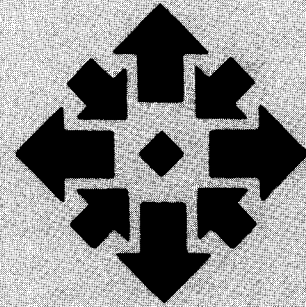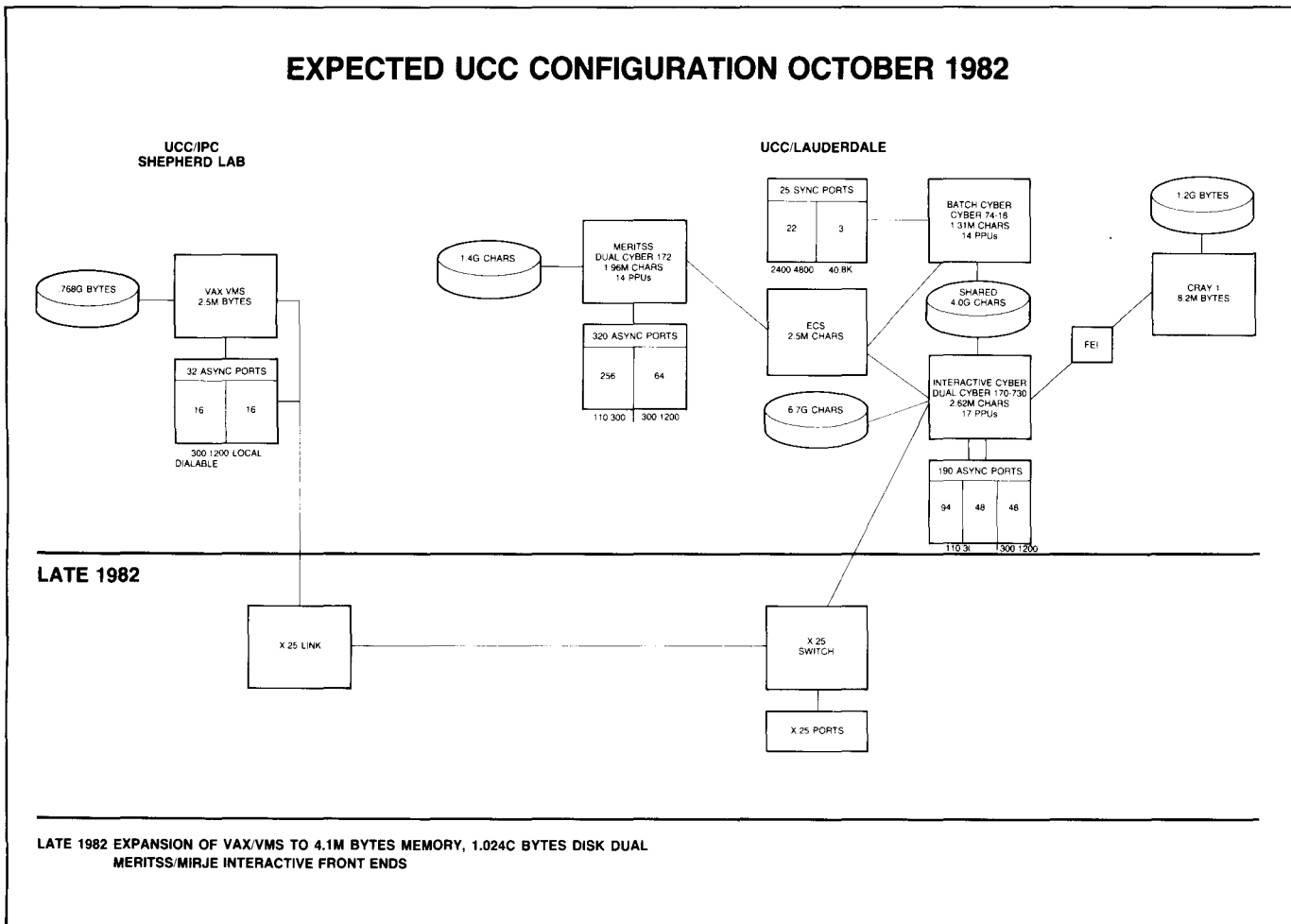# University Computer Center Newsletter

University of Minnesota
Twin Cities

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Volume 16, Number 10

EXPECTED UCC CONFIGURATION OCTOBER 1982

UCC/IPC
SHEPHERD LAB

UCC/LAUDERDALE

LATE 1982

LATE 1982 EXPANSION OF VAX/VMS TO 4.1M BYTES MEMORY, 1.024C BYTES DISK DUAL
MERITSS/MIRJE INTERACTIVE FRONT ENDS

WELCOME!

Welcome (and, in many cases, welcome back) to the University of Minnesota and the University Computer Center. The UCC *Newsletter* is the official voice of the Center and its users. We publish general articles about our systems and services, news about hardware and software changes, useful information such as our phone list, operating hours, and lab locations, and reports on successful computing applications by our staff and our readers. Occasional staff columns deal with the latest in data base systems, graphics, microcomputing, and other areas of interest. We welcome contributions from readers in the form of short articles, letters to the editor, queries, complaints, or want ads (free to anyone with a user number who has something related to computing to buy, sell, swap, or give away). Just contact the editor at 227 Experimental Engineering or call 376-9832.

This issue offers a general overview of our services—from a chart delineating our system configuration to a look at language processors, public access labs, and text processing to the latest news about our Reference Room and Computer Store. Read on and enjoy!

Contents

All Systems Bulletins

M77 NEWS

On September 26, CURRENT, M77 (version 2.1) was moved to PAST, and FUTURE, M77 (version 2.2) was moved to CURRENT. Most of the changes between versions 2.1 and 2.2 are bug corrections. But you may notice a difference in the way your interactive jobs run, since the T = E (tracing) parameter is on by default for sequenced source files and for jobs run under the M77 subsystem in version 2.2.

The reason for the default T = E parameter is that tracing provides a simple and effective means of detecting errors during program execution for the instructional user and those debugging programs: the typical interactive user.

M77 tracing also provides useful information about the execution of the program, even if there are no errors in it. Automatically for interactive jobs or when the T = E parameter is used with batch jobs, the subscripts of all arrays are checked to see that they are within the declared dimensions of the array; substring specifications are checked to see that they lie within the declared length of the string; GO TO and DO statements are checked for legal values; and FORMAT conversions are checked to ensure that the type of the corresponding input or output list element is correct.

The use of tracing will normally slow down the execution of the program by 10-50%, but this is a price worth paying to detect hidden errors that might otherwise take hours to find.

If you consider the sequenced program to be debugged or need quicker execution speed, this default tracing can be turned off by using the T parameter on the M77 control card or T = 0 on RUN or RNH in the M77 subsystem. For example:

M77(I = YOURS,SEQ,T = E) or RUN(T = 0)

To select specific trace options if default tracing is being performed, you can turn off the default tracing and then select the options you want. For example:

M77(I = GOOD,SEQ,T = -E/F)

will cause tracing of formats only. (Specific options may not be selected on the M77 subsys-tem.) Tracing can also be controlled with the TRACE and NOTRACE statements in M77. See WRITEUP(M77) for additional details. (*Janet Eberhart*)

GRAPHICS

Cray News

DISSPLA runs on our Cray! DISSPLA, a library of graphics routines with over 80,000 daily users across the world, provides industry-standard surface grid, contour, cartographic mapping, and general two- and three-dimensional plot capabilities.

But you need not be an expert to access this sophisticated software-supercomputer combination. We have developed a procedure to compile and run your FOR-TRAN program on the Cray, then return a plot and dayfile when it's done. WRITEUP(GRAFGEN = CRAY) and WRITEUP(GRAFSAM = DISSAMD) describe how to use the procedure file.

To find out more about DISSPLA's capabilities, call our Professional Services Division (376-1764) to arrange a free exploratory seminar.

User Services

CONSULTING

Need help using UCC's systems? We provide many ways for you to get your questions answered.

General Consulting

Your first recourse is our General Consulting service in 140 Experimental Engineering. General Consulting provides in-person assistance on all our systems from 9 a.m. to 5 p.m., weekdays during the quarter. Evening, weekend, and quarter break hours are also available for users who work after hours.

Most problems you encounter can be dealt with by the general consultants anytime consulting is open. Occasionally though, you may need truly specialized assistance. General Consulting is staffed at regular hours each day by people who have particular expertise in graphics, statistics, non-traditional computing, and text processing. An additional hour of non-traditional computing consulting is provided in 14 Folwell Hall from 2-3 p.m. each weekday. (You can find more information on non-traditional computing elsewhere in this issue.) Microcomputer consulting is conducted in 139 Shepherd Labs from 10 a.m.-noon and 2-4 p.m. weekdays (see the related article on the Micro Systems Group in this issue).

HELP-Lines

Sometimes it is not practical for you to visit General Consulting in person. We provide HELP-lines that you can phone for assistance.

The main HELP-line (376-5592), staffed from 9 a.m.-5 p.m. Monday through Friday, fields questions on anything related to computing at UCC. If the staff member who takes your call can't answer your question, she or he will refer you to someone who can.

In addition to this general service, several specialized HELP-lines are now in operation. The business data products and data base HELP-line (376-1761) takes calls from 1-3 p.m. Monday through Friday. If your question is related to a statistics package, that HELP-line (376-5062) offers answers weekdays from 1-2 p.m. The microcomputer HELP-line (376-4276: dial DR MICRO) can help you weekday mornings from 10 a.m. to noon, and weekday afternoons from 2-4 p.m. If you are doing non-traditional computing in fields such as the humanities, the non-traditional HELP-line (373-5780) can assist you from 10:30-11:30 a.m. Monday, Wednesday, and Friday. The TELL-A-GRAF and DISSPLA graphics packages HELP-line (376-2663) is open for business from 1-3 p.m. on Tuesday and Thursday.

And, finally, the text processing HELP-line (376-2943) answers questions from 9 a.m.-noon Tuesday through Thursday. Each specialized HELP-line is staffed by people knowledgable in that particular area, so if you know exactly what your problem is, calling the appropriate one is probably your best bet. For general questions about the system or for a solution to a problem when you're unsure of its source, call the general HELP-line.

Phone or Walk-In?

Consulting questions fall into three general categories: advice, simple inquiry, and debugging. Advice questions are things like "I want to produce computer graphics, what package should I use?" Simple inquiries are questions like "Do you have BMDP?" Debugging questions are things like, "I think I'm doing everything right, but my program doesn't work."

While walk-in consulting can handle any of these questions, phone consulting is best suited to advice and simple inquiry. Trying to debug programs over the phone can be frustrating for both you and the consultant. If you can, try to take your errant programs to person-to-person General Consulting.

Policies

As always, we ask that you read documentation and try to run your job before contacting consultants. Bring with you, or have at hand near the phone *all* the evidence you can assemble: the most recent output (including dayfile), your card deck or paper copy of an interactive job, and any documentation you have used. To bring less is to ask the consultant to solve the mystery without benefit of clues.

If you need consulting help for a system not operated by the University Computer Center (except micros), our consultants will refer you to our Professional Services Division for assistance.

Schedules

You can retrieve our consulting schedule by entering:

On the Cybers: **WRITEUP(CONSKED)** and **WRITEUP(CONSULT)**

On the VAX/VMS: **morehelp consulting**

(Sara Graffunder and Linda Merims)

REFERENCE ROOM

The Reference Room moved to a new location during the summer-fall interim. You can find us now in 140 Experimental Engineering, where we will be sharing space with general consulting. The user room, previously located in 140, has moved down the hall to 130. This move offers several benefits to both our users and our staff. The Reference Room is easier to find: no more dark halls, twisting corridors, and numerous, unmarked doors. The increased space in 140 allows us to consolidate UCC's heretofore "distributed" collection: manuals, books, and journals previously shelved in staff offices or in storage can be in one place again. The Reference Room staff can provide more efficient service while ending the running from office to office to locate documents.

For the present, Reference Room policies are the same. Materials are for reference only and do not circulate. This collection is for the use of UCC staff members; others, however, have free access to the collection, but may use materials only in Room 140. The Reference Room hours, 8:00 a.m. to 4:30 p.m., Monday through Friday, remain unchanged. The Reference Room phone number is 373-7744.

(Michael Dunham)

DOCUMENTATION

At UCC, we try to help you use our computer systems successfully by providing good documentation: documents we write about our computer products and documents produced by various computer vendors for their products. Our documentation comes in printed and machine-retrievable form, and it can be acquired through several different channels:

1. Some introductory, printed documents (UCC Briefs and Fact Sheets) are available without charge in 140 Experimental Engineering. You should investigate these documents, especially the "Documentation Directory," before attempting any computing at UCC.

Documents of general interest are:

UCC Brief: WRITEUP
UCC Fact Sheet 1: Getting Started at UCC
UCC Brief: VAX/VMS Access
UCC Brief: Cray Access
UCC Newsletter

2. UCC and vendor printed documents are sold through our Computer Store. Purchases can be made with a University departmental journal voucher, by charging the cost to a non-instructional user number, or by paying cash. Store hours are 9 a.m.-3 p.m., Monday-Friday; 5 p.m.-7 p.m. Monday-Thursday (612-373-4877).

Documents of general interest are:

Introduction to Computing

Facilities and Services
Guide to Cyber Batch Computing
Guide to Cyber Interactive Computing
VAX/VMS Primer
Cray Operating System Version 1 Reference Manual

3. Machine-retrievable documents are available on the VAX-11/780 and the three Cyber machines (includes information about the Cray and the VAX as well). The Computer Store will provide on-line documents to those of you who cannot obtain your own copies. Call or write for more information.

WRITEUP

Documents on the Cybers are available via a special control statement, WRITEUP. To get instructions for using the WRITEUP utility, see the article on WRITEUP in this issue, read the one-page description of WRITEUP (available in 140 Experimental Engineering), or use the control statement WRITEUP.

To obtain a list of on-line documents, use the contol statement WRITEUP(INDEX).

Some writeups of general interest are:

WRITEUP(ACCRATE)—information on billing charge rates.
WRITEUP(ACCSTAT)—how to obtain billing statistics.
WRITEUP(CLASSES)—a list of non-credit classes offered by UCC.
WRITEUP(CONTROL)—descriptions of all the NOS control statements.
WRITEUP(CRAY)—descriptions of all the COS control statements.
WRITEUP(DOCLIST)—a list of available documents.
WRITEUP(HOURS)—current computer operating hours.
WRITEUP(NLETTER)—a copy of our most recent monthly Newsletter.
WRITEUP(SITEBIN)—lists the open RJE sites.
WRITEUP(STORE)—information about the Computer Store.
WRITEUP(VAXVMS)—introductory information on using our VAX-11/780.
WRITEUP(CRAYUSE)—introductory information on using our Cray-1A.

MOREHELP

On-line information on the VAX-11/780 is available via the command MOREHELP. MOREHELP leads you to information on VAX/VMS services such as on-line writeups, classes, consulting hours, special output devices, and additional software. To discover what main topics are covered by MOREHELP, use the command MOREHELP.

Topics of general interest are:

MOREHELP WRITEUPS—explains how to retrieve on-line writeups.
MOREHELP PUBLIC_TERMINALS —describes where to find terminals, lab hours, and available equipment.

(Mary Boyd)

WRITEUP

A large number of machine-retrievable documents and a special utility program called WRITEUP are features of UCC's Cyber on-line documentation service. The WRITEUP documents cover varied topics. UPGRADE, for example, describes features and changes in the upcoming NOS R5 operating system. CLASSES provides information on and a schedule for our non-credit short courses. The DOCLIST writeup contains a complete list of UCC-produced documents, and STORE contains information about our Computer Store. You can obtain a complete list of NOS control statements from CONTROL, or a description of subroutines from MINNLIB.

If you need introductory information about our two other computer systems, the Cray-1A and the VAX-11/780, you can get it from the writeups CRAYUSE and VAXVMS, respectively; the CRAY writeup is a description of the entire set of Cray operating system (COS) control statements.

For the most part, WRITEUP documents are produced by UCC and usually describe software packages we have created and changes made to operating system software. Indices and bulletins can also be obtained through WRITEUP. Many of the longer documents are divided into sections ('indexed') for ease of reference.

You can obtain copies of these machine-retrievable documents by using the WRITEUP control statement. The general form of the control statement is:

WRITEUP(name1,name2,.../options)

where "name1,name2,..." are the names of specific documents. The names can be specified in several ways:

1. If you enter "name" only, you will get a copy of the specified document or, if the document is indexed (subdivided), you will get a copy of the index only.

2. If you enter "name = *" you will get a copy of all the sub-divisions of the indexed document "name".

3. If you enter "name = sub1 + sub2 + ... + subn" you will get a copy of only those subsections of "name" specified by "sub1," "sub2," and so on.

If you use the control statement without parameters:

WRITEUP.

you will get a description of the WRITEUP statement. (An information sheet describing WRITEUP is also available without charge in 140 Experimental Engineering.) If you use this form:

WRITEUP(INDEX)

you will get a listing of the names of all the 200-plus WRITEUP documents. The form:

WRITEUP(INDEX = name1 + name2 + ...)

gives you the index listing for those documents specified by "namei."

Any of the following options can be included after the slash (/) in the WRITEUP control statement; the options are separated by commas.

L = ofn
You can use the L= parameter to specify an alternate output file. For example:

WRITEUP(CATLSYS/L = LIST)

will write the document for CATLSYS to a file named LIST. If no file is specified, the default is OUTPUT.

PT = TT or PT = LP or PT = AS
You can use the PT= parameter to change the default printer type. If you are working from an interactive terminal, the default printer type is TT. Otherwise, the default is LP for line printer. WRITEUP will convert document files, depending on the type of file (see the INDEX listing) and the specified (or default) printer type.

If you specify PT = AS, WRITEUP will produce an upper/lower case document formatted for the line printer. If you use PT = AS, you must specify an output file with the L= parameter and then route the output file to a specific printer site. For example:

WRITEUP(APPLE = */L = LIST,PT = AS)
ROUTE(LIST,DC = PR,EC = A9,TID = site)

Note that you must specify both DC = PR (for the line printer), and EC = A9 (for the upper/lower case printer).

D = yymmdd
You may specify a date parameter on the WRITEUP statement to get only those entries that have been changed after that date. For example:

WRITEUP(CONTROL = */D = 820701)

will print out only those parts of the CONTROL document that have been changed on or after July 1, 1982.

LO = S
The LO = S parameter controls the format of WRITEUP(INDEX). Specifying LO = S on the WRITEUP statement produces a short index list; it includes only the names of the WRITEUP documents.

SR = n
The interactive user can specify the SR parameter on the WRITEUP command to activate scroll mode. When in scroll mode, WRITEUP stops the output once n lines are printed. Printing continues when the RETURN key is pressed. For example:

WRITEUP(EXAMINE/SR = 20)

writes 20 lines to the screen and then stops, waiting for a carriage return.

The full WRITEUP index lists several properties of each document, including the following: name, width, length, date last modified, format, whether the writeup is indexed, and a one-line description.

If you do not yet have access to the computer system, or if you are using the MERITSS system and need printed copies of long writeups, the Computer Store sells copies of printed writeups.

(M. C. Boyd, 373-4599)

SYSNOTES

For our Cyber users (including MERITSS), SYSNOTES are our machine-retrievable "bulletin board" to keep everyone aware of the latest news relating to software, hardware, schedule changes, and other important information.

On the Cyber 74 or 730, current notes appear on banner pages of output printed on high or medium-speed printers. If

you're working on an interactive terminal, a request to type in WRITEUP(NOTE) appears just after you log in; this prints out the identical information. If you want to go back and check old SYS-NOTES, WRITEUP(SYSNOTE) contains all SYSNOTES that are no longer current.

MERITSS users see a request to type WRITEUP(NOTE) or WRITE-UP(SYSNOTE) when logging in.

This prints both new and old SYSNOTES.

We strongly urge all Cyber users to make use of this feature. A quick glance through the SYS-NOTES will tell you if the information in them pertains to you. It could save you time and frustration.

(Liz Stadther)

PUBLIC ACCESS LABS

Welcome back to UCC's public computer labs.

Our experience has shown that although most of you are familiar with our major interactive computers, many are not familiar with the facilities we provide to access these systems. This article explains what types of access we provide, and notes some recent and future changes in the public lab network.

Research Clusters

A relatively new facility that we provide is the "research cluster": a number of VT-100 computer terminals attached to our research computer systems (Cybers 730 & 74, Cray, and VAX 11/780). Most of the terminals have medium resolution (640 by 480 pixels) graphics capabilities. We also provide a medium speed printer (60 to 120 cps print rate) in each cluster. These clusters are hardwired to our mainframe computers at relatively high baud rates (2400 to 9600 baud).

To use these clusters, you need a valid user number on one of our systems. You can get a user number by filling out the appropriate form in 227 Experimental Engineering. Research clusters are located in 14 Folwell Hall and 167b Social Sciences. For security reasons, the door to the Social Sciences cluster is kept locked; you can sign out the key

in 90 Blegen Hall. This cluster is open during quarters from 8 a.m.-midnight Monday through Thursday, 8 a m.-10 p.m. Friday, 10 a.m.-6 p.m. Saturday, and 4 p.m.-midnight Sunday. During quarter breaks and summer sessions, it is open 8 a.m.-10 p.m. Monday through Friday and noon-6 p.m. Saturday. The Folwell Hall cluster is open 8 a.m.-10 p.m. Monday through Friday, 8 a.m.-6 p.m. Saturday, and 6 p.m.-10 p.m. Sunday year round. You may reserve terminals in the Folwell Hall cluster by calling 376-2741. Reservations are held only 15 minutes after the time they are supposed to begin, so please be prompt. We plan additional research clusters for 130 Experimental Engineering and 69 Physics. The list of public labs on the last page of the *Newsletter* will reflect changes as they occur.

Remote Job Entry Terminals

The other type of research access we provide is via our remote job entry (RJE) network. The RJE network is the vehicle for submitting batch jobs to run on the Cybers or the Cray. Two kinds of terminals are provided in this network, the older Univac 1004 and the newer PDP-11. Each of these is capable of reading your punch card deck and printing at high speed the output produced by your job. Because of limitations in the character set

and difficulty maintaining the aging design of the Univac 1004, we have decided to phase them out in favor of the newer PDP-11 based RJEs. We will continue to support punch card input of data and programs, but at a much lower level than previously. Accordingly, the keypunch room in 140 Experimental Engineering will be closed and a much smaller room set up in Electrical Engineering 38. The PDP-11 RJE can also read RT-11 formatted files and submit them to the Cybers and Cray. PDP-11 RJEs are available in 90 Blegen Hall, 14 Folwell Hall, and 130 Experimental Engineering. When the work on Lind Hall is complete, the Experimental Engineering RJE will be moved to Lind Hall 26. Another PDP-11 RJE will be installed sometime this year, but we have not yet located a site. For private users of the RJE network, we have made available a new service called HASP. Call if you are interested in more information about this service.

MERITSS Lab Facilities

The Minnesota state budget provides funds for educational computing at the University of Minnesota in the form of support for the MERITSS system. Part of this system is a series of interactive computing laboratories. Terminals in these labs are hardwired to the front end of the MERITSS Cyber 172. Students

who obtain valid account numbers from their instructors can use any of the terminals in any of the labs. All you need do is walk up to an available terminal (you may have to wait), press return, and sign on. You are then ready to type in your lesson, participate in computer-assisted instruction, or whatever. All billing is handled internally by your department and UCC. The locations of these labs are also listed in each issue of the *Newsletter*. Operating hours for these labs are available in WRITEUP(LABHOUR) on either MERITSS or the research computing network.

The major change we anticipate this fall is the movement of many terminals from Lind Hall 25 next door to Lind Hall 26. This will undoubtedly relieve the overcrowding there. Expect this change to occur at about the middle of the quarter. Most of the dormitories on campus have miniature MERITSS labs in them. Many will have upgraded either the quality or the quantity of the available equipment when you return this quarter. Several others will be planning improvements. We are experimenting with the use of microfiche to replace the bulky documentation racks previously used to store manuals in the labs. In addition to a reduction in documentation cost, we expect this to reduce the cost of document installation, replacement, and maintenance.

Microcomputer Labs

We offer public microcomputer access in two labs equipped with Terak 8510 microcomputers. You can get an access card that entitles you to unlimitted use of either lab for one academic quarter (two summer sessions) from the Computer Store for $10. The labs are located in 14 Folwell Hall and 160 Architecture. The Folwell Hall Micro Lab hours are the same as those listed above for the research cluster. Consult WRITEUP(LABHOUR) for the Architecture lab hours. To make the most of the micro labs, we recommend that you obtain a copy of MMOS (Minnesota Microcomputing Operating System) from the Computer Store.

(Joe Cornell 376-2703)

COMPUTER STORE REVISITED

In an earlier issue of the *Newsletter*, we paid a visit to the Computer Store. Now, let's revisit this micro organization with its macro vision of providing comprehensive, full-range supplies and documentation for computer users at the lowest possible cost.

The Store is located in the Experimental Engineering building on the east bank, and is open from 9 a.m.-3 p.m. Monday through Friday and 5 p.m.-7 p.m. Monday through Thursday. The items for sale include supplies and documentation such as:

—Floppy disks for microcomputers. All disks are soft sector, single and double-density in 5¼ and 8-inch size.
—Paper for printers.
—Computer cards in lot sizes of 500 and 2000.
—Ribbons for printers.
—UCC-produced microcomputer software.
—Guides to Cyber Interactive and Batch Computing.
—Cray, Control Data Corporation

(CDC), and Digital Equipment Corporation (DEC) manuals.

We also offer special services, including printed copies of write-ups, short course registration, microcomputer access cards, and special orders. You can pay for your Computer Store purchases with cash, check (with University ID), or departmental journal voucher; or you can charge them to your non-instructional user number.

The Computer Store is self-supporting, which means two things for you, our customers: we need your business to continue operating and we are willing to consider your suggestions for items that the Store might stock. Faculty members who are interested in having the Store supply materials for their classes should contact us to discuss this possibility; this would allow students to purchase these materials without paying sales tax on them.

We are frequently asked a number of questions regarding

Store policies and procedures. Here are the answers to some of the most common ones:
—Sales tax is charged on all purchases unless our files show that they are required for a class.
—Sales charged to user numbers are not covered by grants.
—Mail orders are accepted, but a charge for postage and handling is included.
—Defective materials can be exchanged within 90 days of purchase (receipt required).
—No refunds.
—Writeups can be purchased.
—Anyone interested in computer-related materials is welcome to make purchases at the store.

For more detailed information about the Computer Store, see WRITEUP(STORE), which includes a complete list of materials available at the Store and their prices. If you have any questions not answered by this article and the writeup, give us a call at 373-4877. *(Marvin Mohr)*

NON-TRADITIONAL COMPUTING

We're Still Here!

More than ever you need to get the most out of your computing dollars. We at UCC would like to help you all we can. To begin with, we offer consulting on the initial stages of research design. If you're not sure how or even whether to use the computer in your research, call us and we'll be glad to discuss the possibilities with you. Next we'll assist you in writing your grant proposal. We are currently preparing a Grant Proposal Primer which will be available later this fall. This Primer contains the technical information necessary for a complete proposal, plus helpful information on proposal writing. We will also personally assist you in estimating the computer costs for your particular project. At any stage of your research we'll be happy to answer your questions and help solve your computing problems.

Non-Traditional Users: Who Are You and What Do You Want?

Starting this fall, we will be contacting someone from every department in CLA to find out what you need from us in the form of software and services. We want to know how we can better serve the needs of those of you who are new or potential users as well as those who are seasoned veterans of computing. We are starting with CLA because therein lies a great potential for innovative and creative computing: non-traditional in the best sense of exploring new and untried avenues of research.

If you would like to be sure of being contacted soon or wish to be the contact person for your department, call me (373-5780) or leave a message (373-4360). If you are not in CLA but would like to be contacted or have a "great idea" that needs exploring, don't hesitate to call: we interpret "non-traditional" *very* broadly.

Coming Soon

This fall we are initiating a UCC sponsored lecture series on interesting and creative projects that use the computer. The lectures will focus on research currently in progress by University of Minnesota faculty and graduate students. The connecting theme is how computing is used in a variety of ways, in a variety of disciplines. Check future *Newsletters* for details or call 373-5780.

(Vicky A. Walsh, 373-5780)

TEXT PROCESSING SERVICES

UCC's Text Processing Services can direct you to the computer equipment and programs available for text processing on campus. Many facilities exist to create and format your manuscripts. Printed output can range from draft to finished quality documents. We offer a series of short courses each quarter that begin with an overview of text processing—what it is and how to do it—and continues with courses on specific text editors and formatters on the various computer systems: MMOS editor, PROSE, and WordStar on microcomputers, EDT and Scribe on the VAX, XEDIT and PROSE on the Cybers. Telephone consulting is available from 9 a.m.-noon Tuesday through Thursday at 376-2943.

Scribe on the Shepherd Labs VAX is our most sophisticated text formatting program—powerful, flexible, and fun to use. With Scribe you can:

—build a customized set of document specifications.
—merge form letters with mailing list data bases.
—produce a thesis formatted to Graduate School specifications, with footnotes and tables automatically placed for you.

Scribe features serif and sanserif character sets with a range of type sizes, Greek and other special characters, bold face, underlining, and italics, super- and subscripting, and tabbing. You can examine a Scribe manual in our Reference Room or purchase one at the Computer Store.

We are investigating new directions for our text processing services at the present time: your comments and suggestions are welcome. *(Elaine Collins)*

THE MICRO SYSTEMS GROUP

UCC's Micro Systems Group provides information and consultation for the general support of microcomputers within the University community. We offer general microcomputer consulting, microcomputer programming, computer-aided instruction programming, assistance with the evaluation of individual microcomputing needs, and microcomputer instruction through UCC short courses held throughout the year.

Anyone with microcomputer-related questions may obtain brief cost-free consultation by telephone (dial DR MICRO, 376-4276), or on a walk-in basis (139 Shepherd Labs). Consultation is available from 10 a.m.-noon and 2-4 p.m. Monday through Friday. More extensive consulting and programming services are offered on a contract basis.

Micro group members are especially well-equipped to answer questions concerning the Xerox 820, Terak 8510, IBM Personal Computer, Apple II computers, and the CP/M, UCSD, and MMOS operating systems.

The Micro Group also develops software utilities and tools that are potentially useful to the general microcomputer user. Such programs include COM, a communications program for microcomputers; plotting and digitizing utilities; and SIMTEK, a Tektronix 4010 terminal emulator. You can purchase these programs from the Computer Store in Experimental Engineering.

For more information about Micro Systems Group products and services, please call our Micro HELP-line (376-4276).

(Earl Schleske)

Systems Services

OPERATIONS SERVICES

UCC's operations group offers a variety of services in addition to the basic high-speed batch services (card input and printed, plotted, or punched output; tape and disk mounting). Call Cyndee Gallimore (373-4995) with regard to the following services:

1. Purchase of new tapes at the Lauderdale site and rental of removable disk packs on the Cyber 74 + 730. (You can also purchase tapes at the Computer Store.)
2. Rental of secure or reserved output bins at the Lauderdale site.
3. Generation of microform output, including microfiche (see WRITEUP,SERVICE = FICHE), 16 mm microfilm, and 35 mm microfilm.
4. Tape storage for the Cybers (including off-site backup tapes) and tape maintenance (including replacement of broken reels and canisters, replacement of BOT and EOT markers, and tape cleaning and evaluation).
5. Special forms services on the Cyber printers, including UCC-supplied and user-supplied forms (see WRITEUP, SERVICE = FORMS).

Call Carol Winther (376-3068) about the following services:

1. Shuttle delivery services, including regularly scheduled passenger and delivery service between the Lauderdale and Experimental Engineering sites, regularly scheduled deliveries to other user facilities and service bureaus, and specially scheduled deliveries.
2. Xerox 9700 page printing services on the Cybers (see WRITEUP,SERVICE = X9700).
3. Rental of secure or reserve output bins at the Experimental Engineering input/output station.

If you have questions or suggestions about related services not outlined here, please call Jerry Larson, Operations Services Manager, 373-7538.

(Jerry Larson)

PROGRAMMING LANGUAGE PROCESSORS

The University Computer Center offers a wide range of language compilers, interpreters, translators, and assemblers on its various systems. This diversity offers more options than are typically available on a personal computer or on a dedicated research machine. The Programming Language Processors Group has compiled a list of the language processors available (Exhibit 1). The support levels (indicated in parentheses) are:

(1) high-priority software, maintained by UCC
(2) high-priority software, maintained by outside vendor
(3) low-priority software, maintained by UCC or outside vendor
(4) experimental software, run at your own risk
(5) unsupported, no maintenance provided, use at your own risk
(6) user-contributed and user-supported software

Exhibit 2 delineates language processor usage statistics on the Cyber 74 + 730 and MERITSS computer systems from July 1, 1981 through June 30, 1982 and (for comparison) 1980-1981 and 1979-1980. Pascal is the only major processor to show a significant and steady increase in use. We have no statistics available for programming language processor use on the Cray, the VAX, or the roughly 1000 personal computers on campus.

(Andy Mickel and Susan Steffen)

Exhibit 1

Computer systems abbreviations: Cray/COS system = cra
                                            Cyber/NOS   = cyb
                                            VAX/VMS   = vms

Language	(level)	Description Processor available: system: name version type (source)

APL — A Programming Language - numerical and operator-oriented language.
- (2) cyb: APL 2.1 APL interpreter (CDC and U of Massachusetts)

Assembler — machine-dependent, low-level language.
- (2) cra: CAL 1.10 Cray Assembly Language (Cray Research)
- (2) cyb: COMPASS 3.6 COMPrehensive ASSembler (CDC)
- (2) vms: MACRO 2.0 MACRO assembler for VAX (DEC)

BASIC — Beginner's All-Purpose Symbolic Instruction Code - small and limited language.
- (2) cyb: BASIC 3.5 BASIC compiler (CDC)

COBOL-74 — ANSI 1974 standard COmmon Business-Oriented Language.
- (2) cyb: COBOL5 5.4 COBOL-74 compiler (CDC)
- (2) vms: COBOL11 1.2 COBOL-74 compiler (DEC)

Emulator — Assembly Language and Simulator for another computer.
- (3) cyb: EMULATE 1.0 CDC 3200 computer (U of Minnesota)
- (3) cyb: MACRO11 1.7 DEC PDP-11 computer (U of Minnesota)
- (5) cyb: MIXAL 2.0 Knuth MIX computer (U of Minnesota)

FORTRAN IV — ANSI 1966 FORmula TRANslation language - numerical language.
- (1) cyb: MNF 5.4 MiNnesota Fortran compiler (U of Minnesota)
- (2) cyb: FTN 4.8 ForTraN compiler (CDC)

FORTRAN-77 — ANSI 1977 FORmula TRANslation language - extended numerical language.
- (2) cra: CFT 1.09 Cray ForTran compiler (Cray Research)
- (1) cyb: M77 2.2 Minnesota FORTRAN 77 (U of Minnesota)
- (2) cyb: FTN5 5.0 ForTraN compiler (CDC)
- (2) vms: FORTRAN 2.1 FORTRAN compiler (DEC)

GPSS — General-Purpose Simulation System - discrete-event simulation language.
- (3) cyb: GPSS 5.1 GPSS compiler (Northwestern U)

LISP 1.5 — LISt Processing language - non-numerical, symbolic-expression language.
- (3) cyb: LISP 4.1 LISP interpreter (U of Texas)

MIMIC — MIMIC an analog computer - continuous-system simulation language.
- (3) cyb: MIMIC 2.0 interpreter (CDC)

Pascal — ISO 7185 Standard Pascal language - general-purpose, structured language.
- (3) cra: PASCAL 1.08 Pascal translator (Los Alamos)
- (1) cyb: PASCAL 3.4.2 Pascal compiler (ETH Zuerich and U of Minnesota)
- (2) vms: PASCAL 2.2 Pascal compiler (U of Washington and DEC)

PL/1 — Programming Language 1 - all-purpose language.
- (4) cyb: PL1 rev R PL/1 compiler (New York U)

RPG-II — Report Program Generator II - business-oriented language.
- (3) cyb: RPGII 1.0 RPG-II translator (U of Minnesota and CDC)

SIL — Systems-Implementation Language - machine-dependent, medium-level language.
- (2) cyb: SYMPL 5.4 SYsteMs Programming Language compiler (CDC)

SIMSCRIPT II.5 — SIMulation tranSCRIPT language - discrete-event simulation language.
- (2) cyb: SIMII5 3.2 SIMSCRIPT II.5 compiler (CACI)

SIMULA-67 — SIMULAtion language - discrete-event simulation language.
- (3) cyb: SIMULA 1.0 SIMULA-67 compiler (CDC)

SNOBOL4 — StriNg Oriented and symBOlic Language - non-numeric language.
- (3) cyb: SNOBOLC Nov73 SNOBOL4 interpreter (UC Berkeley and Minnesota)
- (3) cyb: SNOBOL4 3.10 SNOBOL4 interpreter (U of Colorado)

Exhibit 2

APL = CDC APL 2 interpreter
ASM11 = U of Minnesota PDP-11 cross-assembler
BASIC = CDC BASIC 3 compiler
COBOL = CDC COBOL 4 compiler
COBOL5 = CDC COBOL 5 compiler
COMPASS = CDC COMPASS 3 assembler
EMULATE = U of Minnesota CDC 3200 assembler
FTN = CDC FORTRAN 4 compiler
FTN5 = CDC FORTRAN-77 5 compiler
GPSS = Northwestern U GPSS 5 translator
LISP = U of Texas LISP 5 interpreter
MIMIC = CDC MIMIC interpreter
MIXAL = U of Minnesota MIX assembler
MIXBYTE = U of Minnesota MIX interpreter
MNF = U of Minnesota FORTRAN 5 compiler
M77 = U of Minnesota FORTRAN-77 2 compiler
PASCAL = ETH Zuerich/U of Minnesota Pascal compiler
PL1 = New York U PL/1 compiler
RPGII = U of Minnesota/CDC RPG 1 translator
SIMII5 = CDC SIMSCRIPT 3 compiler
SIMULA = CDC SIMULA 1 compiler
SNOBOL4 = U of Colorado SNOBOL4 3.10 interpreter
SNOBOLC = U of California SNOBOL4 2 interpreter
SYMPL = CDC SYMPL 2 compiler
TSF = U of Minnesota interactive FORTRAN compiler

LANGUAGE PROCESSOR	1981-1982			1980-1981			1979-1980		
	TOTAL	MERITSS	CY74/730	TOTAL	MERITSS	CY74/730	TOTAL	MERITSS	CY74/730
APL	2,696	2,228	468	4,161	3,436	725	4,994	2,869	2,125
ASM11	55,781	33,987	21,794	11,883	6,862	5,021	238	10	228
BASIC	522,367	448,155	74,212	500,967	408,977	91,990	420,413	330,573	89,840
COBOL(T)	89,902	43,568	46,334	107,632	18,706	88,926	96,422	2,617	93,805
COBOL	10,574	191	10,383	38,235	678	37,557	38,721	544	38,177
COBOL5	78,829	43,014	35,815	69,263	17,947	51,316	57,701	2,073	55,628
COMPASS	43,042	24,556	18,486	43,782	21,736	22,046	34,735	15,674	19,061
EMULATE	11,022	10,409	613	12,519	5,239	7,280	14,399	6,602	7,797
FORTRAN(T)	1,244,098	780,584	463,514	1,205,796	667,575	538,221	1,061,607	490,895	570,712
FTN	54,235	140	54,095	87,661	—	87,661	84,859	—	84,859
FTN5	18,154	128	18,026	6,630	—	6,630	—	—	—
MNF	342,641	100,115	242,526	412,863	130,473	282,390	403,062	69,426	333,636
M77	460,795	413,942	46,853	437,741	292,390	145,351	136,116	103,044	33,072
TSF	368,273	266,259	102,014	360,741	244,552	116,189	437,570	318,425	119,145
GPSS	1,179	—	1,179	1,884	—	1,884	1,921	23	1,898
LISP	2,184	1,500	684	3,534	2,895	639	1,792	1,006	786
MIMIC	48	—	48	34	—	34	335	—	335
MIXAL	6,600	5,953	647	10,201	6,076	4,125	19,740	4,400	15,340
MIXBYTE	2	—	2	1,380	686	694	1,326	10	1,316
PASCAL	972,193	914,451	57,742	578,817	503,987	74,830	525,446	455,098	70,348
PL1	451	—	451	14	—	14	255	3	252
RPGII	20	—	20	55	—	55	—	—	—
SIMII5	281	262	19	—	—	—	—	—	—
SIMULA	2,235	—	2,235	4,549	—	4,549	481	6	475
SNOBOL(T)	43,842	26,187	17,655	41,280	22,048	19,232	42,593	25,394	17,199
SNOBOL4	6,772	—	6,772	7,758	—	7,758	5,547	26	5,521
SNOBOLC	37,070	26,187	10,883	33,522	22,048	11,474	37,046	25,368	11,678
SYMPL	739	449	290	173	2	171	173	5	168

CRAY COMPILERS

FORTRAN (CFT)

We currently have three versions of the Cray FORTRAN compiler (CFT) available on the Cray-1. They reflect the development of new features and the correction of previous problems. Past CFT is version 1.09 with bugfix 4; current CFT is version 1.09 with bugfix 5. The differences between them result from bug fixes, so you should use current CFT (default). CFT version 1.09 conforms to the 1977 standard with the exception of CHARACTER type.

Future CFT is the first release of CFT version 1.10, and it is in complete conformance with the 1977 standard. Extensions to the standard in CFT include:

1) POINTER statement.
2) IMPLICIT NONE declaration.
3) NAMELIST declaration.
4) READMS, WRITMS statements for random access I/O.
5) Boolean expressions.
6) Hollerith constants.
7) ENCODE and DECODE statements.

8) Two-branch arithmetic IF statements.
9) PUNCH statement.
10) ORDERS sort subroutine.

Three versions of the FORTRAN libraries correspond to the three versions of the Cray FORTRAN compiler (CFT). They can be accessed as follows:

For the past version of CFT (level 109 Bugfix 4) use:

    CFTPAST.
    LDR,LIB = $FTLIBP.

For the future version of CFT (CFT level 110) use:

    CFTFUT.
    LDRFUT,LIB = $FTLIBF:$SYSF.

For the current version of CFT (level 109 Bugf x 5) use:

    CFT.
    LDR. (This accesses the default library $FTLIB.)

PASCAL

A version of Pascal that originated at Los Alamos National Laboratories is now available on the Cray-1. This Pascal implements nearly all the standard Pascal as defined in Jensen and Wirth's *Pascal User Manual and Report*, as well as several additional predeclared functions and procedures, including most of those provided in Pascal 6000-3.4. The compiler system is the "P2" compiler. It was implemented on the Cray-1 by John Montague of LANL for CTSS, and later modified by Dennis Ellis of Cray Research Incorporated to run under COS.

The user interface is:

    PASCAL,INPUT = source,OUTPUT =
        listing,B = binary,LIST = on/off.
    LDR,LIB = $PSLIB.

The default for INPUT is $IN, for OUTPUT it is $OUT, the default for B is $BLD, and the default list is ON. For a writeup on the Cybers with more information about Pascal, see: WRITEUP (CRAY = PASCAL).

(Susan Steffen)

Next month, our graphics report will focus on the variety of graphics software available on the Cray, including the MNCORE, DISSPLA, PLOTPAC, and CALCOMP packages.

SPSS Graphics

We have adopted the MNPLOT graphics metafile as our standard graphics metafile (as noted in the December, June, and August *Newsletters*), but SPSS Graphics still produces the old CALCOM-format metafiles. Users of these packages should type:

    PAST(PLOT31)

before using the PLOT31 command. We will announce the change to MNPLOT format in future *Newsletters*.

(John Cornelison)

CYBER UPGRADE DELAYED

Our conversion to NOS Release 5 was incomplete as of September 27 and will be delayed until the end of fall quar-

ter. The information in last month's *Newsletter* about submitting Cray jobs will not be correct until this change is made. We will begin running NOS Release 5 on Sunday, December 19. See WRITEUP(UPGRADE) for more details. *(K. C. Matthews)*

INTERACTIVE GRAPHICS SEMINAR

An interactive graphics seminar and equipment demonstration will be held at 9 a.m. and 1:30 p.m. October 19 and 20 at the St. Paul Computer Center, 50 Coffey Hall. Both research and color devices will be featured.

Graphics work stations can dynamically support joysticks, light pens, plotters, printers, and digital tablets, and some of these will be demonstrated. James L. McCann, manager of the IBM Graphics Support Center in Poughkeepsie, New York, will lead the seminar. He has been associated with interactive graphics since its early years.

To reserve a place at the seminar, call Diane Suski (373-0987) or Maura Clavin (341-5591).

DOCUMENTATION COSTS

The UCC publications *Guide to Cyber Batch Computing* ($1.20), *Guide to Cyber Interactive Computing* ($1.20), *Pascal 6000*, Release 3 ($3.70), and *Prose Instruction Manual* ($1.45) are now available at the Computer Store, 211 Experimental Engineering. Store hours are 9 a.m.-3 p.m. Monday through Friday and 5-7 p.m. Monday through Thursday.
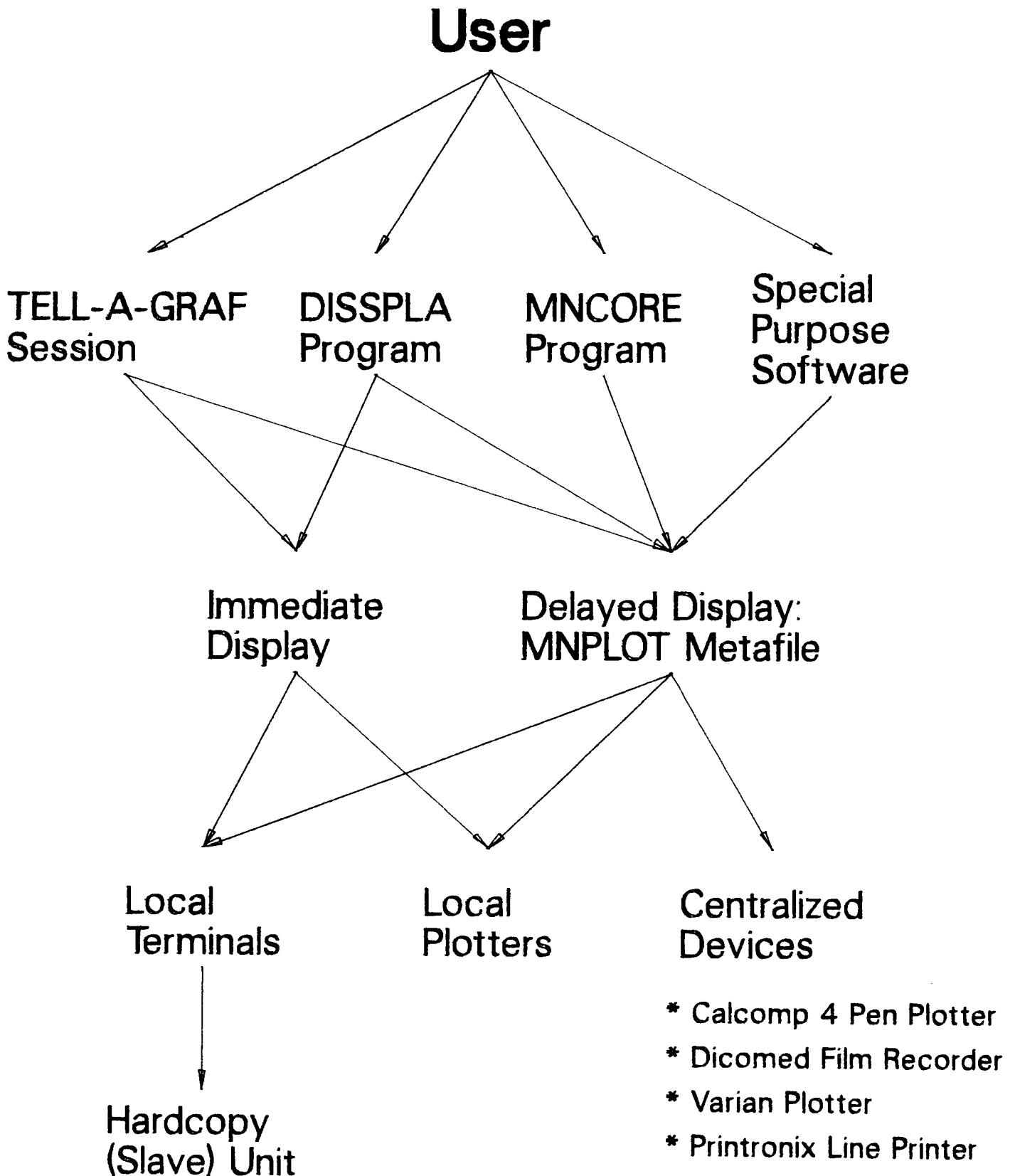
WEST BANK NOTES

The remote job entry (RJE) terminal previously located in 2 Wilson Library has been moved to 90 Blegen Hall.

FOR SALE

Texas Instruments 745. $2125 new; yours for only $1000. Call Stephanie Mitchell, 376-5927.

Z-19 terminal. $660. Call 920-4263.

User Interface with UCC Graphics System

User

TELL-A-GRAF Session

DISSPLA Program

MNCORE Program

Special Purpose Software

Immediate Display

Delayed Display: MNPLOT Metafile

Local Terminals

Local Plotters

Centralized Devices

* Calcomp 4 Pen Plotter

* Dicomed Film Recorder

* Varian Plotter

* Printronix Line Printer

Hardcopy (Slave) Unit

Fall Quarter Short Courses

INTRODUCTORY COURSES

PRICES: U. Student = $10, U. Staff = $20,
Non-Univ. = $30

010 Introduction to Computer Terms (Section 1)
Oct. 5-7 (TWTh), 3:15-5 p.m.
015 Introduction to Computer Terms (Section 2)
Nov. 22-24 (MTW), 3:15-5 p.m.
020 Text Processing: An Overview
Oct. 5-7 (TTh), 3:15-4:30 p.m.
030 Introduction to UCC (Section 1)
Oct. 8 (F), 3:15-5 p.m.
035 Introduction to UCC (Section 2)
Dec. 2 (Th), 3:15-5 p.m.
040 Introduction to VAX/VMS
Oct. 12-18 (TWThFM), 2:15-4 p.m.
050 NOS (Cyber Operating System)
Oct. 13-29 (MWF), 2:15-4 p.m.
055 Interactive System Commands (Cybers)
Oct. 26-28 (TWTh), 3:15-5 p.m.
060 Introduction to Cyber Batch Computing
Oct. 28 (Th), 2:15-4 p.m.
100 Text Editing on VAX/VMS (EDT)
Oct. 26-Nov. 4 (TTh), 3:15-5 p.m.
110 Introduction to Cray 1-A and COS
Oct. 28-Nov. 5 (ThMWF), 3:15-5 p.m.
080 Introduction to Microcomputers
Oct. 21-Nov. 11 (Th), 3:15-5 p.m.
120 Introduction to DBMS
Nov. 1 (M), 3:15-5 p.m.
130 XEDIT
Nov. 2-11 (TTh), 3:15-5 p.m.
150 Introduction to Programming
Nov. 2-18 (TTh), 3:15-5 p.m.
160 CP/M Software and UCC Systems
Dec. 2-9 (Th), 3:15-5 p.m.

ELECTIVES

PRICES: U. Student $20-30, U. Staff = $30-50,
Non-Univ. = $50-100

510 Introduction to System 2000 (DBMS)
Nov. 1-17 (MWF), 3:15-5 p.m., $30-$40-$50
520 SIR (DBMS)
Nov. 2-18 (TTh), 3:15-5 p.m., $30-$40-$50
530 SPSS (Statistical Package)
Nov. 8-12 (MTWF), 3:15-4:30 p.m., $25-$40-$65
600 Beginning FORTRAN
Nov. 8-19 (MWF), 3:15-5 p.m., $25-$35-$60
620 Cray FORTRAN Features (CFT)
Nov. 9-18 (TTh), 3:15-5 p.m., $30-$40-$60
550 PROSE (Text Formatter)
Nov. 16-18 (TTh), 1:15-3 p.m., $20-$30-$50
560 Scribe
Nov. 15-19 (MWF), 3:15-4:30 p.m., $30-$40-$60
570 Text Processing on Micros
Nov. 22-30 (MT), 3:15-5 p.m., $25-$35-$60
580 Graphics
Nov. 29-Dec. 8 (MW), 3:15-5 p.m., $20-$30-$50
640 Introduction to Pascal
Nov. 2-18 (TTh), 3:15-5 p.m., $25-$40-$70
650 COBOL
Nov. 22-Dec. 10 (MWF), 3:15-5 p.m., $30-$45-$70
590 Cray Assembly Language (CAL)
Nov. 29-Dec. 3 (MWF), 3:15-5 p.m., $25-$45-$70

HOLIDAYS: Monday, October 11, and Thursday &
Friday, November 25-26, are University holidays. No
classes will be held.

The joys of summer have faded and autumn is in the air. Time to hit the books— and the computer terminals.

If you're interested in enhancing your education by becoming knowledgeable about computing, the short courses we offer may be just what you need. These courses are aimed at everyone— from those who know little or nothing about computing to those with experience who want to expand their knowledge into other areas.

The course numbers will assist you in choosing what courses to take, and the order in which to take them. "0xx"-level classes offer basic introductions to computing and to the operating systems at UCC. They are numbered in the proper sequence for someone with little or no experience with our equipment Simply choose the machine that best fits your computing needs. 100-level classes explore text editors and introduce various computer applications such as programming, data base management, and micro-mainframe communications.

Among the electives, 500-level classes teach program packages available on our systems, including data base management systems, statistical packages, text formatters, and graphics. 600-level classes deal with programming languages such as FORTRAN, Pascal, COBOL, and Cray FORTRAN.

You may need some lower level classes to decide which machines, languages, and packages are most appropriate for you.

Then you'll know which classes to take next.

You can register at our Computer Store, 211 Experimental Engineering (the hours are 9 a.m.-3 p.m. Monday through Friday, and 5 p.m.-7 p.m. Monday through Thursday). We'll accept mail registrations for an additional $1 fee per course.

A self-service registration terminal is located outside the store, and separate lines at the store window are designated for registrants and for regular customers. Course fees may be paid with cash, check, University journal voucher, or they may be charged to your non-instructional UCC user account.

If you have questions about our short courses or about registration, call Jerry Stearns, 376-8806.

PHONE NUMBERS

Budgets 373-2521
Computer-Aided Instruction 376-2975
Computer Hours (recorded message) 373-4927
Computer Store 373-4877
Consulting
    HELP-line 376-5592
       9 a.m.-5 p.m., Monday-Friday
    Business Data Products 376-1761
       1-3 p.m., Monday-Friday
    Statistics Packages 376-5062
       1-2 p.m., Monday-Friday
    Data Bases 376-1761
       1-3 p.m., Monday-Friday
    Microcomputers 376-4276
       10-12 a.m. and 2-4 p.m., Monday-Friday
    Non-Traditional Computing 373-5780
       10:30-11:30 a.m., Monday, Wednesday, Friday
    TELL-A-GRAF/DISSPLA 376-2663
       1-3 p.m. Tuesday, Thursday
Contract Programming 376-1764
Data Base Applications 376-1764
Educational Services 376-3963
EDUNET Liaison 373-7745
Engineering Services 376-1023, 376-8153
Equipment Purchase/Information 376-8153
Experimental Engineering I/O 373-4596
Field Engineering 376-7584
Graphics Software 376-5592
HELP-line 376-5592
    9 a.m.-5 p.m., Monday-Friday

HOURS-line (recorded message) 373-4927
Image Processing 376-2895
Information, Experimental Engineering 373-4360
Information, Lauderdale 373-4912
Information Systems 376-1764
Instructional Labs 376-2703
Job Status, ExpEng (recorded message) 373-4994
Lauderdale Computer Room 373-4940
Lauderdale Services 373-4995
Lauderdale Services Manager 373-7538
Lauderdale Users' Room 373-4921
MECC Liaison 373-4573
Newsletter Subscription 376-4668
Permanent File Restoration 376-5605
Professional Services Division (PSD) 376-1764
Project Assistance 376-1764
Program Librarian 376-1636
Programming Languages 376-7290
Reference Room 373-7744
Remote Batch (RJE) Services 376-2703
Short Courses 376-8806
Shuttle Bus Service 376-3068
System Status (recorded message) 373-4927
Tape Librarian: see Lauderdale Services
Text Processing Services 376-2943
User Accounts 373-4548
User Services 376-3963

OPERATING HOURS

	Cyber 74/730	Cray	MERITSS (Cyber 172)	VAX
M-F	8 a.m. - 4 a.m.	8 a.m. - midnight	7:45 a.m. - 1:30 a.m.	8 a.m. - 6 a.m.
Sat	4 a.m. - 5:15 p.m.	8 a.m. - 5 p.m.	7:45 a.m. - 1:30 a.m.	24 hours
Sun	4 p.m. - 1 a.m.	4 p.m. - midnight	4 p.m. - midnight	24 hours

PUBLIC LABS—TWIN CITIES CAMPUS

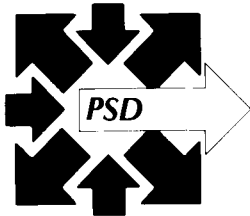| Location	Batch	Interactive	Micro	Location	Batch	Interactive	Micro
East Bank				*West Bank*			
Arch 160		X	X	BlegH 91T			X
CentH		X		BlegH 140		X	
ComH		X		MdbH		X	
DiehlH 270, 207		X		OMWL 2	X	X	
EltH 121, 125		X		SocSci 167		X*	
EltH N640	X						
ExpE 130	?	*		*St. Paul*			
FolH 14, 14a		X*	X				
LindH 25		X		BaH		X	
MasCan 39	X			ClaOff 125	X	X	
MechE 308		X		NorH 24	X		
Physics 69		*					
SanfH		X		*Lauderdale*			
TerrH		X					
VincH 4		X		Users Room	X		
WaLib 204		X					

* Research cluster; access to Cyber 730 and VAX/VMS
X in interactive column indicates access to MERITSS
? Unknown at the present time

University Computer Center Newsletter

User Services
227 Experimental Engineering
University of Minnesota
208 Union Street SE
Minneapolis, Minnesota 55455

October, 1982