the recipient, the date, and the subject of the message. After a short pause, the ABBS will then list the message. If the message is to you alone, you will be asked whether you wish to delete it (new).

S - (Summary of messages) "S" will list a two line summary of all messages within the specified number of days. Entering "0" will retrieve messages from that date only. The summary lists the message number, the WAP number of the sender, the recipient, the date, and a 20-character summary of the subject. A word to the wise: Summaries of even private messages will be retrieved.

W - (Who is on the ABBS) To find out the name that belongs to a WAP number or the WAP number associated with a name, use the "W" command. After choosing which type of search you want, enter either the first two letters of the name or the WAP number.

contd.

A search of a match for a name can take up to a minute or so.

X - (Xfer files) The file transfer subsystem has its own set of instructions, listed in response to an "H" command once inside the Xfer subsystem. Download files, i.e., loading files off of the ABBS to your own computer, is done using D.C. Hayes Micromodem II commands. You will first be given the menu of files available for downloading. After you select one, the ABBS will send your Apple a Ctrl-R, which should force it to exit the terminal program. If the file to be downloaded is a program, the ABBS then does an "FP" or an "INT" and waits in case your Apple needs to load the proper basic. It then lists the file and, when the listing is complete, returns you to the terminal program by poking the appropriate value in the FLAGS byte of your Micromodem:

```
POKE PEEK(1784)/16+1912,138
```

PEEk(1784)/16 is the slot number in which the modem is located, and slot+1912 is the location of the FLAGS byte. One hundred thirty-eight means that the micromodem will send in full duplex (128), with the terminal program on (8), and your keyboard operative (2). The ABBS will then give you final instructions on how to save the program to disk. If you have asked to receive a text file, you must have a program such as Datacapture available to receive the file. A simple program to perform the same function will be published in this magazine next month.

Uploading files is more complex and will be covered in a future issue. Users desiring to send a file to the ABBS should contact the SYSOP.

$ - (Prices and products at the club store) "$" will list the current products available to members through the club store, and the latest available price information. The ABBS and the store are not directly related, and no guarantee of accuracy is made. Requests for items should not be made through the ABBS -- contact the appropriate club store officials.

These control characters are also supported: (This is all new.)

Ctrl-C, Ctrl-K or ESC act as Ctrl-C normally does: to stop whatever is going on (new). Ctrl-C and its siblings will return to the COMMAND? prompt. They are enabled once your password is accepted, so that you need not wait to see if you have any messages. On some occasions, such as during downloading, Ctrl-C is temporarily disabled.

Backspace (Ctrl-H) erases the last character from your screen.

Ctrl-L toggles lower case translation (new). If you wish to send and receive lower case, you must enter Ctrl-L at some point. (As with Ctrl-N, no carriage return is required. Thus, you may enter Ctrl-L and another command on the same line. Lower case is only allowed in message text and subject summaries (new). At all other times, lower case will automatically be translated into upper case before it is echoed back to you.

Ctrl-N toggles linefeed insertion (new). In this respect, it serves the same function as the "N" command, although it does not affect the delay following carriage returns. Ctrl-N may be entered anytime the ABBS expects input from you. If linefeed insertion is off, there will be no delay following carriage returns. Ctrl-N may first be entered when the ABBS asks you to "ENTER A CARRIAGE RETURN:". To see whether linefeed insertion is active, use the "N" command.

Ctrl-S temporarily suspends listing, almost exactly as it does during normal execution with the Autostart ROM (new). Type any other character to resume. Whereas the old ABBS program offered you a "STOP LIST/CONTINUE" option every twenty lines, the new ABBS expects you to decide when you want to suspend a listing (new). The new ABBS program is much faster than the old one in retrieving certain information, and you must keep aware of what is flying past you.

Right arrow (Ctrl-U) retrieves previously-erased characters (new).

Ctrl-X behaves exactly as it does in normal Apple line input: it cancels the line being entered and allows you to retype the entire line (new).

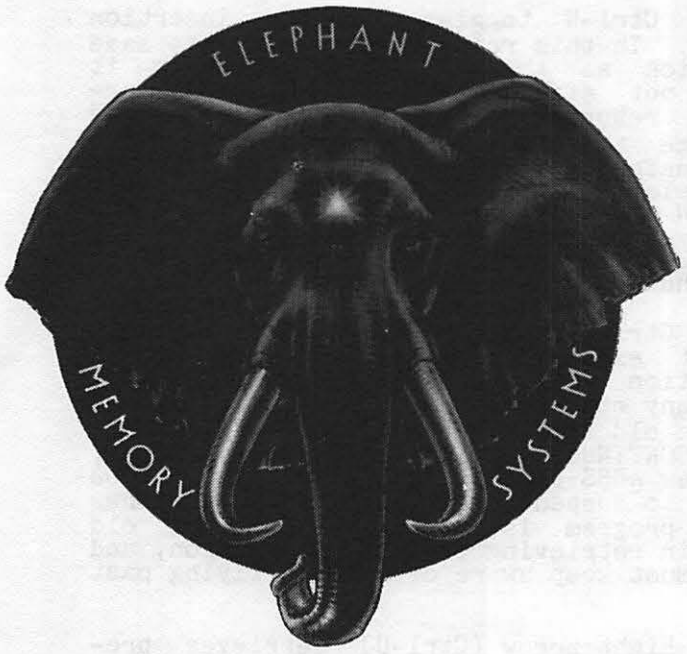
THE AUTHOR REPLIES

by Tom Van Flandern

Following the article "Your Diskettes Cost Too Much" in last month's newsletter, there appeared an editorial remark stating that it might be possible for the magnetic flux to pass through to the opposite side of a diskette, as a caution against using diskettes on two sides. In fact, Apple drives generate a signal which penetrates the surface typically only about one-third of the diskette thickness making such occurrence quite unlikely. Since new users are often uncertain about the advisability of using both sides of their diskettes, it is important to check out such claims with a diskette professional when you hear them.

It might also be noted that a leading software company, On-Line Systems, is distributing its large new adventure "Time Zone" on six double-sided diskettes, despite expectations that both sides will see heavy use. On the negative side of the ledger, it is possble for the pressure pad which presses against the diskette's opposite side to become encrusted with debris. This condition could result in scoring or other physical damage to the contacted surface. Although this too is infrequent, if you try two-sided use of your diskettes and experience a problem, inspection and/or replacement of the pressure pad may alleviate this problem.

(Ed. Note. See also Letter to the Editor from Val Golding elsewhere in this issue.)



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I AUTHORIZE THE RELEASE OF MY NAME__, ZIP CODE__ AND TELEPHONE__ TO OTHER MEMBERS.

(NOTE: Club policy prohibits releasing members' names and addresses unless you release that information by checking the appropriate areas above.)

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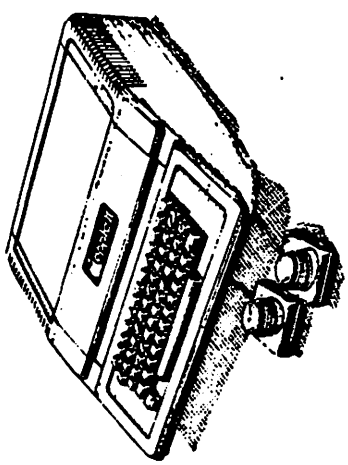
In December, 1978 a small group of APPLE II owners and users gathered in Silver Spring, Maryland, in what loosely might be termed as a meeting. Even though the name was not to orginate for several more months, this was technically the genesis, for Washington Apple Pi. As of September, 1981 our group numbers over 850 members, who are primarily from the greater Washington, D.C. metropolitan area. Our members are from all walks of life and of all levels of expertise. We are organized for mutual learning and education on the intracies of programming the personal computer and its application to business, education, science, self expression and fun.

Washington Apple Pi serves as a center of learning for everyone, from the beginner to the expert. If you are interested in personal computers (particularly the APPLE II and III) and are looking for others who share your interest and who are willing to guide you over the rough spots, Washington Apple Pi is for you. Those of you who are trying to make a decision on whether a computer is appropriate in the first instance are welcome to discuss this with any of us, free from any concern that we are salespersons who stand to gain from your purchase of equipment or programs. We are a not-for-profit organization of users who contribute time and effort voluntarily to keep our members up-to-date on the growing technology and to provide information which makes its application more understandable and usable in everyday life.



We share our knowledge and experiences with the APPLE in a number of ways:

• We have regular meetings at a convenient Washington metropolitan area location. These general meetings are usually held on the fourth Saturday of each month at 9:30 AM. A topic or demonstration of general interest is followed by smaller meetings of our Special Interest Groups (SIGs). These SIGs include New Users, Games, Education, Pascal, Assembly Language, Business, Handicapped and others, reflecting the many interests of our members.

• Our newsletter is published monthly and is regarded by many as one of the best. Club news, articles and software are regularly included and provide an invaluable reference source.

• Our extensive software library gives members access to a large collection of public domain programs, many of which have been contributed by our members, at a very low cost. They are distributed on diskettes and are available for purchase by mail order, to be distributed at the monthly meetings or by return mail for a small additional postage and handling fee.

• An electronic APPLE bulletin board system (ABBS) is maintained to allow members with APPLEs equipped with modems to exchange messages, obtain club information and share software.

• Group purchases of APPLE-related products save our members considerable sums of money, and several local merchants have offered additional discounts exclusively to our membership.

If you have any questions, please call the club phone (301) 621-2719, a local call in the DC metropolitan area.

Washington Apple Pi

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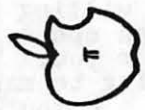

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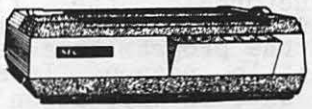

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FINDING UNDEFINED LINE NUMBERS IN APPLESOFT PROGRAMS

by Paul A. Sand

I recently accepted the task of making major modifications to an Applesoft program. The program was quite large, occupying about 25 Kbytes of memory when loaded. The program had also been "crunched"; all remarks had been deleted and multiple statements were combined into single program lines whenever possible. Worse, the program wasn't particularly well-structured: the flow of control jumped unpredictably and randomly from one part of the program to another with seemingly little reason. In short, it was a mess. Why, oh why, doesn't everyone use Pascal? Still, a job's a job...

I really got worried, though, when I spotted (by chance) a "GOTO 12010" statement with no line 12010 in the program. The program bore the scars of previous sloppy modifications. Which got me to thinking ... were there any other such references to non-existent line numbers in the program? Manual checking was out of the question; the program was just too big. And perhaps more importantly, how could I make sure I didn't introduce such mistakes myself?

So I wrote BADREF, an assembly language routine to sniff out and report instances of undefined line numbers in Applesoft programs. Fortunately, the task was easy enough to accomplish even with my meager assembly language skills; most of the difficult work was done by seven routines filched from the Applesoft ROMs (as documented in the March/April 1980 issue of Apple Orchard):

STXTPT ($D697) - This subroutine initializes TXTPTR ($B8-$B9) which is the pointer Applesoft maintains to keep track of where it is currently getting orders from. Typically, this routine will leave TXTPTR pointed at $800, one byte short of where Applesoft programs usually begin.

CHRGET ($00B1) - This subroutine increments TXTPTR and fetches the next character in the program into the Accumulator. It sets the Z flag if the character is either a colon (Applesoft's end-of-statement flag) or a NUL (Applesoft's end-of-line flag). It clears the C flag if the character is an ASCII digit. CHRGET can't be used for all character-fetching, however, because it skips over blank (ASCII $20) characters in the program. (By the way, CHRGET is in RAM rather than ROM because it is self-modifying. Programming purists may now weep and gnash their teeth.)

ADDON ($D998) - This routine simply adds the Y register to TXTPTR and leaves the result in TXTPTR.

LINGET ($DA0C) - This subroutine reads and translates the line number currently pointed to by TXTPTR and stores it in LINNUM ($50-$51). The first character of the line number must have been previously fetched by CHRGET. LINGET leaves TXTPTR pointing at the first byte after the line number. If the line number is greater than 63999, a syntax error will result.

FNDLIN ($D61A) - This subroutine searches the Applesoft program for the line whose number is in LINNUM. The C flag is set if the line is present, cleared if it is not. (It also leaves a pointer to the line in $9B-$9C, but BADREF doesn't use this information.)

INPRT ($ED19) - This routine prints the word "IN" and the line number stored in CURLIN ($75-$76).

CRDO ($DAFB) - This routine prints a carriage return.

Applesoft lines are stored in memory beginning (usually) at location $801. The first two bytes are a pointer link to the next line; if the high byte of the link is zero, it indicates the end of the program. The next two bytes represent the current line number. Then follows a series of bytes representing the program text; to save space, Applesoft keywords are stored as single bytes in the range $80-EA. (See Appendix F of the Applesoft Reference Manual for the list.) Non-keywords are stored as normal ASCII, character-by-character. Finally, a zero byte indicates the end of the line. The next line begins at the address pointed to by the link. And so on, to the end of the program.

BADREF uses all this information to find the undefined line numbers in an Applesoft program. First, BADREF stores the current value of TXTPTR, to be restored on exit. Then it calls STXTPT to point TXTPTR at the beginning of the program. The link to the next line is stored, first checking to see if the high byte is zero - if it is, we're done. Then the line number is stored in CURLIN. Then each program byte is examined, looking for a GOTO ($AB), GOSUB ($B0), or THEN ($C4) token; these are the keywords that may be followed by line numbers (although a line number might not always follow a THEN).

If one of these tokens is seen, we check to see if the next byte is a digit. If it is, we fetch the rest of the number, store it in LINNUM (using LINGET), and search for it (using FNDLIN). If the line doesn't exist, the current line number is printed.

Slightly complicating matters are statements like "ON I GOSUB 100, 200, 300, 400"; GOTOs and GOSUBs may sometimes be followed by a list of line numbers. So BADREF checks for a comma after a line number; if found, it attempts to find a second line number. And so on.

contd.

Here is the source code for BADREF:

```
;
;       BADREF - Finds undefined line num-
                 bers in Applesoft programs
;
;       Equates
;
STXTPT EQU $D697
CHRGET EQU $00B1
LINK   EQU $3C
CURLIN EQU $75
LINGET EQU $DA0C
FNDLIN EQU $D61A
CRDO   EQU $DAFB
INPRT  EQU $ED19
TXTPTR EQU $B8
ADDON  EQU $D998
OLDPTR EQU $79
;
       ORG $300
;
       LDA TXTPTR    ; Store current text
                       pointer
       STA OLDPTR
       LDA TXTPTR+1
       STA OLDPTR+1
       JSR STXTPT  ; Point to beginning of
                       program
       LDY #$01
NXTLIN LDA (TXTPTR),Y ; Save link to next
                       line
       STA LINK
       INY
       LDA (TXTPTR),Y
       BEQ DONE        ; Done if link high
                       byte = 0
       STA LINK+1
       INY
       LDA (TXTPTR),Y ; Store current line
                       number in CURLIN
       STA CURLIN
       INY
       LDA (TXTPTR),Y
       STA CURLIN+1
NXTBYT INY
TEST   LDA (TXTPTR),Y ; Get next program
                       byte
       BEQ ENDLIN      ; If zero, end of
                       line
       CMP #$AB        ; Is it a GOTO?
       BEQ FOUND
       CMP #$B0        ; Is it a GOSUB?
       BEQ FOUND
       CMP #$C4        ; Is it a THEN?
       BNE NXTBYT
FOUND  JSR ADDON       ; Update TXTPTR
       LDY #$00
       JSR CHRGET      ; Get first byte of
                       possible line no.
       BCS TEST        ; Whoops, not a line
                       number
       JSR LINGET      ; Get line number
       JSR FNDLIN      ; Search program for
                       it
       BCS COMCHK      ; If found, check for
                       comma
       JSR INPRT       ; Not found, report
       JSR CRDO
COMCHK LDY #$00
       LDA (TXTPTR),Y ; Get next character
       CMP #$2C        ; Is it a comma?
       BNE TEST        ; No, check other
                       possibilities
       BEQ FOUND       ; Yes, get next line
                       number
ENDLIN LDY #$00
       LDA LINK        ; Point TXTPTR at
                       next line
       STA TXTPTR
       LDA LINK+1
       STA TXTPTR+1
       BNE NXTLIN      ; Always taken
DONE   LDA OLDPTR      ; Restore previous
                         text pointer
       STA TXTPTR
       LDA OLDPTR+1
       STA TXTPTR+1
       RTS             ; And return
```

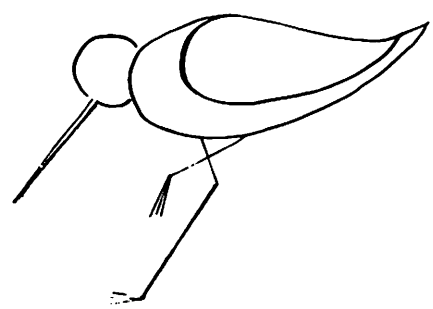
Here is the object code:

```
]CALL -151

$300.369

300- A5 B8 85 79 A5 B9 85 7A
308- 20 97 D6 A0 01 B1 B8 85
310- 3C C8 B1 B8 F0 4B 85 3D
318- C8 B1 B8 85 75 C8 B1 B8
320- 85 76 C8 B1 B8 F0 2E C9
328- AB F0 08 C9 B0 F0 04 C9
330- C4 D0 EF 20 98 D9 A0 00
338- 20 B1 00 B0 E6 20 0C DA
340- 20 1A D6 B0 06 20 19 ED
348- 20 FB DA A0 00 B1 B8 C9
350- 2C D0 D0 F0 DE A0 00 A5
358- 3C 85 B8 A5 3D 85 B9 D0
360- AC A5 79 85 B8 A5 7A 85
368- B9 60
```

Finally, here's a sample execution of BADREF on a nonsense Applesoft program:

```
]LIST

10 GOTO 20
20 GOTO 500
30 ON I GOSUB 10,20,30,40,50,60
40 IF I < 0 THEN 400
50 IF I = 0 THEN GOTO 500
60 IF I > 0 THEN GOTO 600

]CALL 768

 IN 20
 IN 40
 IN 50
 IN 60

]
```

BADREF can also be used to find out which lines in a program reference a given line, often a useful thing to know. Simply delete the line in question, making sure, of course, that you can restore it again. Calling BADREF will then tell you which lines referred to the now-absent line.



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June 18, 1982

Bernie Urban
6205 Walhonding Rd
Washington, DC 20016

"A letter to the editor or whatever"

Dear Bernie,

I'm sure you know my admiration for WAP; I consider it one of the best newsletters currently published. Nevertheless, even with the disclaimer, I believe the publication of "Your Diskettes Cost too Much" was a disservice to your members and readers. The author supplies no statistics, no authorities, no anything to back up his "facts".

Yes, some computers write on one side of the disk and some on the other, but in each case, I'm assuming, it is the same side, i.e., the "A" side as certified by the manufacturer. If Mr. Van Flandern believes both sides are certified, I would recommend he tour a diskette manufacturing operation.

The process as I understand it, is this:

1. Initially, only one surface is tested. If this surface passes, the diskette goes on for sleeving and notching. This means the reverse surfaces are indeed untested and thus less reliable.
2. If the first surface tested fails, the diskette is turned over and then, and only then, the reverse side is tested. If the reverse side passes, the diskette moves forward in the chain. This further increases odds of hitting bad media by using the reverse side, since the reverses are composed of a combination of not checked and "fails".

We duplicate nearly 5000 diskettes per month and have at times kept extensive statistics. We have tested front and back of many, many diskettes and in almost all cases the failure rate for the reverse side is in the range of 7-8%, while the certified side failure rate is as low as 2 to 3%. The author should also note that those systems with drives that use both sides of a diskette, without exception, have two sets of read/write heads and pressure pads.

The problem of pressure pad contamination does exist, but it appears to be in direct proportion to the quality of the magnetic coating. Contrary to what is stated in the article, there are vast differences from brand to brand, which is not to say that one should never use "white box" brands. I would not touch,with a ten foot pole, some major brands I have experienced. It is also true, but only as a generalization, "you gets what you pays for". I can say this also, based on my experience in the audio field as the producer of an LP record, and other involvement in the broadcast media.

The paragraph on double density is completely erroneous. There is no difference whatsoever in the magnetic coating between sing le and double density, only in the certification. A single density diskette is certified for reliability up to 80K of data and double density up to 160K. Normally double density disks are graded from the same production run as single density. With 13 sector DOS 3.2, single density limits were exceeded by only a small margin, however with the dense data packing of a 16 sector DOS this becomes far more critical. I suspect the reason single density disks work as well as they do in DOS 3.3 is because, although not tested and certified, the majority actually meet the standards for the more dense media.

On the Call -A.P.P.L.E. Hotline, I field somewhere in the neighborhood of 1000 queries per month. A fair amount of these relate to disk I/O errors and read/write reliability, and this type of query has trebled with the advent of DOS 3.3, which is far more critical of all disk access operations. This is compounded by the fact that some of Apple's drives did not always center truly. One of the suggestions I always make is to always buy diskettes with huo rings to overcome this problem, and many of my callers have been kind enough to call me back or drop a note in the mail to let me know that the hub rings had solved their problem.

The only point on which I full agree with Van Flandern is with regard to the disk cleaning kits. I have a two drive system, the oldest of which was the first disk drive delivered to the Seattle area (still has the old "clunk" relay). I have cleaned by two drives only once, about two years ago and noted very little residue on the cleaning diskette. Further, my drives are in a not-ideal environment with much cigarette smoke, dust, etc.

I would like to suggest that you or someone with WAP take the time to round up some authoritative sources and verify this information. I'd further suggest perhaps starting with some of the larger software houses and determine their in-house policies for using both sides, brands used, etc. I'm sure the results would be interesting.

Peace,

Val

Val J. Golding, Editor
Call -A.P.P.L.E.

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A PAGE FROM THE STACK

by Jill and Vance Giboney

Five new disks for the library this month. Three of them are new EAMON adventures:

Volume 193. The Abductor's Quarters.
Volume 194. The Quest for Trezore.
Volume 195. The Underground City.

For those who are new to WAP or to the World of EAMON, each of these adventures requires that you begin with library disk 181 - Beginner's Cave. This disk is necessary since you need to begin by RUNning THE WONDERFUL WORLD OF EAMON. You will be prompted when to insert the disk for an adventure, at which time you can either leave Volume 181 in and try the Beginner's Cave or insert any of the other EAMON disks (Volumes 182 to 195).

In addition to the new EAMON disks we're also adding:

Volume 118 - Utilities D
Volume 119 - IAC 15. Miscellaneous.

The IAC disk contains programs from the Apple User Group of the Tulsa Computer Society. The programs on this disk range from games to utilities, and many require Integer Basic.

The Utilities D disk contains programs from many sources. Some were used in the first WAP tutorials and have appeared on other disks. They are included again here since they were used for the tutorial and since the DOS utilities have all been upgraded to run on DOS 3.3. Note, however, that these are not tutorial programs but utilities that allow you to explore various aspects of the Apple. In addition to these programs there are a number of new and updated utilities, as described below.

ALPHABETIZE A DIRECTORY FILE - Allows you to alphabetize a text file. Reads the file from disk and writes it back to disk for you.

DATESOFT - A hello program that can act as a simple calendar that can be set to date a disk.

DISK ZAP - Allows you to read, write, and zap a sector from a disk.

DUMP- Dumps any DOS 3.3 file to a printer in hexadecimal. Run PRINTER DUMP DOC for instructions.

EVENT REMINDER - Reminds you of birthdays, etc., for a specified time period.

FASTBOOT MAKER - A group of four programs that installs a fastbooting loader for a 16K RAM card. It requires that the target diskette contain ONLY the boot program. Also, the code is "hidden" and doesn't appear on the catalog.

GENERAL DISK UTILITIES 3.3 - Disk read/zap program that includes other general functions. Enter H for help instructions.

GET A AND L FOR A BINARY FILE - Will BLOAD a binary file then print the starting address and the length of the file.

HEX-DEC CONV - Converts hexadecimal numbers to decimal and decimal to hex.

HEX/ASCII DUMP - Displays the hex values and ASCII characters of locations in RAM. Information is in HEX/ASCII DUMP INFO.

INTEGER BASIC-DISK - For Apple II+ owners, this is the RAM version of Integer Basic. Simply BRUN INTEGER BASIC-DISK, and when you get the ">" prompt you are in Integer Basic.

LAM ROUTINE UTILITY - Allows you to EXEC machine code into your Basic program.

LHS DISK MAP - Gives a display on the low-res screen of which sectors on a disk are used, which are free, and which generate I/O errors.

MAKE A DIRECTORY FILE - Allows you to make a directory file of programs on a disk.

MAS.CAT.48K.RE-REVISED11/22/81 - Another revision of the Master Catalog program that allows you to create a catalog of your disk library.

PROGRAM MAP - Gives a map of an Applesoft program.

REAL VAR STUDY - Allows you to study how real numbers are stored and evaluated by the Applesoft floating point routines.

SIMULATION-6502 - Simulates the working of the 6502 microprocessor.

SYSTEM CONFIGURATION CHECKER - Reports what's in each slot in your Apple.

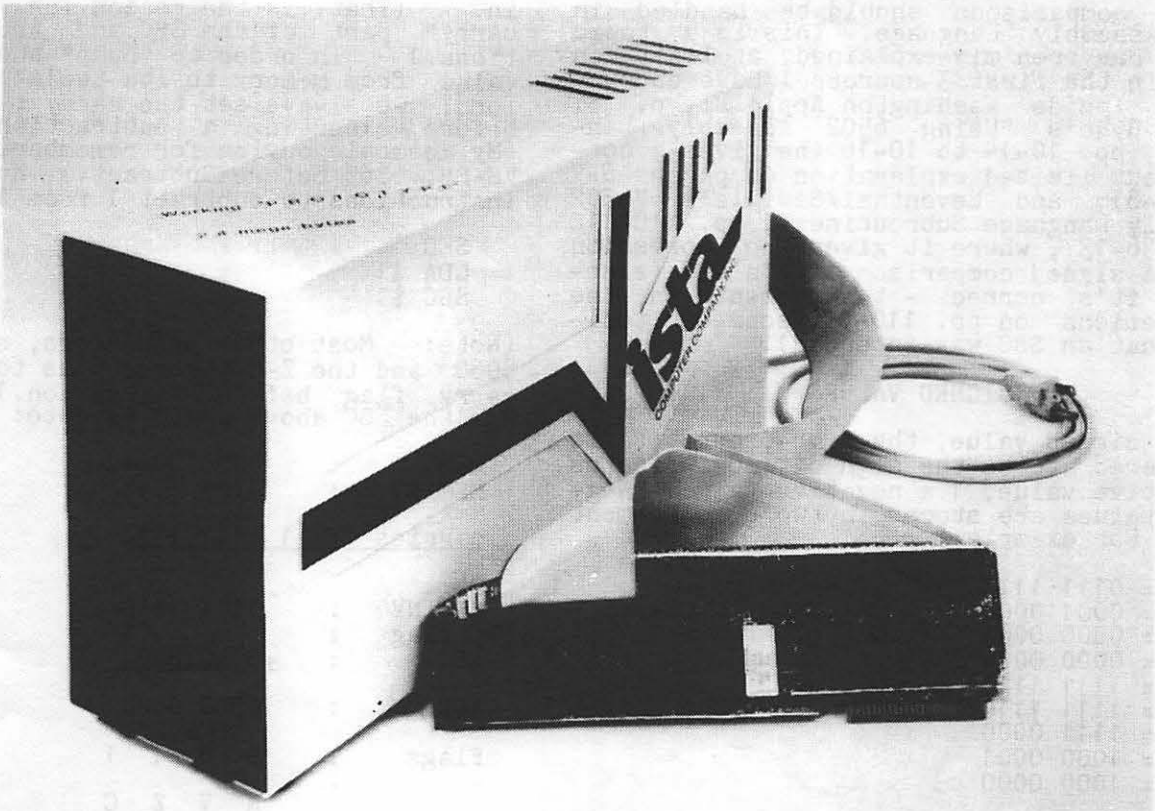
THE LO-RES ASSEMBLER - Creates machine code for lo-res graphics which could be incorporated into machine language subroutines. An invalid keypress or a <CR> when entering plot information will give you the options. Use "Q" to quit entering information.

VTOC REPORT - Displays the information other than the bit map contained in the disk Volume Table of Contents.

VOLUNTEERS NEEDED

Volunteers are needed on Tuesday afternoons to help the 4H Club demonstrate the use of APPLEs. Call David Morganstein, 972-4263, if interested.

NOW YOU CAN PUT 2 EGGS INTO ONE SHELL



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SIGNED COMPARISONS

by Roger Knights

Here is an accurate description of how signed comparisons should be handled in 6502 Assembly Language. This is a topic which has been mis-explained, at least in part, in the first 3 sources I have encountered: Inside Washington Apple Pi, p. 5; Randy Hyde's "Using 6502 Assembly Language", pp. 10-14 to 10-16 (he gives a correct but limited explanation on pages 6-7 and 6-8); and Leventhal/Saville's "6502 Assembly Language Subroutines", pp. 110-112 and 136-137, where it gives the impression that a signed comparison uses a CMP (elsewhere it's correct - the comments on the instructions on pp. 110-112 seem to indicate that an SBC was intended).

SIGNED VALUES

In a signed value, the high-order bit is considered to be the sign bit; 0 indicates a positive value, 1 a negative value. Negative values are stored in two's complement form. For example:

```
 127 = 0111 1111
  16 = 0001 0000
   1 = 0000 0001
   0 = 0000 0000
  -1 = 1111 1111
  -2 = 1111 1110
 -16 = 1111 0000
-127 = 1000 0001
-128 = 1000 0000
```

Incidently, in going from 0 to -1, it is as though we had "borrowed" from a phantom 9th bit, thus;

```
  1 0000 0000
-         1
  ------------
    1111 1111
```

I find this concept useful in anchoring the logic of the numbering system in my mind.

COMPARES (CMP, CPX, CPY)

It is possible to use a compare instruction to test the equality of signed values, and in some cases using one would have an advantage over using an SBC (if the comparand were in the X register and we didn't want to disturb the Accumulator, for instance; or if we wished to preserve the comparand in the Accumulator). However, unlike the case with unsigned values, the status of the carry flag after a compare gives no clue to a greater/lesser question. Only the overflow/V flag can help us determine that, and we must use the SBC instruction to affect it.

SBC

Subtraction is handled by the 6502 (or at least is best visualized by us) as the addition of the inverse ("one's complement") of the value in memory to the value in the Accumulator. Simultaneously, the value originally in the carry flag is added in. (That is the reason for the "with carry" part of the SBC and ADC instructions.) In order to "bump" the inverted value from memory to its two's complement form, we always set the carry flag to a 1 before executing a subtraction process. (My mnemonic device for remembering this is "S-S"; Set before Subtract.) Here are the instructions to subtract 1 from 1:

```
SEC
LDA $1
SBC $1
```

(Note: Most other processors, such as the 8080 and the Z-80, require us to clear the carry flag before subtraction.) Here is how the SBC above would execute:

```
MEM      :    0000 0001
MEMINV   :    1111 1110

carries  :  1 1111 111


MEMINV   :    1111 1110
C flag   :           1
ACC      :   +0000 0001

ACC      :    0000 0000

Flags    :    0  0  1  1

              N  V  Z  C
```

The flags are set according to the result and processing above. It is not negative so the sign/N flag is off; there was no overflow (to be explained later) so the overflow/V flag is off; the result is zero so the zero flag is on; and there was a carry out of the high order bit so the carry flag is on. Because the zero flag is on, a BEQ after the SBC would succeed.

HOW TO BGE/BLT

The BGE/BLT instructions (which are just the BCS/BCC pair differently named) cannot ordinarily be used in signed comparison sequences (SEC....SBC), as comparisons of values with different signs will not set the carry flat appropriately. For instance, if we want to branch if 2 is greater than or equal to -2, the flags would be set by an SBC thusly:

```
MEM (-2) :    1111 1110
MEMINV   :    0000 0001

carries  :           11


MEMINV   :    0000 0001
C flag   :           1
ACC (2)  :   +0000 0010

ACC      :    0000 0100
```

contd.

```
Flags    :    0  0  0  0
              N  V  Z  C
```

A BGE (BCS) would fail to branch, and hence is of no use to us. (Note that a CMP would also have left the carry flag off.)

To effectively BGE/BLT we must interpret the sign/N and overflow/V flags as follows:

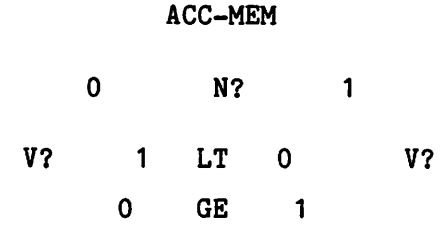
```
N =  V : ACC GE MEM
N <> V : ACC LT MEM
```

I remember this by mentally muttering "GEE-SAME, GEE-SAME ....". if N and V are both zeros (as in the two examples so far) or both ones, i.e. if they are the same, then the value in the Accumulator exceeds or equals that in memory. Note that the convention is followed of loading the first term in a comparison into the Accumulator; that is, if we are asking "Is B less than C?", we load B into the Accumulator to find out.

Here is a decision table illustrating the interpretation of the flags:

Sign/N	1	1	0	0
Overflow/V	1	0	1	0
Go to;	GE	LT	LT	GE

Here is a flowchart:



The flags are tested by the following branch instructions:

```
    Sign/N : BMI (N=1) / BPL (N=0)
Overflow/V : BVS (V=1) / BVC (V=0)
```

BMI = Branch if MInus (Sign/Negative flag is set;
BPL = Branch if PLus (Sign/Negative flag is off;
BVS = Branch if OVerflow Set;
BVC = Branch if OVerflow Clear.

(Note on terms: set = on = 1; reset = off = 0.)

Here is a sample code to effect a BGE/BLT:

```
        SEC
        LDA   TERM1
        SBC   TERM2
        BMI   TESTV     Branch if N set
        BVC   GE

LT      ... (reached if DIFF)
        ...
        ...

TESTV   BVC   LT

GE      ... (reached if SAME)
```

HOW TO BLE/BGT

There are two differences from the preceding BGE/BLT procedure. First, we must load the Accumulator with the second term in our comparison-question. Second, to compensate for this swapping of terms, we must reverse the placement of our Greater and Lesser routines. Here is a decision table showing the logic involved:

Sign/N	1	1	0	0
Overflow/V	1	0	1	0
Go to;	LE	GT	GT	LE

(My mnemonic mutter now becomes the rhyming "LEE-SAME".)

To verify that the logic is correct, consider the following chain of implications:

```
              N   EQ   V

implies:    ACC  GE  MEM
implies:  TERM2  GE  TERM1
implies:  TERM1  LE  TERM2

              N   NE   V

implies:    ACC  LT  MEM
implies:  TERM2  LT  TERM1
implies:  TERM1  GT  TERM2
```

Now work upwards through the chain to see how the following comparison-questions are handled. Notice that the answer to the last question is a proper answer to the rest, as well, which is as it should be:

```
                1  LE  2?
becomes;        2  GE  1?
becomes:      ACC  GE  MEM?
becomes:        N  EQ  V?
becomes:           YES

                2  GT  1?
becomes:        1  LT  2?
becomes:      ACC  LT  MEM?
becomes:        N  NE  V?
becomes:           YES

                1  LE  1?
becomes:        1  GE  1?
becomes:      ACC  GE  MEM?
becomes:        N  EQ  V?
becomes:           YES

                1  GT  1?
becomes:        1  LT  1?
becomes:      ACC  LT  MEM?
becomes:        N  NE  V?
becomes:           NO

                2  LE  1?
becomes:        1  GE  2?
becomes:      ACC  GE  MEM?
becomes:        N  EQ  V?
becomes:           NO

                1  GT  2?
becomes:        2  LT  1?
becomes:      ACC  LT  MEM?
becomes:        N  NE  V?
becomes:           NO
```

Here is a sample code to effect a BLE/BGT:

```
        SEC
        LDA   TERM2
```

contd.

```
        SBC  TERM1
BMINLE  BMI  TESTV
        BVC  LE

GT      ...  (reached if DIFF)
        ...
        ...

TESTV   BVC  GT

LE      ...  (reached if SAME)
```

In some situations we will be constrained to have the first term of the comparison in the Accumulator. The solution for these cases is a little less compact and efficient; in general terms we must modify the BGE/BLT routine so that the Equal case is sent in the opposite direction, converting label GE into GT, and LT into LE. The instruction needed is BEQ LE, which is placed after the SBC TERM2 and before the BMI TESTV.

In all of these routines, if it is desired to reverse placement of the Lesser/Greater code, the BVCs must be changed to BVSs, and their operands swapped.

MULTI-BYTE COMPARISONS

First, a signed comparison is made of the Most Significant Byte. If one of these is higher than the other, then the whole number is higher. If they're equal, then an unsigned comparison is made of the rest of the number. This makes sense because the sign byte is now out of the picture, and with it the possibility that the numbers have opposite signs. Here is a sample code to test if TERM1 is GT TERM2; both are 3 bytes:

```
        SEC
        LDA  TERM2+2  (MSB; TERM2 LDA'd for
                       BLE/BGT-type test)
        SBC  TERM1+2
        BNE  BMINLE   Goes to signed comp.
                       code like that above
        LDA  TERM2    Least Significant Byte
        CMP  TERM1
        LDA  TERM2+1
        SBC  TERM1+1
        BLT  GT       If TERM2 is less,
                       TERM1 is greater

LE      ...
```

THE OVERFLOW/V FLAG

Despite what you may read (Randy Hyde, "Using 6502 Assembly Language", Datamost, p. 6-6 & 10-9; Rodney Zaks, "Programming the 6502", 3rd Ed., Sybex, p. 107), the V flag is not set "if there is a carry out of bit 6". It is set if there is a carry into the sign bit (bit 7) which is <u>different</u> from the carry <u>out of</u> the sign bit (Rodney Zaks, op. cit., p.23). This is also the way the overflow flag is set on the 360/370 systems and, I believe, on any two's-complement CPU. In other words, if there is a carry out of bit 6 and also out of bit 7, there will be no overflow; likewise, if there is no carry out of either, there will be no overflow. The examples of binary addition under "SBC" and "HOW TO BGE/BLT" illustrate, respectively, these two possibilities.

If the result of an SBC (or ADC) exceeds 127, or is less than -128, the overflow flag will be set because of unmatched sign bit carries. For example, to compare 1 to -128, we first SEC, then LDA 1, then SBC -128, which executes and sets flags as follows:

```
MEM (-128):  1000 0000
MEMINV    :  0111 1111

 carries  :  1111 111

MEMINV    :  0111 1111
C flag    :         1
ACC (1)   : +0000 0001

Flags     :  1  1  0  0
             N  V  Z  C
```

Because there was a carry into the sign bit but no carry out of it, the Overflow/V flag is set. The value in the Accumulator is GE the value in memory, as can be determined from the N and V flags being the same.

Note that if we had visualized the addition as occurring only after the carry flag had been separately added to the value from memory, the overflow flag would not have been set, and we would be in disagreement with the 6502. Hence the addition-format I've used should be followed.

THE 6502 PROGRAMMING MANUAL

This manual is issued by the three sources of the 6502. On page 46 (page 4-7 in Rockwell's version) the following statement is found: "The compare instruction is designed to allow a signed comparison between two values, assuming one makes appropriate use of the Z, N, and C flags." The word "signed" is a typo, and should be changed to "unsigned". This is probably the source of the confusion on the subject which exists. Commodore (formerly MOS Tech.), Rockwell, and Synertek have confirmed to me that "signed" is an error, and that they will change it in the next printing.

Softviews contd. from pg. 9

EXAMINE - print variables or memory locations during pause

These options are part of the Soft-step debugging package. The programmer can define up to 10 line numbers at which a break can be set or which will be traced on the screen when executed. A table of commands like PRINT, PEEK, POKE or LET, containing 96 bytes of command can be executed whenever requested or automatically upon single stepping through the program. Many of these features are similar to the capabilities given the machine language programmer using the old monitor with single-step and trace functions. (Perhaps they are what Ken Bowles had in mind for the Pascal programmer when he included a D(ebug option at the command level.) If you write Applesoft programs, you should consider this utility. The manual is brief, only 11 pages in length. It does not contain any reference to how the package works or any examples, but Soft-step will prove a useful tool to the BASIC programmer. (Accent Software, Inc., 3750 Wright Place, Palo Alto, CA. 94306)

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A PROPOSAL FOR A READING LIBRARY

by Jesse Wagstaff

As I see it there are two main purposes for belonging to Washington Apple Pi: 1) comradeship with others who have a similar interest to our own and 2) information about how to use our APPLEs better. We seem to be achieving the first purpose to a certain degree. A friend of mine who knows little about computers attended one of our main meetings and commented that we didn't seem to be too formal in our procedures but we were one of the most enthusiastic groups he had ever seen. On the second purpose, i.e. sharing information, we are good in some ways, and not so good in other ways. One of our major deficiencies is making printed matter available to our members. We need a library! I can only echo the comments of Walt Francis in the June 82 issue of the Newsletter.

This article is to propose some specific plans for a WAP library. Let's start with the objective that the major magazines, newsletters, books, and manuals dealing with APPLE should be conveniently available for reading by the majority of our members. These materials should be maintained in good usable shape. All materials should be well marked, and easily found. A convenient pleasant reading area should be provided. The occurrence of missing issues, lost volumes, and torn or damaged items should be minimized. Security measures should be effective in preventing loss or damage but should not be threatening. Achievement of the objective will require time, money and effort.

This proposal has been presented in preliminary form to the Board. The Board asked questions but took no action other than to request further details. However, a straw vote at that time indicated that aout 2/3 of those present felt that library materials should remain in the club office and should not be loaned out. Reasons given for this point of view were the risk of loss and the work of checking materials in and out. Any members who feel strongly about the advantages of having a lending function will need to address several issues including charging for mailing to members and back to the library, and payment of adequate deposits to cover any losses. Volunteers or paid help would be needed to handle the finances, the check-out system, and the lugging of the materials to and from the mail box.

Six different methods of maintaining magazines and newsletters have been suggested. First, individual issues could be stacked loose on shelves. This is a simple inexpensive method but the lost, misfiled, torn and damaged items would inevitably produce frustration and lack of pride in the library on the part of both library workers and patrons. Except perhaps for very recent issues and extra copies this method should not be seriously considered.

The second method is housing loose items in boxes on shelves. This may have some value for recent issues which are awaiting arrival of the last members of the set prior to more permanent binding. Adequate sturdy boxes are not cheap. Misfiling and dogearing are constant risks.

The third housing method suggested is three-ring binders. This would entail the moderate expenses of purchasing the binders and drilling the holes in the magazines. There would be risk of drilling through printing in some magazines. Also, there would be risk of breaking sets because people could easily remove individual issues.

The fourth possibility is binders with wires which can be placed through the centerfolds but these have the disadvantages of breaking with hard use and being easily dismembered and issues removed.

A fifth suggestion is that we have microfilm copies of magazines. The cost for making a 16mm microfilm copy of magazines is aout 4 cents per page. Microfilm photographers are unwilling to copy copyrighted material, so if we decided to house microfilm copies we would have to have a dual system to cover those materials which could not be filmed. Some of the magazines can be purchased in microfilm cartridges at $10 to $38 per year depending on the number and size of issues per year. Microfilm would require microfilm reading machines. These are expensive to purchase and maintain. A separate photocopier would have to be purchased. Use of microfilm in the library would probably double the library budget. An equally serious disadvantage is that the space taken by the reading machines would reduce the number of patrons which the library could service by perhaps half or more.

The sixth and last method suggested is class A binding. This consists of cloth covered hard covers, stitched pages, embossed labeling, and even perhaps our own logo. This will cost about $1 per issue if a large number of issues are bound at once. One disadvantage of stitched binding in hard covers is that if the printing is near the center fold photocopying can be difficult. But this problem is being successfully handled in libraries all the time. This method provides the most service for the money. It is a practical affordable procedure which can be easily maintained and which will be a source of pride and service for years to come. It has been the standard in libraries of all sizes. Even with this recommendation, hard binding will do the job at the lowest combined cost of money and frustration.

After the committment is made to build a library and decisions made on the type of library it is to be, the next step is to organize the most important titles into sets and determine which issues are

contd.

missing. Donations of magazines and books by club members should go a long way toward filling the gaps. The club library will have to be selective of the materials that it can receive at each stage of development. Lists are needed of items members have available to donate. Indiscriminate dumping of materials on the library could inundate it. A second way of obtaining missing issues is to trade for them. We will trade back issues of our newsletter for back issues of newsletters of other clubs. The third way to fill the sets is purchase.

A goal for the first year would be to obtain, bind, catalog, shelve, and make available to members full sets of 10 magazines and 10 newsletters from the first publication starting as early as 1974 up through 1981. Reserve sets tied with cord and stored in sturdy boxes would be held in the back room just in case of loss or damage to the original sets. The following 10 magazine titles have been proposed for the first year: Nibble, Byte, Creative Computing, Kilobaud, Dr. Dobbs Journal of Computer Calisthenics & Orthodontia, Interface Age, Personal Computing, Popular Computing, and 6502 Micro. If a full set of another title of general interest became available it could replace one of these. The 10 newsletters have not been selected but probably will include Washington Apple Pi, Call-A.P.P.L.E., Apple Orchard, and those from San Francisco, Boston, and Michigan.

A photocopy machine should be available for use by library patrons. The selection and maintenance of this machine should depend on othe uses for it in the club office. No budget for it is included here. The library should not photocopy materials for people and should notify all patrons to obey the law and respect the rights of others in the use of photocopies.

Other expenses will be shelving, tables and chairs. The shelving would probably be used only by the library but the tables and chairs could also be used for small meetings and other club business. It is anticipated that shelving along the walls of a 200 sq ft room would hold all the major books, newsletters, and magazines dealing with APPLE and closely related microcomputer subjects for the next 5 years.

A budget of $1200 for the libary for the first year would get it started. This would include binding, shelving, tables, and cataloging supplies but would not include rent, photocopier, or wages. The budget proposed is as follows:

Table, 95"x36" folding banquet type w/ Formica top	$100
Chairs, metal folding (12 at $14.50)	160
Bookcase, 36"x48"x12" particle board w/ 3 shelves	140
Binding, class A (750 issues at $)	750
Cataloging supplies	50
Total	$1200

Next year a budget of this same amount should be able to provide for a few subscriptions and perhaps some shelving for current issues. An additional constraint on the rate of library growth and achievement of its projects will be the number and dedication of volunteers.

Some operating policies will be necessary but they should be such that they serve us well. The library should have a responsible person present during all open hours. Eventually decisions should be made on availability of the library to nonmembrs and levying fees for service.

Four things are needed to get started. Two of these should come from individual members. First need is volunteers to do the work. Second need is for members to provide lists of items they wuld be willing to donate. There is a possibility that these donations may be tax deductible. The two things needed from the club are authorization to establish the library and approval of the budget.

In summary, a motion should be made to the effect that WAP authorize establishment of a library for books, manuals, magazines, and newsletters, and approve a budget of $1200 for the first year.

Edsig News contd. from pg. 8

Package fees for accommodations, transportation, and class. Unlimited wine and lunch and dinner included.....

For those of you who haven't made a decision on summer classes for your children, please refer to the May and June issues of WAP - no new classes have been uncovered for this issue.

DATABASE SYSTEMS

by Paula & Bernie Benson

The presentation at the May meeting of APPLE PI was on data base management systems. The following article contains some of the information presented by Ernie Forman and company at that meeting. Some opinions of the reporters may have slipped in.

DEFINITIONS

A collection of information in the computer is called a FILE. Files are made up of RECORDS and records are made up of FIELDS. For example, a file may contain information on all members of the WAP, a record contains the data on a specific member (#388), and a field contains a specific piece of data on that member (546-0076). The DOS or operating system opens, reads, writes, closes, and maintains the files on the disk. There are various types of fields - alphanumeric (letters and numbers), numeric, dollar, etc. A record, then, is a collection of fields that contains information on a single item such as a customer.

A data base is a collection of one or more files. All the data doesn't have to be in a single file. A data base system can access a number of data files and "know" the relationship between them. A data base system must provide the ability to define data files and their relationships, to add, modify, and delete records, and to generate reports.

When there are a number of files available but a different program accesses each of them, that's not a true data base system. A system that can store information on one file, reference it, retrieve it, sort it, and do a little reporting, is not really a data base system either. It's just a data management facility. Whether a true data base system is needed or whether a data management facility is sufficient depends on the complexity of the data relationships and the amount of manipulation intended by the user. Our own FILE CABINET program on WAP vol 37 is a data management utility.

OVERVIEW

The following considerations should be made before buying any data base or data management package.

One important consideration about a data base system is its ability to redefine the format or structure of a data base after it has been created and data added. This will allow modifications and improvements to a data base even after it is in use. Another consideration is space limitations, size of fields (# of characters per field), size of records (# of characters and # of fields per record), and size of files (# of records per file). The number of indices and files active at one time, as well as, overall hardware requirements are also very important. These are limitations easy to relate to because a user runs into them very quickly.

Performance is also something easy to relate to. Even on large computers - DEC, IBM, or CDC, a sophisticated data base system sometimes seems to limp along. Don't expect the same performance on the APPLE. There is a varied range of performance for the microcomputer. A system that does very nicely with 5, 10, or 50 records may be very slow with 200 or 1000 records because the time of access often rises exponentially with the number of records being managed.

Report generation is a feature that should be considered. Some systems store a print format for a particular report on a utility disk. It can be accessed at a later date. Other systems make use of a dynamic print format where the instructions must be given from the keyboard each time the report is generated. Some systems have both methods for greater flexibility. The ability of the report generator to select records based on complicated conditions, compute sub and grand totals, and print reports for your specifications should be looked at.

There are a few other items to look at in data base systems. The kind of documentation available is very important. Consideration should be made of error handling and support from the vendor. If there are any problems, can you call up the vendor and get some useful help? Ease of learning and use is important. If you are a new computer user it is very important to have a package that is easy to learn. But, by and large, the easier a package is to learn, the less it does. It shouldn't be painstaking to learn, however. The documentation should be sufficient so that if a person is willing to invest the time, it should progress in a logical fashion. One last thought concerns file compatibility with other operating systems and programs. Systems which are heavily protected tend to not generate files useable by other programs or read files produced by other programs. These systems can not take advantage of new products that increase memory or disk storage capacity. System backup is usually impossible.

DATA MODELS

The technical jargon for data bases includes the terms entity and attributes. Entity is simply something that exists. If there is something in the business or home identified as an item on which to keep information; this is an entity. Attributes are the characteristics of that entity - what color is it, what size is it, etc. In most of the data bases we relate the attributes by defining a record. Each record contains the attributes of the entity. That is standard in most systems. With two separate data bases, the relationship between the entities in each, is called an association. The way that the association

contd.

is represented determines what kind of data model it is. There are two basic kinds of data models - network and relational.

The network data model uses nodes and links. A node is the record type or entity and a link is the connection between nodes or association. Typically names are given to the nodes and links. A relational data model is a model in which associations are represented in the same way as the attributes, like a two-dimensioned table. Each row going across the table is called a record. Each column is called a field of the record.

These data models are logical data models, ie. the way people think of data. This is not the way the computer actually stores and retrieves the data. Some of the models available commercially do not neatly fit into either of these categories. The structure may get rather complicated with more links and reverse associations. The user should map the logical structure of the business or home situation and then find a package to support it.

Within the class of models called network data models, there are certain variations. There is one model called the General Network. This model says you can link any two record types, in any direction, with multiple links, and no restrictions. There's a second category of network models which includes Database Master and DBTG. These are network models with restrictions. The most popular commercial data base systems follow the DBTG model.

There are even further restrictions in a hierarchical model ie. one that looks like a tree. The relationships between the data elements are maintained with sets, linked lists and pointers telling the system where to go next. This kind of system can get very complex with lists of lists and pointers to pointers. By two-fold manipulation, any DBTG model can be represented as a hierarchical model. In this scheme there is data redundancy, ie. the data is duplicated. The complexity creates storage problems with a microcomputer. There is also the problem of having redundant data modified in one place and not in another. That leads to data inconsistency; a big concern in data management.

EXAMPLES

Four packages were discussed as examples of data base management systems, increasing in cost and capability. VISIFILE is marketed by Visicorp. It is very easy to use but is limited in what it does. It uses indices which is a method that a data base system uses to find records quickly, perhaps a system of pointers. VISIFILE is useful for storage and retrieval of data. It does mailing labels nicely.

DB MASTER is not a data base system in the true definition of the term. It is not a system to catch and store information for a user application program. What it does do is implement a record management system for storage and retrieval of records and report generation. It is a report management system implemented with an index sequential access method with provision made for secondary keys. In an index sequential system, there is a specific attribute of a record called a key that is pulled out and stored in a separate file. This file is used to look up the record on the main file and find all the attributes associated with that record.

CONDOR is a complete relational data base system. It is very powerful in terms of the amount of data that can be handled and the ease of getting at that data. The process of relating the data in one file to the data in another file is also straight forward. CONDOR must run under CP/M and is quite expensive, not for the casual user.

DBASE II is a relational data base that allows manipulation of small to medium sized databases using conversational English for commands. It is a powerful system that allows the user to easily add, delete, edit, display and print data from the database. It can generate reports from one or more databases, automatically manipulating the data as it reports. There is a full-screen editing capability so that data can be entered in the final format. One of the advantages to the system being in CP/M is the capability of backing up the disk. Both the software and the data are stored in standard CP/M files. Data from other sources in CP/M format can be modified easily to be an acceptable DBASE II data file.

SUMMARY

The system you should choose depends on the capability you need. If you need a simple index card system look to a program like File Cabinet. If you need to do reports and handle lots of records and do sorts, then a system like DB Master might be the thing. If you need to express relationships between different record types, to handle more sophisticated types of data that can't be handled by a simple flat file structure, you may need a system like Condor or DBASE II.

COMPARISON OF SYSTEMS

CHAR	VISIFIL	DBMASTER	CONDOR	DBASEII
char/rec	232	1020	1024	1000
fields/rec	24	100	127	32
file sp.	1 disk	1 disk		1 disk
indices	24	2		2
ind. act.	1	2		2
files act.		1		2
rec/file			32,767	65,535
require			Z80 48KRAM 16Kcard CP/M 2 drive	Z80 48KRAM CP/M 2 driv
report format		disk	not need	disk dynam
doc.	well done	tutorial	inadeq.	fairly good

contd. on pg. 44

SPACE/TIME ANALYSES OF FUNDAMENTAL HIGH-RESOLUTION GRAPHICS ALGORITHMS

by Charles K. Mesztenyi

The efficiency of an algorithm is measured in terms of space and time. In the case of Apple, the space requirement of an algorithm is the number of memory bytes the algorithm (program and data) occupies. The time, which is needed to run the program, can be measured either by running the program in conjunction with a real time clock or by counting cycles needed to execute the individual instruction cycles. The latter method is adopted in this article. There are two complications to be considered. The first complication is that an algorithm is usually a part of a larger program, thus its implementation depends on the full program. If it is implemented as a subroutine, one must consider the overhead of space/time for the jump to subroutine and return sequence. Furthermore, the contents of registers A, X and/or Y may need to be saved at the beginning of the algorithm, and restored at the end. The second complication is caused by the data dependence of the running time. In this case, one can give the minimum and maximum time together with an average. The average time requirement necessitates some statistical assumption on the data. In this article, an equal probability of data values are assumed, e.g. yc-coordinate values on the high-resolution are 0, 1, ..., 191. It is assumed that all 192 values have equal probability. Thus average time may be calculated by summing up the time requirement with yc=0, yc=1, ..., yc=191 and dividing the sum by 192.

The objective of this article is to list some fundamental algorithms for high-resolution graphics in assembly language and give precise space/time measures in terms of bytes and cycles. These data enable direct comparison of two or more algorithms for the same purpose. Part 1, given in this issue, contains algorithms for defining bit positions for a given xc, yc coordinate pair. In following issues, Part 2, will contain algorithms for modifying bit positions when xc and/or yc coordinates change by one, and algorithms for line drawing; in Part 3, clipping and rotation algorithms. As will be seen, there is usually no overall "best" algorithm, one may be "best" in space but another is better in time. This justifies the existence of compromising algorithms which are in-between the "best-in-space" and "best-in-time" algorithms. All the listed algorithms assume a black and white monitor; no color codes are considered.

Before going into the main topic, graphics algorithms, one could analyze the first complication, subroutine implementation and register savings. Subroutine implementation consists of a jump to subroutine (JSR) and a return from subroutine instruction, thus the overhead is:

```
JSR $aaaa      3 bytes   3 cycles
RTS            1   "     3   "
```

i.e. the total of 4 bytes and 6 cycles. This may be larger if indirect jumps are implemented for relocatability. Register savings can be implemented in three different ways, whether the values are saved in the stack, in zero-page location or in absolute location. There is no difference between X and Y registers space/time requirements, but register A is different when it is saved in the stack:

Register A

where	instr.	bytes	cycles
stack	PHA ... PLA	2	7
zero page	STA $zz ...	4	6
abs. loc.	STA $aaaa ... LDA $aaaa	6	8

Register X (or Y)

where	instr.	bytes	cycles
stack	TXA PHA ... PLA TAX	4	11
zero page	STX $zz ... LDX $zz	4	6
abs. loc.	STX $aaaa ... LDX $aaaa	6	8

For efficiency, the register contents should be saved in the calling routine (before JSR) since that part of the program "knows" which register content must be reserved. On the other hand, subroutines should state the registers used by them to avoid superfluous register save/restore operations.

Part 1.
Bit Position Algorithms.

Given xc, yc coordinate values, one must find the equivalent bit position for the purpose of plotting the point:

```
( LDA  MSK      )
  ORA  (BASL),Y
  STA  (BASL),Y
```

erasing it:

```
( LDA  MSK      )
  EOR  #$FF
  AND  (BASL),Y
  STA  (BASL),Y
```

contd.

TUTORIALS

* 1. Introduction to the Apple : Microcomputer Fundamentals
and
* 2. Applesoft Basic Programming

L. Morganstein Consultants is offering these tutorials beginning in July. Both tutorials will be taught by David Morganstein.

The Introduction to the Apple tutorial will be held Saturday, July 31 & Aug. 7 from 9 am to 12:15 pm and will include:

- Binary, Hex and ASCII
- Bits, Bytes, Rams and Roms
- Memory Map and the Monitor
- The CATALOG, VTOC and Dos

The Applesoft Basic tutorial will be held Saturday, July 31 & Aug. 7 from 1:15 pm to 4:30 pm and will include:

- Variables
- Input and Print
- Changing Program Control
- Reading and Writing Data

Both tutorials will be at the Washingtonian Motel on Shady Grove Road in South Gaithersburg. There will be a limit of 24 participants at each tutorial.

If you wish to attend one or both tutorials, please fill out form below. Enclose check or money order for the appropriate fee. You will receive confirmation of registration and a list of suggested readings within 2 weeks. Mail form to:

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(Pls. ck.) _____Intro. to the Apple _____ Applesoft Basic

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inverting it:

```
( LDA  MSK      )
  EOR  (BASL),Y
  STA  (BASL),Y
```

or testing it:

```
( LDA  MSK      )
  AND  (BASL),Y
  TNZ  ...
```

LDA MSK instructions are shown in parentheses since the algorithms below exit with the value of MSK already in register A. In either case, one has to calculate the values for MSK, for the consecutive zero page locations BASL,BASH, and values for the register Y based on the values xc, yc. The bit position algorithms perform these calculations. The values for MSK and register Y depend on the xc value, values for BASL and BASH depend on yc value. The task can be divided into these two categories. For the purpose of these algorithms, it is assumed that xc is stored in consecutive zero page locations XL (remainder part of xc/256) and XH (integer part of xc/256) and yc is stored in zero page location YC. Many fast drawing algorithms restrict the value xc between 0 and 255; in this case it is sufficient to have only one zero page location, XC, for storing the xc.

Chapter 1.A contains the algorithms which calculate the values for register Y and MSK dependent on the full range of xc values (0 to 279). It also shows the same algorithms for the restricted range of xc values (0 to 255). Chapter 1.B gives the algorithms for calculating the values for BASL and BASH depending on yc.

1.A Algorithms for MSK and Register Y.

The data requirement for MSK and register Y (RY) can be expressed using Basic:

```
RY = INT(XC/7)
 I = XC-7*RY
MSK = 2^I
```

Since division and multiplication are not available on the M6502, one has to use repeated subtraction (Calculation Method) or precalculated tables (Table Look-up Method). By combining tables, one may obtain a Compromise Method.

Calculation Method.

The following algorithm is used by Applesoft. It requires the least amount of storage, but it takes a relatively long time to run:

```
   ------------------------------ cycles
   LDA  XL        get xc value        3
   LDY  XH        high bit to Y       3
   CPY  #$00      set C and check Y   2
   BEQ  P2        branch if xc<256  3   2
   LDY  #$23      reinit Y and A    -   2
   ADC  #$04        for xc>255      -   2
P1 INY            subtraction loop  -   2 r2
P2 SBC  #$07         until           2   r2
   BCS  P1        C is cleared        2   r3
   TAX            remainder-7 to X    2
   LDA  MT-249,X and MSK from table   4
-------------------
MT       DFB    $01,$02,$04,$08,$10,$20,$40
-----------------------------------
Total:  28 bytes,  avge. 136.3 cycles
                   rnge. 21-273 cycles
                 (r indicates repeat count)
Registers used: A, X, Y
   -----------------------------------
```

Table Method.

The Table Method is simply using the xc value as an index for the pregenerated tables I7 (integer part of xc/7) and M7 (corresponding masking bits). The only complication is that index registers can not hold numbers larger than 255:

```
---------------------------------- cycles

   LDX  XL        use low byte of xc  3
   LDA  XH        for index, test     3
   BEQ  LW          high byte        3   2
   LDA  M7+256,X    yes, pick data   -   4
   LDY  I7+256,X     with offset     -   4
   BNE  CT           and jump        -   3
LW LDA  M7,X        no, pick data    4   -
   LDY  I7,X         without offset  4   -
CT ....
  --------------------
M7 RES  280
I7 RES  280
-----------------------------------
Total: 580 bytes,   Avge. 17.17 cycles
                    rnge. 17-19 cycles
Registers used: A, X, Y.
   -----------------------------------
```

Compromise Table Method.

One can shorten the table sizes by not using the masking bits, which are 2 raised to the power of the remainder of xc/7, but storing the remainder itself usable as an index for an MT table as in the case of the Calculation Method. Then the table I7 can be combined with the remainder table since the entries of I7 require a maximum of 5 bits, the remainder 3 bits, which fit into one byte. The following algorithm goes one step further by using such a table only for even numbers, thus its length is only 140 bytes. The first 5 bits of the entries of the table TX contains the integer part of xc/7, the last 3 bits of the entries contain the remainder part. Thus the table is generated by the following Basic program:

```
FOR J=0 TO 139
X = 2*J
I = INT(X/7)
R = X-7*I
POKE TX+J,8*I+R
NEXT J
```

Now consider an even number xc with the integer and remainder parts of xc/7 as I and R. Then the next number, xc+1 is such that INT(xc/2) = INT((xc+1)/2). Furthermore, INT((xc+1)/7) = I and the remainder of (xc+1)/7 = R+1 unless R=6, in which case INT((xc+1)/7) = I+1 and remainder of (xc+1)/7 = 0. The following algorithm takes care of this addition to R in case of an odd number by the use of the C flag. The possible carry over to I is automatically accomplished by the packing of I and R into one byte:

```
---------------------------------- cycles
   LDA  XH        get low bit of xc-   3
   ROR              high into C        2
   LDA  XL        for the division     3
```

contd.

```
   ROR             by 2, and odd bit  2
   TAX             to C, xc/2 to X    2
   LDA  TX,X     to get table entry   4
   ADC  #$01     add 1, 2 if odd      2
   TAY           save it in Y         2
   AND  #$07     separate remainder   2
   TAX             into X             2
   TYA           get back entry and   2
   LSR            shift out rem.      2
   LSR            to get integer      2
   LSR            part into Y         2
   TAY                                2
   LDA  MR,X     get mask byte        4
   ----------------------------------
MR DFB  $01,$01,$02,$04
       $08,$10,$20,$40
TX RES  140
-----------------------------------
Total: 172 bytes,  38 cycles
Registers used: A, X, Y
-----------------------------------
```

Note that the masking table MR has 8 entries with $01 repeated in the beginning. This is necessary since the addition by one and the C-flag generates one plus the remainder. Thus the table is shifted by one, and the first entry must be the same as the second one.

Restricted Interval, Calculation Method.

For the restricted interval, xc<256, one can save time if one reinitializes register Y and modifies A when xc>127 as was done in the Calculation Method for xc>255. The algorithm is then as follows:

```
---------------------------------- cycles
   LDY  #$00     init Y               2
   SEC             and flag C         2
   LDA  XC       get xc and check     3
   BPL  P2         if >127          3   2
   AND  #$7F     yes, get rid of    -   2
   LDY  #$11      high bit, reinit. -   2
   ADC  #$02      reg. Y and A      -   2
P1 INY           division loop      -   2 r2
P2 SBC  #$07       by subtraction       2   r2
   BCS  P1                              2   r3
   TAX           Rem.-7 to X            2
   LDA  MT-249,X masking byte to A      4
 --------------------
MT DFB  $01,$02,$04,$08,$10,$20,$40
-----------------------------------
Total:  29 bytes,  Avge.  85 cycles
                   Rnge. 20-153 cycles
Registers used: A, X, Y
```

Restricted Interval, Table Method.

The Table Method for the restricted interval, xc<256, becomes even more simple with the truncated I7 and M7 tables:

```
---------------------------------- cycles
   LDX  XC       pick the 1 byte xc   3
   LDA  M7,X      mask bit            4
   LDY  I7,X      offset address      4
   ----------
I7 RES  256
M7 RES  256

-----------------------------------------
Total:  520 bytes, 11 cycles
Registers used: A, X, Y
-----------------------------------------
```

Restricted Interval, Compromise Method.

The restricted interval version of the Compromise Method truncates the table TX to 128 bytes and the first two instruction replaced by a CLC (2 cycles) instruction, thus giving

```
--------------------------
Total: 158 bytes, 35 cycles
--------------------------
```

1.B Data for BASL, BASH

Page 21 in the Apple Reference Manual contains the necessary information for placing the addresses in BASL (low byte) and BASH (high byte) based on the yc coordinate value and high resolution page number. One can get a clearer picture if BASL and BASH are shown bit-wise using the bits in YC. Thus let

YC = y7 y6 y5 y4 y3 y2 y1 y0

be the bits in YC, then

BASL = y3 y7 y6 y7 y6 0 0 0
BASH = 0 p2 p1 y2 y1 y0 y5 y4

where the bits p2,p1 are 0,1 for high resolution page 1, and 1,0 for page 2. Grouping the consecutive bits in BASL, BASH which are in the same order as in YC, we can define

B7 = y7 y6
B5 = y5 y4
B3 = y3
B2 = y2 y1 y0
BP = p2 p1

This definition is useful for calculating the values for BASL, BASH to generate the tables by Applesoft for the Table Method:

B7 = INT(YC/64)
B5 = INT(YC/16)-4*B7
B3 = INT(YC/8)-2*INT(YC/16)
B2 = YC-8*INT(YC/8)
BP = 1 or 2
BASL = 128*B3+(32+8)*B7
BASH = 32*BP+4*B2+B5

Calculation Method.

The Calculation Method uses elaborate shifting operations with the value of yc. This routine appears repeatedly in Apple produced software (Applesoft, Graphics Table software, etc.):

```
---------------------------------- cycles
   LDA  YC     get yc                3
   AND  #$C0   separate for B7       2
   STA  BASL   store it left adjust. 3
   LSR         shift twice           2
   LSR          to get it repeated   2
   ORA  BASL    still left adjusted  3
   STA  BASL                         3
   LDA  YC     get yc again          3
   STA  BASH    and store for shift  3
   ASL         shift out y7          2
   ASL               and y6          2
   ASL         y5 to C, then to      2
   ROL  BASH     BASH behind y0      5
   ASL         y4 to C, then to      2
   ROL  BASH     BASH behind y5      5
   ASL         y3 to C, then to      2
   ROR  BASL     BASL front of B7    5
```

contd.

```
   LDA  BASH  zero out first 3 bits 3
   AND  #$1F   then add page number 2
   ORA  PAGE    $20 or $40          3
   STA  BASH                        3
-----------------------------------
Total:  35 bytes,  60 cycles
   (byte for PAGE is not included)
Registers used: A
-----------------------------------
```

Table Method.

The Table method consists of using yc value as an index to pick up the values for BASL and BASH (without the page to make it applicable for either one). These tables, TL and TH, can be ganerated by Basic programs as mentioned above.

```
------------------------------------ cycles
   LDX  YC    get yc as index         3
   LDA  TL,X  data for                4
   STA  BASL          BASL            3
   LDA  TH,X  data                    4
   ORA  PAGE    with page #           3
   STA  BASH    for BASH
----------------
TL RES  192
TH RES  192
-------------------------------------
Total:  398 bytes,  20 cycles
     (add 1 cycle for each table if
      crosses page boundary)
Registers used: A, X
```

Compromise Method.

The bit representation of BASL and BASH suggests some possible compromise between the Calculation and Table methods. The following algorithm uses the Calculation method (shifting) B2 (= y2 y1 y0) into BASH while the right adjusted bits y7 to y3 serve as index for a table:

```
------------------------------------ cycles
   LDA  YC    get yc                  3
   LSR        shift out y0            2
   LSR                y1              2
   LSR              and y2            2
   TAX        rest to index           2
   LDA  BL,X    to get                4
   STA  BASL        BASL              3
   LDA  YC    get back yc             3
   AND  #$07  retain B2               2
   ASL        shift to its place      2
   ASL                                2
   ORA  BH,X  add B5 from table       4
   ORA  PAGE    and page              3
   STA  BASH  store result            3
  ----------------
BL RES  24
BH RES  24
   ---------------------------------------
Total:  72 bytes,  37 cycles
Registers used: A, X (Y may be used for X).
```

The right adjusted bits y7 to y3 could not have the full range (0 to 31) since the value yc is always less than 192. The following Basic program may be used to generate the tables BL and BH:

```
        FOR I=0 TO 23
        B7 = INT(I/8)
        B5 = INT(I/2)-4*B7
        B3 = I-2*INT(I/2)
        POKE BL+I,128*B3+40*B7
        POKE BH+I,B5
        NEXT I
```

==========

Summary.Point Positioning.

0=<xc<=279 to Reg.Y,A(=MSK)

	Bytes	Cycles	Reg's
Calc. M.	28	136.3 (21-273)	A,X,Y
Table M.	580	17.17 (17-19)	A,X,Y
Compr. M.	172	38	A,X,Y

0=<xc<=255 to Reg.Y,A(=MSK)

	Bytes	Cycles	Reg's
Calc. M.	29	85 (20-153)	A,X,Y
Table M.	523	11	A,X,Y
Compr. M.	172	38	A,X,Y

0=<yc<=191 to BASL,BASH

	Bytes	Cycles	Reg's
Calc. M.	35	60	A
Table M.	398	20	A,X
Compr. M.	72	37	A,X

* * * _ _ _ * * *

Database Systems contd. from pg. 39

vendor	satis.	nonlocal	alot
ease of use	very easy	menu driven	menu driven	manual refer

PERFORMANCE of CONDOR

	182 rec	1000 rec
SEARCH last rec	6 sec	35 sec
SORT 1 field	52 sec	262 sec
SORT 5 fields	55 sec	315 sec
SELECT 1 field	30 sec	100 sec
SELECT 5 fields	24 sec	61 sec

PERFORMANCE of DBASE

	500 rec
SORT	< 60 sec
CREATE a key	30 sec

ON CIRCUIT AVENUE AND ALL ABOUT THE TOWN

By LOUISE ALDRICH BUGBEE

Friends are nice. Intelligent, well-educated friends are an honor. Practical "life-wise" friends are a real asset. This is particularly true for me because when anything goes wrong with any kind of machinery, my thoughts and feelings never can get beyond resentment. Any machine which doesn't work properly is my enemy and is out to get me, the spiteful thing, and I have only two choices. I can ignore it or I can kick it.

I feel differently about people. No amount of time and thought is too much for me to give to people problems. I'm so generous and eager in this respect that I have to keep telling myself over and over, "wait until you are asked."

Back to the value of wise and experienced friends. For some time now friends have been complaining that my typed letters were hard to read because the typing was so very pale. That was a people problem and I responded willingly and put in a new ribbon, which took hours and taxed my mechanical skill to the limit. The typing was still pale and continued that way for months until Gert DeMilo, with the wisdom of experience, said, "It isn't the ribbon. It's the carriage. It's worn. I had the same trouble with my old typewriter and put in several sheets of paper until I bought a new machine." The extra sheets padded the worn carriage, she said.

Buying a new machine was fine, and probably wise, for Gert. I couldn't do that. I not only expect all machinery to work properly at all times, I expect the things to last forever. I'd paid good money for this typewriter 10 years ago. Not a lot of money, since I bought the cheapest available at the time, but perfectly good money, not a counterfeit dollar in the bundle. Four sheets of paper does help a little, when I remember to put them in. I do wonder why typewriter carriages aren't made of more durable stuff, though. Aren't machines invented and manufactured for the convenience of humans?

I could be wrong about that. The evidence against my supposition is all around us. Maybe machines are invented and manufactured to sell to humans, to break down and need repairs, to wear out by the time they are paid for so humans will buy more machines. Which is using and benefiting from which? Are machines made for humans, or are humans here to be used by machines and those who invent and manufacture them?

About the same time that my typewriter showed signs of premature aging, an article in the Christian Science Monitor, sent by a New Jersey friend, and the Today Show on television had words to say about word processors, which some claim will make the typewriter obsolete. (Not for me, of course. I paid good money for my typewriter and it is made of solider stuff than I am, and it better not wear out before I do.)

The Today Show didn't question the value of word processors and computers in education and neither do I. I wouldn't want a generation to grow up with the same attitude I have about machinery. Since my father and his employee, Davey, who could fix any machinery then in existence with baling wire, are no longer with us, I'd be inconvenienced if everyone had the same attitude I do.

Intangibles

The commentator on the show did point out that there are some things that can never be taught by computers. These things are valuable and should not be overlooked in our enthusiasm over the wonders of machinery.

Integrity, for instance.

Computers can be programmed to instill fear of punishment and hope for reward, for giving the answer the programmer has decided is correct. Integrity is something entirely different. Integrity is something some people have, and all should have, when no one, human or machine, is watching, when there is no danger of being caught if we make the wrong decision or rewarded for doing right, except the nice feeling, deep inside, and maybe the strength of character it builds.

Computers can't deal with the intangibles and the intangibles are a part of life, a part of humanity. That they are the best and most important part is only my personal opinion, but until humans and machines become so much alike that humans have no more feelings than machines, the intangibles are unquestionably a part of us.

There are other things that computers will never understand. One is the delightful quirks which make each person unique. A few months ago some friends and I were playing a game on some sort of computer. The players typed out words and the computer responded. A friend, a sweet and gentle lady, typed in a little gem of wit and wisdom. The machine responded with something like "You are WRONG, try again." The friend, who is a sweet and gentle lady, went on playing the game by the computer rules. I think she "won." I don't know because I had to leave the room. I couldn't stand it to see a nice, intelligent person insulted by a machine and since it wasn't my machine I was restrained from kicking it for its stupidity and rudeness.

In life the "right answer" is not always the same for all people in all circumstances.

The clipping was sent by some people who are running some words of mine through a word processor. That's fine with me. I know them and trust them. I also trust them to be in control of the machinery they are using. I know their integrity and their quirks, their human qualities. One of them, I do believe, might even kick a machine or hit it with a heavy object rather than let it take the quirks and human qualities out of my words.

Too Much to Learn

The article, The Great Literacy Machine by Melvin Maddocks, is enough to give me nightmares. It starts out by saying that a lot of people are "functionally illiterate." This may be true, and if it is it may be because there is too much to learn in the world today and the important things are science and math, in the opinion of educators. English is, at best, only a tool to make the learning of the important subjects possible.

In the schools of my day, English was the important subject, one of the subjects a pupil, from the first grade on, could not fail and continue to the next grade. We studied the classics, we studied current events in current language, we composed stories, essays and reports. We parsed and we diagrammed.

Since some young people write to say they read my column I should explain those two functions. To parse a sentence we had to take each word and tell the teacher what it was (noun, verb, adverb, preposition, conjunction) and how it fitted in the sentence. Diagramming was much the same except that we had to draw lines and fit each word on its proper line, connecting the whole thing. Each word had its place and it had to fit in where it belonged.

All this gradually cured our illiteracy but it never damaged our imagination or taste for variety. We learned to fit almost any word or idea into a proper diagram.

Even I, what didn't get lerned much grammer and hardly no spelling at all, benefited from this antiquated form of education. I could, even now I do believe, parse or diagram a sentence. Not that I intend to do so, at least not any sentences of my own, but I'm not illiterate. I can write so as to be understood, and I can understand the written word. Well, most words anyhow. Government forms and such do take a lot of time and maybe something is lost in their translation into English.

Electronic Teacher

Of course, the cure for this illiteracy is not to teach the English language but to invent a machine that will correct the mistakes of the illiterates who want to use the language without learning it. They have invented a machine, a computer-type thing, called Writer's Workbench, which will take the illiterate offerings of humans, criticize and correct them.

Now ain't that just marvelous? I'll rush out and buy the machine and I won't make no more mistakes nor dangle a participle or split an infinitive, never again, no how. In a pig's eye I will. Instead I'll declare war on the monster.

It's invaded my turf and since my betters aren't around to defend it, it is up to me to gather up the chains and switchblades, figuratively speaking, of course, and lead the gang in defending our territory.

Let the computers take over math and science. I'll stay off that turf. I'll even cheer them on and give them my unqualified approval, but no computer or word processor can possibly know or understand what is in any writer's mind. As for style, machines can be programmed for only one style. The greatest, most inspiring writers who ever lived would come out Dullsville with only one style of writing, and that not their own.

Do you think this is just sour grapes because I never made it as a writer and frequently, even with all my training in parsing and diagramming — to say nothing of a father who was angered by a grammatical error — make unintentional mistakes in the language? That's a justifiable opinion and you may have a lot of truth on your side. I'm no great shakes as a writer and I do wish I'd been more alert in all my English classes and hadn't given up the study after high school.

On the other hand, when I decided to fight to protect my turf, I wasn't being narrow and selfish. The turf belongs to Dickens and Lincoln and all writers, now and in the future.

Someone turned the Writer's Workbench loose on the first paragraph of Dickens's Tale of Two Cities and Lincoln's Gettysburg Address.

Dickens's "It was the best of times. It was the worst of times. It was the age of wisdom, it was the age of foolishness" was corrected by the machine to read, "The times were the best and worst, wise and foolish." Now I ask you, is that any way to start a great novel? Would it give anyone the feel of the situation?

You all know the Gettysburg Address. The Writer's Workbench thought, or was programmed to conclude, that it was much better like this, "Eighty-seven years ago our grandfathers created a new nation here." Says the same thing, of course, but does it sparkle? Does it inspire? Does it have a ring to it? Is it anything that would be remembered longer than the writing on the label of a bean can?

I may not win this tussle for the turf and there is a lot more involved than a machine taking over the job of literary critic. It isn't so much a battle for the minds of humankind, but for the spirit of humanity and the emotions and the intangibles, the individuality, the beauty, the humor, the amusing and delightful little quirks that make each person unique, with human virtues and faults all his own. It is the freedom to communicate with each other, in our own words strung together in our own way.

No machine, and few humans, will ever tell me what to write or how to write it. If I lose the conflict, I shall declare myself illiterate and never write nor read another word. I wouldn't spend much time grieving over it, as long as I could watch birds fly and the tide come in, smell flowers and touch moss. Not while I would know that everything there was to read would be written in the style of the instructions on an income tax form.

I would grieve for the English language, though. It's been a good language, used by a lot of people, in many forms, correct and incorrect. It's been a flexible language, changing constantly, enriched by Latin, French, German and Nordic words and ideas. It's complex, and sometimes frustrating. And expressive and beautiful. Yes, I'd grieve to see it corrupted by systematic and mechanical correction.

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Volume 6	Games IV	( )
Volume 7	Games V	( )
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Volume 12	Games VI	( )
Volume 13	Games	( )
Volume 14	IAC Utilities IV	( )
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Volume 18	Educational II	( )
Volume 19	Commumications	( )
Volume 20	Music	( )
Volume 21	Apple Orchard	( )
Volume 22	Utilities VI	( )
Volume 23	Games VIII	( )
Volume 24	Games IX	( )
Volume 25	Utilities VII	( )
Volume 26	Stocks/Investments	( )
Volume 27	Math	( )
Volume 28	Planetfinder	( )
Volume 29	Utilities VIII	( )
Volume 30	Games X	( )
Volume 31	Plot Utilities	( )
Volume 32	Games XI	( )
Volume 33	Accounting	( )
Volume 34	Solar Tutor	( )
Volume 35	Garden Management	( )
Volume 36	Games XII	( )
Volume 37	Utilities IX	( )
Volume 38	Games XIII	( )
Volume 39	IAC VII	( )
Volume 40	IAC VIII	( )
*Volume 193	The Abductor's Qtrs.	( )
*Volume 194	The Quest for Trezore	( )
*Volume 195	The Underground City	( )
Volume 180	Dungeon Designer	( )
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*Volume 182	Lair of Minotaur	( )
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Volume 111	Games C	( )
Volume 112	Utilities C	( )
Volume 113	Business B	( )
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Volume 114B	Adventure	( )
Volume 115	IAC 12/13 Miscellaneous	( )
Volume 116	IAC 14 Micromodem II	( )
Volume 117	Picture Packer	( )
Volume 301	PIG1: (Pascal)	( )
Volume 302	PIG2:	( )
Volume 303	PIG3:	( )
Volume 304	PIG4:	( )
Volume 305	PIG5:	( )
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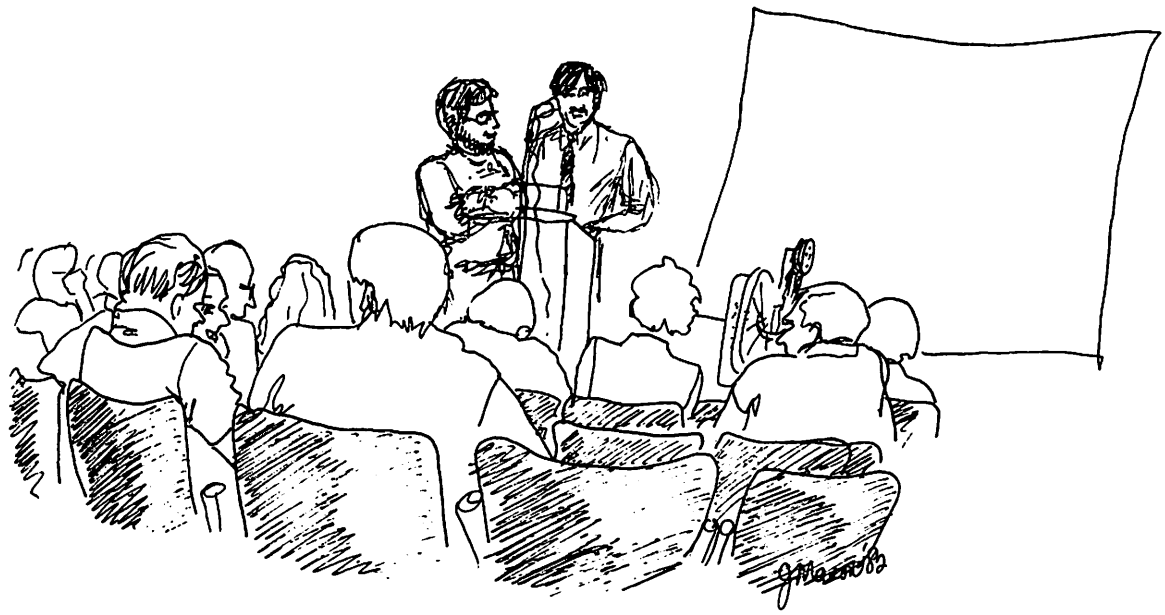
Anderson Jacobson . . . . . Back Cover
Bethesda Computers. . . . . Inside Back
Clinton Computer. 25
Columbia Computer Systems 14, 19
Comm Center 24
Computerland of Tysons Corner . Inside Front
Computer Workshop 2
D & H Associates. 13
Dagar Corporation 7, 31
Datamost. 17
Decision Support Software 37
Disk Connection 46
Frederick Computer Products 21
H & H Scientific. 11
H L A Inc 1
L. Morganstein Consultants. 41
Omega Software. 17, 29
Ramada Computer Products. 15
Turris Ebora Computer 35
VF Associates 15



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