University Computer Center Newsletter

University of Minnesota
Twin Cities

December 1985
Volume 19, Number 12

The New Computer Center: Past Services, Mission, and Plans for the Future

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Highlights of the Last Year

The following sections describe some of UCC's services for the University in the last year (fiscal 1985 data):

Research: Working together, UCC and the Supercomputer Institute provided over 900 CRAY-1 hours to University researchers for leading-edge computation problems. Grant use has doubled since the beginning of the Keller policy two years ago, which allows faculty and graduate student researchers to pay $50 to receive up to $1000 worth of central computing services. In the past year, 870 of 5100 FTE faculty researchers (1 in 6) averaged $483 in computing services and 1100 of 7300 (1 in 7) graduate students averaged $433 under that grant policy. Last year UCC installed 11 new libraries and packages, besides upgrading 9 of the old ones with new versions.

Instruction: The 225 general-purpose ports on the MERITSS CYBER 174 and the 60 large-memory or CAD/CAM ports on the IT MERITSS CYBER 825 provided over 50,000 connect hours per month to students during peak November and February instructional periods. About 5000 of the University's 36,000 Twin Cities undergraduates (1 in 7) thus averaged about 10 hours per peak month on a MERITSS system. We installed color graphic terminals in the Mechanical Engineering and Computer Science labs in the past year and upgraded the terminals, telecommunications, furniture, and appearance in half of the labs. Last summer both MERITSS systems were upgraded from NOS 1.4 to the NOS 2.4 operating system and now have the capacity to handle 30,000 different student numbers.

Other Services: The UCC Micro Group's pre- and post-sale support for the 3500 micro systems sold in the first year of the deep-discount micro program includes a general Micro HELP-Line (dial DR MICRO), in addition to the Shepherd Lab demonstration and consulting room. If we assume that each of these micros has an instruction rate of .5Mips, the CRAY-1 has 120Mips, the CRAY-2 has 1000Mips, and the CYBER 205 has 200Mips, then we can assume that those 3500 micros provide more computing power than all the University's supercomputers combined. (The difficulty, of course, is to combine enough of those micros to work on one leading-edge supercomputer problem.) Over 5000 users subscribe to the UCC Micro *Newsletter* **(a best buy),** which provides excellent hardware and software evaluations plus tips and solutions to programming and hardware problems. UCC's Engineering Services on Transfer Road provides several economical maintenance plans to support these micro and mini systems in addition to its other contract work. Engineering Services is a warranty center for a number of PCs and Epson and Diablo (630) printers. In addition, Engineering Services offers technical advice on hardware that it currently services.

The demise of Experimental Engineering has caused an increase in the number of different UCC campus locations. Support for UCC's many public labs is now provided from Folwell Hall. Shepherd Lab is the base for Humanities and Microcomputer support groups. Our Reference Room, now in 128A Lind Hall, provides a growing collection of computing newsletters from other universities, current computer periodicals, manuals, and other publications that support

UCC's systems. Also in 128 Lind Hall is our I/O station, short course coordinator, and the in-person consulting service. Wulling Hall now houses UCC administration, accounting, and professional service groups.

Academic Computing Services and Systems – Mission and Future

The mission of Academic Computing Services and Systems (ACSS) is to provide computing support for academic programs of the Twin Cities campus, consistent with the goals and resources of the University. Some of the service needs of individual departments on the Twin Cities campus are attended to by smaller departmental centers and by other Information Systems computing service organizations, such as Health Sciences Computing Services and St. Paul Computing Services. These organizations augment ACSS services.

The University has a long history of making available the computing services required to support academic programs. The unique nature and quality of these services put them in high demand by Minnesota state agencies, non-profit organizations, and other educational institutions. These organizations share in the cost of providing these services, while receiving University expertise in the delivery of computing resources.

The emphasis of ACSS is service, not specific equipment. In the future, academic computing problems will be solved by any or all of the available resources of microcomputers and workstations up through medium and large central computers that are interconnected by the telecommunications systems.

Changing technology offers solutions to problems and, in turn, new problems for the University. Dealing with this technology requires a support organization whose fundamental operating philosophy recognizes frequent change and continual renewal in the practice of applying computing in higher education. Thus the ACSS staff will need to begin to think of themselves as problem solvers rather than as pure data base consultants, microcomputer programmers, or as in other such roles. The tools we work with today will not be the same three years from now. ACSS's role is to acquire, support, promote, and use these new tools, as they become available, to advance the missions of the University.

A supercomputer is one tool necessary for solving certain problems. During the past four years, we have given much attention to introducing this new tool to the University. Supercomputing has matured and become the mission of a separate organization. ACSS will now work on other areas that have risen in importance. Non-numeric computation, provision of large data bases, electronic mail, and workstation and local area network support are some of the areas in which ACSS will be placing new or renewed emphasis.

Current thinking at many universities is to provide computer services as a required tool for faculty, as opposed to the past practice of cost recovery from faculty. The Keller grant policy in the past two years has shown that tactic to be fruitful for faculty researchers and graduate students. ACSS will continue lowering rates and encouraging that type of grant policy.

Current and Future Projects

1. We are now reorganizing, preparing to transform UCC into the new ACSS on January 1, 1986. UCC will transfer its supercomputing functions to Research Equipment, Inc. (REI). The Supercomputer Institute will continue to be the main supplier of supercomputing grants to University researchers. The January issue of this *Newsletter* will explain how the various groups in the new ACSS department will supply existing and new services.

Note that, except for supercomputer users, organizational changes should be invisible to UCC users.

2. By July 1986 the University will have installed a modern digital phone system (InteCom) that delivers both voice and digital service to every University building, office, lab, and dorm. A simple Data Option Board (DOB-1) unit installed under your telephone set will allow modemless asynchronous transmission at up to 19,200 bits per second to any site within the University. Another Data Option Board will allow Ethernet transmission at 960,000 bits per second. To prepare for these faster rates, UCC must upgrade the front-end devices and network boxes that are attached to its central systems. This CDCNET and Tellabs equipment will be phased in during the early months of 1986, with the first ones upgrading the CAD/CAM service to the instructional MERITSS CYBER 825.

3. A VAX 8600 running the 4.2 VMS operating system will be installed in place of the current VAX-11/780 system running 3.6 VMS. The new system, which will not be a supercomputer front-end system, will have more capacity than the 11/780 and permit us to offer computing grants, additional software, and limited instructional usage. Although the 8600 is three to four times faster, the VAX 8600 rates will be only 2 to 2.5 times the present 11/780 rates, resulting in

lower costs for the user. New data base and statistical packages, the Common LISP language to support Artificial Intelligence (AI) applications, DEC's DATATRIEVE, and Kermit for micro-to-mainframe file transfer, are some of the new software packages to be offered. BITNET, a communications network that links educational institutions for electronic mail, also will be provided.

4. UCC will replace the older line printers at its central Lauderdale site with a XEROX 8700 laser printer and replace those at the Lind Hall I/O station with slower laser printers. This will continue the trend of providing high-quality output.

5. Currently there are two central MERITSS instructional CYBER systems. We are discussing plans with Control Data and the Institute of Technology to replace these systems with a single CYBER instructional system. The change will result in simplified access, faster CAD/CAM processing, improved I/O processors, and additional memory for jobs, all (we hope) at lower than the current cost of running the present systems.

6. We have added additional microcomputer support personnel to support the IBM Woksape projects and to expand Micro *Newsletter* coverage about workstations and Local Area Networks (LANs).

7. We are installing a new public microcomputer lab in Walter Library. The current project for upgrading the instructional labs will be completed shortly.

8. Our Engineering Services group will be offering alternatives to the standard maintenance service contract as a way of reducing costs.

HOLIDAY HOURS

Operating hours during the upcoming holidays will be as follows:

Christmas

	DOWN	UP
CRAY-1	1:00 pm Tue 12/24	7:00 am Thu 12/26
CYBER CA	1:00 pm Tue 12/24	7:00 am Thu 12/26
CYBER ME	1:00 pm Tue 12/24	7:45 am Thu 12/26
CYBER MD	1:00 pm Tue 12/24	8:00 am Thu 12/26
CYBER 205	1:00 pm Tue 12/24	8:00 am Thu 12/26
VAX 11/780	1:00 pm Tue 12/24	7:00 am Thu 12/26
Lind I/O Station	10:00 pm Mon 12/23	8:00 am Fri 12/27

New Year's

	DOWN	UP
CRAY-1	5:00 pm Tue 12/31	7:00 am Thu 1/2
CYBER CA	5:00 pm Tue 12/31	7:00 am Thu 1/2
CYBER ME	5:00 pm Tue 12/31	7:45 am Thu 1/2
CYBER MD	5:00 pm Tue 12/31	8:00 am Thu 1/2
CYBER 205	5:00 pm Tue 12/31	8:00 am Thu 1/2
VAX 11/780	5:00 pm Tue 12/31	7:00 am Thu 1/2
Lind I/O Station	5:00 pm Tue 12/31	8:00 am Thu 1/2

Getting Output from the NOS 2 CYBERs

In the last year UCC has made a number of changes, both large and small, in the ways you get output from the CYBER CA and the MERITSS computers, the ME and MD. These include, for example, the upgrading of the MERITSS machines to NOS 2 and the move of our East Bank I/O station from Experimental Engineering to Lind Hall.

With the CA going to the NOS 2 operating system this month, this seems a good time to summarize the process of getting output from all our NOS 2 machines. Details of the process will undoubtedly change in the coming year. Watch future issues of the *Newsletter* for more information.

The Basics

When you run a job on the CYBERs, the system writes your output to a system file named OUTPUT.

For a batch mode job (that is, a job with an input deck), this produces at least two pages of line printer output: a "banner" page and a "dayfile" page. Any results, listings, or other output is printed between these two pages.

For an interactive job, the banner page is omitted and the dayfile information is retained by the system and made accessible to you during your interactive session through the DAYFILE command: simply type **DAYFILE**. The rest of your output returns to your terminal (the system uses the terminal as the OUTPUT file).

Getting Printed Copies of Output

Having output return to your terminal can be inconvenient. For example, suppose you need a printed copy of a file and you're at a VDT terminal. Or suppose you're at a printing terminal but you would like to accomplish a few tasks while a long file is listing out. These are just two examples of when you might want to use the ROUTE command to send your output to another printing device such as a line printer.

Note: Not all classroom accounts on MERITSS are validated to use the ROUTE command. (Those that are validated should see the MERITSS output section that appears later in this article.)

ROUTE allows you to:

1. Designate a new site for printed output. Output goes to either a numbered bin or to specially labeled ROUTE shelves. You can send terminal output to a lineprinter or change the default line-printer site for a batch job.

2. Specify upper- and lowercase characters on your printed output when output text is in upper- and lowercase.

3. Request that special forms (labels, multipart paper, etc.), processed only at Lauderdale, be delivered to Lind Hall, Blegen Hall, or St. Paul.

Output Format

When you use ROUTE on an output file, you can expect at least two pages of printed output from the system.

The first page, called the *banner page*, has a series of seven, large, block letters printed across the top. This is the jobname. The first four characters are taken from the hash code of your user number (use the HASH command to find out what this is). The last three characters of this jobname are added by the system to make the jobname unique. The banner page also contains the time, date, and site from which the job was run. The message at the bottom of the banner page is called a *sysnote*.

At an interactive terminal, type the WRITEUP,NOTE command to see the current system notes and messages. These are timely and important messages about the CYBER systems. To see a *long* display of current and past system notes, type WRITEUP,SYSNOTE.

Following the banner page are the pages of results, listings, or whatever output your job produces. The content of these pages will depend entirely on the output file. If you have run an RJE batch job, then the last page of your output is the dayfile page. SUBMIT batch jobs require special action to capture dayfile information.

Interactive users will find dayfile information stored in a file called DAYFILE; simply type DAYFILE. The dayfile contains a list of each command executed by your job along with any warnings, comments, notices, or error messages issued by the system. Each line in the dayfile gives you a message and the time of day the message was placed in the file. You should always look at the dayfile to see if the system completed your job successfully or if it aborted on some type of error.

Using the ROUTE Command

In NOS 2, the ROUTE command has the following form:

```
ROUTE(filename,DC=xx,EC=cc,UN=ss,UJN=ujn,DEF,...)
```

where

`filename` is the name of the local file you want to ROUTE.

`DC=xx` specifies an output device; use a two-letter code to replace `xx`. For example, PR is line printer and PL is plotter.

`EC=cc` specifies external characteristics of the file, indicated by a two- or three-character code. A6 (the default) is the NORMAL 63-character set, uppercase printer output; A9 is upper- and lowercase ASCII output.

`UN=ss` specifies the site where output is to be produced, as described later in this article. EA is 128B Lind Hall, EB is 90 Blegen Hall, BC is Lauderdale. Plots and special forms output are only produced at Lauderdale (site BC).

`UJN=ujn` specifies the site and bin number to which output should be delivered. It can, for example, be used to designate a Lind Hall delivery site for output produced at Lauderdale (site BC). Replace `ujn` with the site code and bin number, separated by an asterisk. (Example: `BC*100`).

`DEF` defers routing of the file OUTPUT until the job is finished. You may place the ROUTE command early in the job stream, but postpone the file's release until the job terminates.

`...` other optional output parameters; see the on-line manual EXPLAIN, M=COMMAND and the section below on MERITSS.

The following ROUTE command sends an ASCII file `(EC=A9)` to an upper- and lowercase printer `(DC=PR)` at the Lind Hall site `(UN=EA)`. Output will be placed in bin 420.

```
ROUTE(filename,DC=PR,EC=A9,UN=EA,UJN=EA*420)
```

The following commands put the WRITEUP called NOS2DOC on an ASCII file called LIST `(PT=AS)` and send LIST to an upper- and lowercase `(EC=A9)` printer `(DC=PR)` at the 90 Blegen Hall site `(UN=EB)`. The listing is placed on the routed output shelves according to the first letter of the jobname. (Note the lack of a bin specification.)

```
WRITEUP(NOS2DOC/L=LIST,PT=AS)
ROUTE(LIST,DC=PR,EC=A9,UN=EB)
```

Finding Your Output

If you run a punch card job at a high-speed, staffed site, the number on the BIN command will identify the location where your output will be placed. Open bins for users are numbered:

97-144	at Lauderdale (site BC)
401-448	at Lind Hall (site EA)
155-271	at Blegen Hall (site EB)
R70, R71, R72	125e Classroom Office Building, the printer room (site R70)

You can either select a BIN card at one of these sites or select a bin number. (One example of a user-supplied bin number would be your use of the `UJN=`*`ujn`* parameter on the ROUTE command.) Allow at least twenty minutes for your output to appear under normal conditions and longer if the computer system is busy. Unusual output such as magnetic tapes or punched cards is placed with the printout, alphabetically by jobname, or it can be routed to a numbered bin.

If you run a job at a medium-speed, self-service site, the output is printed at the terminal in a reasonably short time. Wait for it; otherwise it may be discarded by another user.

The following ROUTE command sends a file to be printed at Lauderdale and delivered to bin 395 at 128B Lind Hall.

```
ROUTE(filename,DC=PR,UN=BC,UJN=EA*395)
```

Special Forms

We provide a number of special forms for output, including mailing labels and 8-1/2 x 11-inch paper. Service for user-provided forms also is available. You request special services with the forms code parameter `(FC=)` on the ROUTE command. Read the output from WRITEUP(SERVICE=FORMS) to get details on costs and supplies. Special forms are processed only at Lauderdale `(UN=BC)`.

The forms codes are:

AA	Back (unlined side) of 14-7/8 x 11-inch paper
AD	two-part, carbonless 14-7/8 x 11-inch paper
AH	one-part 9-7/8 x 11-inch paper
AJ	Mailing labels 15/16 x 3-1/2 inch, 1 up
AK	Mailing labels 7/16 x 4 inch, 1 up
AL	Mailing labels 1-7/16 x 4 inch, 3 up
AM	Mailing labels 15/16 x 3-1/2 inch, 3 up
AN	Mailing labels 15/16 x 3-1/2 inch, 4 up
AR	New ribbon with stock forms
ZZ	Any user-supplied form

The following ROUTE command will print output from FILE on two-part, carbonless 14-7/8 x 11 inch paper `(FC=AD)` at the Lauderdale site `(UN=BC)`; output will be delivered to Lind Hall, bin 425.

```
ROUTE(FILE,DC=PR,UN=BC,FC=AD,UJN=EA*425)
```

Punched Card Output

Users who have sent output to be punched on cards should note that as of January 1, 1986, punched card output is no longer available.

Printer Carriage Control: the First Column of Output

Whenever your job produces output for a line printer, the printer sees any character in column 1 of a print line as a "carriage control" character. The character is not printed; rather it controls the behavior of the printer. For example:

character	action
space	single space
1	eject page before print
0	skip 1 line before print (double space)
-	skip two lines before print (triple space)
+	suppress space before print (over-print)
/	suppress space after print (over-print)

If you don't want the first column of your output to be interpreted as carriage control—in other words, if you are losing the first column of a text file or skipping pages unnecessarily—you can shift the entire file one column over with the COPYSBF command.

Not all possible controls are available at all sites. However, all these controls work when you print a file at Lauderdale (site BC).

MERITSS Printed Output

Since MERITSS is an interactive system with no attached line printer, you must use the ROUTE command to get printed output from MERITSS; this output is sent to the CYBER CA system and printed there. Only MERITSS users with the necessary validations on their accounts can route output to a printer.

The following example of a ROUTE command used on a MERITSS machine sends a MERITSS file to a line printer on the CYBER CA system (ST=MCA). The output is delivered to Lauderdale bin 59.

```
ROUTE(filename,DC=PR,ST=MCA,UN=BC,UJN=BC*59)
```

Print Line Limit

The maximum number of lines that may be printed on the file OUTPUT during execution of a program is 2000. To change this limit, use the `PL=n` parameter on the command that writes to OUTPUT. For example:

```
M77(I=PGM,PL=5000)
```

or, with the M77 compiler:

```
LGO(filename,PL=10000)
```

Some compilers accept other formats. Other than writing to OUTPUT during program execution, the number of lines written on any file is limited only by the predefined file size.

Laser Printer Output

We currently provide laser printer output from a Xerox 9700 laser printer operated by a University service bureau. The Xerox 9700 is a highly versatile laser printer that produces high-quality, printed output on 8-1/2 by 11-inch paper. Turnaround for this output is usually 24 to 48 weekday hours. For additional details about using the 9700, see WRITEUP(SERVICE=X9700), which provides explanations of the 9700 command parameters and costs.

When ACSS begins operating its own laser printers in 1986, turnaround time will improve significantly and the procedures for obtaining laser printer output will change. Again, watch the *Newsletter* for details.

CYBER Notes *continued on page 101*

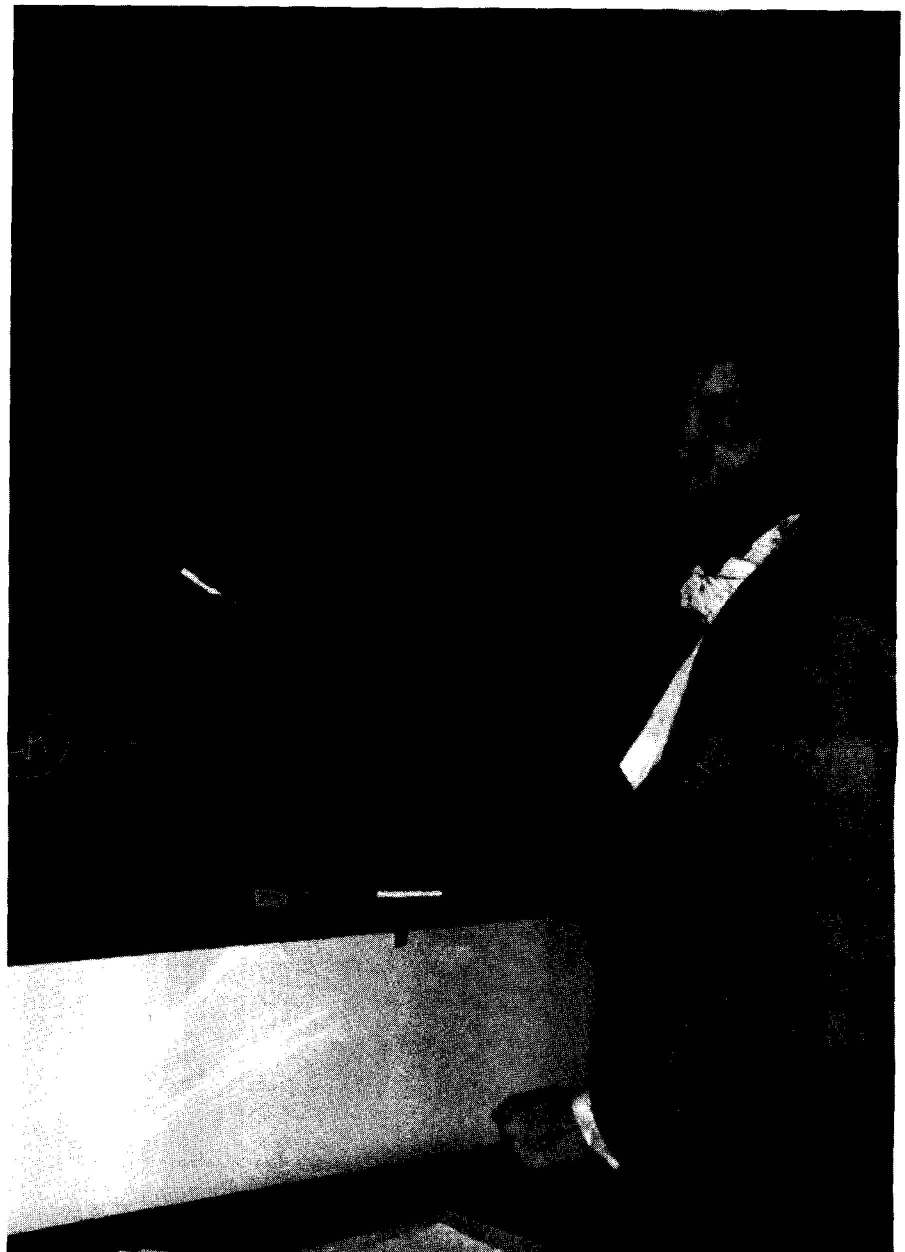
UCC Analyst/Programmer Wins Award

Cheryl Vollhaber, analyst/ programmer in UCC's Professional Services Division, received an award for "The Most Productive Application of SIR Data Base Management System," for her presentation, "Using SIR in a Time Crunch."

Vollhaber delivered her paper at the Second International SIR Data Base Conference in Chicago in October. Her talk focused on the selection and use of a data base management system for a needs analysis connected with the University's telecommunications center project.

Vollhaber chose to use the SIR system because of SIR's built-in, timesaving report generator options and error-checking features. Under an extremely tight schedule of five days, Vollhaber designed a schema to hold all major characteristics of the 19,500 phones as well as numerous micro-computers on the Twin Cities campus. The entire design phase of the project was completed by the time the data collection team started its work.

Vollhaber summarized her use of SIR by saying, "The system is not remarkable because it works. The only unusual aspect of this situation is the speed with which the entire system became operational. Much of the credit has to be placed on the data base management system for built-in features. Very little testing had to be done before a decision was made to use SIR."



Cheryl Vollhaber explains the design of her data base.

SPSSX Now on CYBER CA

The SPSSX package is now available for use on the CYBER CA machine. This is not a new level of SPSS but rather a completely revised version of SPSS written by SPSS, Inc. We have no plans to remove SPSS Version 9 from our system.

There are substantial differences between the two packages. Because of the extremely large memory demands of SPSSX, the package is not available through on-line access. Users will have to run SUBMIT jobs to use SPSSX. Since SPSSX uses more memory than SPSS, it costs more to run. Cost comparisons run on FREQUENCIES, BREAKDOWN, CROSSTABS, and REGRESSION for small, medium, and large data files found SPSSX to be approximately 1.5 times more expensive than SPSS in each test. (It ranged from 1.3 to 2.)

Programs written under SPSS are not generally compatible with SPSSX, although SPSSX can read SPSS system files. SPSS programs can usually be converted to run in SPSSX with a little modification. Perhaps the most obvious modification is on the SPSSX command. The `D=` parameter is no longer permitted. The file name is included on the FILE HANDLE statement instead. The `I=` input file and `L=` output listing are the same. All other file specifications (data file, system file, BCDOUT file, etc.) are handled by specific SPSSX commands in the job stream.

The *SPSSX User's Guide*, Appendix A, contains an excellent discussion of the differences between SPSSX and SPSS. The following five changes in non-procedure commands should be noted.

1. RUN NAME is changed to TITLE.

2. VARIABLE LIST and INPUT FORMAT are replaced by DATA LIST. Format specifications can still be used with the DATA LIST command.

3. READ INPUT DATA and END INPUT DATA are replaced by BEGIN DATA and END DATA respectively.

4. The name of an externally stored data file is specified in the FILE HANDLE command.

5. SPSSX memory is not dynamically allocated. The `W=` work space parameter on the SPSSX control card allows the user to specify the number of words in the SPSSX work space. The default is 5000 words. The maximum on CA is approximately 82,000 words.

The above list is not exhaustive. Additional information can be obtained by inserting the command:

```
INFO ALL
```

into your SPSSX job stream. Or, one can type:

```
WRITEUP,SPSSX=*/PT=AS,L=lfn.
```

Either of these commands produce a document over 100 pages long. WRITEUP,SPSS=LOCAL will tell you how to call SPSSX at UCC.

SPSSX also has some new procedures that were not available in SPSS, including the following:

- CLUSTER performs hierarchical cluster analysis of cases in a small to moderate size data file.

- PROBIT allows you to estimate the effects of one or more independent variables on a dichotomous dependent variable.

- HILOGLINEAR deals with categorical data and is specifically designed for hierarchical models.

• XSAVE will save a system file like the SAVE command, but it is considered a transformation rather than a procedure. XSAVE will not cause a pass of the data.

• PLOT is a general-purpose line printer "plot" routine. It contains many features not currently available in SCATTERGRAM. Its *not* designed to work with high-resolution plotters.

• SET WIDTH is available for controlling the width of printed output.

• IMPORT/EXPORT facilitates portable SPSSX system files for transfer to other types of computers.

SPSSX also includes some new capabilities in the areas of file definition and data transformation that will allow the user to:

• input data from multiple files
• input data with hierarchical file structures
• combine information from two or more files into one file by either concatenation or interleaving
• match data from two sources and generate reports on the combined data
• check for missing records or records out of order
• take certain actions in the event of undefined, duplicated, or missing records
• use string variables (i.e. names) of up to 255 characters

Some SPSS commands are obsolete in SPSSX, including:

ASSIGN MISSING
DELETE SUBFILES
FILE NAME
GET ARCHIVE
LIST ERRORS
SAVE ARCHIVE
SUBFILE LIST

All of these functions can be performed in other ways.

In addition, AGGREGATE, FREQUENCIES, and FACTOR were totally rewritten and major alterations were made to CROSSTABS, DISCRIMINANT, and REPORT. NEW REGRESSION from SPSS 9 is now called REGRESSION.

Several statistical procedures have been eliminated. Most of these were added specifically for the CDC version of SPSS 9 and were not standard SPSS. These procedures include:

CTAB
G3SLS
JFACTOR
NONLINEAR
PLOT
SPECTRAL
SUMMARY TABLES
TETRACHORIC
CANCORR
GUTTMAN SCALE
REGRESSION (as we knew it)

For specific information regarding these commands, check the *SPSSX User's Guide*, second edition, which is available for review in the UCC Reference Room, 128A Lind Hall. Also available are *SPSSX Basics*, *SPSSX Introductory Statistics Guide*, and *SPSSX Advanced Statistics Guide*. These manuals can also be purchased at the Minnesota Book Center in Williamson Hall.

Since SPSSX has no interactive front end and is slower, clumsier, and missing several important procedures, several users have asked why one would want to switch from SPSS to SPSSX. For one thing, SPSSX contains several statistical procedures (i.e., CLUSTER, PROBIT) not available in SPSS. Many procedures have been improved and the output is often much prettier. It has far superior file manipulation and more powerful data transformations. And, finally, SPSSX is the wave of the future. Who wants to be part of the past?

(S. Krmpotich and B. Center)

SPARSPK Sparse Matrix Library

We recently installed the SPARSPK user library on the CRAY-1. The library is used to solve sparse systems of symmetric positive definite linear equations by Gaussian elimination (SPARSPAK-A) and solve sparse constrained linear least squares problems by a combination of Givens rotations and Gaussian elimination (SPARSPAK-B). For unsymmetric systems, SPARSPAK-A can be used if the elimination doesn't require row interchanges. SPARSPAK-B can solve unconstrained linear least squares problems and indefinite systems of linear equations (symmetric and unsymmetric). It can handle both overdetermined and undetermined problems. SPARSPK problems must fit in memory, although only the nonzeros, pointers for them, and workspace are required. There is a provision for saving and later restarting a calculation. SPARSPAK-A can give a relative error estimate for a solution and SPARSPAK-B can give a Euclidean norm of the residual. SPARSPK was written by Alan George and Esmond Ng of the University of Waterloo Computer Science Department.

SPARSPK is only available on the CRAY-1. It is accessed by the command LDR(LIB=SPARSPK). Documentation for the library is WRITEUP(SPARSPK) and the 110-page *SPARSPAK: Waterloo Sparse Matrix Package User's Guide for SPARSPAK-A and SPARSPAK-B*, on reserve in the UCC Reference Room, 128A Lind Hall, (612) 373-7744. For the price of reproduction, Reference Room staff can make you a photocopy.

SPARSPK joins other sparse matrix software on our system. YSMPLIB, the Yale Sparse Matrix Package, and some of the MA routines in the Harwell subroutine library use elimination methods, while PCGPAK uses iterative methods. Questions on SPARSPK or other sparse matrix software can be directed to Mike Frisch, the Scientific Programs Librarian, at 40B Wulling Hall, (612) 376-1636.

New Version of Harwell

On November 4, we replaced the Harwell subroutine library on the CRAY-1 with a new version we received from the Harwell Atomic Energy Research Establishment in England. Since they did not provide us with details, we assume that there are only minor corrections and perhaps additional routines made available for the CRAY.

Also on November 4, we replaced the MPOS linear programming package on the CRAY-1 with one that uses newer memory management calls and thus eliminates a warning message which formerly appeared in the CRAY logfile.

(M. Frisch)

Math and Statistics
continued on page 100

New VAX Hours.

Beginning January 1, 1986, the VAX (VA) will operate during the same hours as the CYBER (CA) now operates. (See page 103 of this *Newsletter* under "Operating Hours.") The January *Newsletter* will list the new hours for the VAX machine.

Algorithms from ACM Transactions on Mathematical Software

We now have on disk the ACM collected algorithms published in the journal *ACM Transactions on Mathematical Software*, starting with algorithm 493 from March, 1975. We recently added algorithms 629 through 633, which were published in June, 1985. They are:

ALG629	An integral equation program for Laplace's equation in three dimensions
ALG630	BBVSCG — A variable-storage algorithm for function minimization
ALG631	Finding a bracketed zero by Larkin's method of rational interpolation
ALG632	A program for the 0-1 multiple knapsack problem
ALG633	An algorithm for linear dependency analysis of multivariate data

All these are available to users on the FETCH file CALGOPL, which is a MODIFY program library. The list of the available algorithms and commands to access them is given in the WRITEUP, which can be obtained by typing this command at your terminal:

WRITEUP(CALGOPL)

The journal *ACM Transactions on Mathematical Software* is available in our Reference Room, 128A Lind Hall.

(T. Pan)

Reminders

UCC Becomes ACSS: On January 1, 1986, the University Computer Center will become *Academic Computing Services and Systems* (ACSS), a new department dedicated to serving the computing needs of the University of Minnesota (Twin Cities) in instruction, research, and public service. See this and all future issues of the *Newsletter* for information on new ACSS services and programs.

NOS 2 on the CA: On December 15, the CYBER CA system will be upgraded to NOS 2. On that date all our CYBER systems will be running the NOS 2 system. (NOS 1 will not be available on *any* machine.) For information on the changes see the online documents WRITEUP,NOS2 and WRITEUP,NOS2DOC.

Punched Card Output Ends: December 1985 is the last month you will be able to get your CYBER output in punched card form. We are discontinuing this service for two reasons: Use of it has declined drastically over the last several years, and the Control Data Corporation will cease to maintain our card punch machine in 1986.

Mass Storage Rates: Effective November 1, 1985 permanent file storage rate units have changed to mega-character-days (MCDs). The cost for keeping a file on any UCC system for a full day remains the same since the new rates are equivalent to the old kilo-sector-hour (KSH) or kilo-block-day (KBD) rates. Mega-character-day rates are now used to simplify and standardize permanent file billing on all UCC systems.

The new rates, in mega-character-days (MCDs), are:

CYBER Permanent Files	$ .75 MCD
CYBER Queue Files (NOS 2)	$ .75 MCD
CRAY (unsecure)	$1.23 MCD
CRAY (secure)	$6.15 MCD
VAX	$ .82 MCD

Using Tapes in NOS 2: TBLOCK

Most of the tape commands CA users relied on in the old NOS 1 operating system remain the same under NOS 2. There is, however, one important exception—a tape command that UCC added to the NOS 1 operating system for the convenience of our users.

This is the **BLOCK** command, which in NOS 2 is named **TBLOCK**. If you have NOS 1 tape jobs that you want to run under NOS 2, you simply have to change all the BLOCK commands in your jobs to TBLOCK. The parameters remain the same.

UCC renamed this command because NOS 2 now contains its own BLOCK command (which has nothing to do with tapes). Note that the command UNBLOCK has not been renamed.

Classified

FOR SALE: Metafile version 7.0 software for sale. Baby Blue Conversion. Best offer. Contact Ellen at 373-0083.

Programming Languages

CYBER Pascal Changes

On December 15, 1985, "current" Pascal on all CYBERs (CA, ME, and MD) will be changed to version 4.1.6. At this time, the sequence of pseudo-random numbers generated by function RANDOM in the RANDOM library package will change, and an error in SETRANDOM will be corrected.

Newsletter Renewal Forms

By this time, you who are *Newsletter* readers should have received a form asking you to renew your free subscription to the UCC *Newsletter*. With this form, we'll make sure you want to continue receiving the *Newsletter*. We are also using the renewal form to gather information from you for correcting and updating our mailing list to improve and simplify both our University campus mail and Postal Service delivery.

If you did not mail in your form, you'll receive a reminder in about 30 days, or you can write us at the Technical Publications address on the back page of this issue. You can also call Technical Publications at (612) 376-1491.

To the many readers who have already mailed in their forms, our thanks. We welcome your comments and suggestions on making the 1986 ACSS *Newsletter* of good use to you in the coming year.

Correction

In our October issue, the NOS 2 command on page 77 should have read:

ROUTE,myfile,dc=lp,ec=a9,un=ea,ujn=ea*405

In the October issue, the comma after **myfile** was erroneously replaced by a slash. The slash is permissible in NOS 1 but produces an error message in NOS 2. The rest of the command is correct as stated.

Winter Quarter Short Courses

1986

INTRODUCTORY COURSES

Introduction to Computers	McAllister	Jan 13-24	(MWF)	2:15-4 pm	$15,$25,$35
Beginning NOS 2 (CYBER OS)	Krmpotich	Jan 27-Feb 7	(MWF)	2:15-4 pm	$15,$25,$35
Introduction to VAX/VMS	Stearns	Jan 28-Feb 13	(TTh)	2:15-4 pm	$15,$25,$35
XEDIT (CYBER Text Editor)	Brodie	Feb 4-13	(TTh)	2:15-4 pm	$15,$25,$35

ELECTIVE COURSES

DI-3000 Graphics Routines	McAllister	Feb 17-28	(MWF)	2:15-4 pm	$35,$45,$80
SPSS (Statistics Package)	Alberg	Feb 17-21	(MWThF)	2:15-4 pm	$25,$35,$60
Magnetic Tapes in NOS 2	Oberg	Feb 25-Mar 6	(TTh)	2:15-4 pm	$25,$35,$60
SIR DBMS Seminar	Oberg	Mar 24-26	(MTW)	9 am-4 pm	$100,$100,$150

MICROCOMPUTER APPLICATIONS COURSES
(Absolutely limited to 10 per class)

Introduction to Micros: MS-DOS, Section 1	Jan 14-16	(TTh)	1:30-4 pm	$25,$35,$60
Introduction to Micros: MS-DOS, Section 2	Jan 21-23	(TTh)	1:30-4 pm	$25,$35,$60
Introduction to Micros: MS-DOS, Section 3	Jan 27-29	(MW)	1:30-4 pm	$25,$35,$60

(*Introduction to Micros* or equivalent knowledge is required for the courses listed below.)

Introduction to Word Perfect, Section 1	Jan 14	(Tu)	9:30 am-Noon	$25,$35,$60
Introduction to Word Perfect, Section 2	Feb 5	(W)	1:30-4 pm	$25,$35,$60
Interm. Word Perfect for Office Applications	Feb 13	(Th)	1:30-4 pm	$25,$35,$60
Interm. Word Perfect for Authors	Mar 7	(F)	9:30 am-Noon	$25,$35,$60
Introduction to dBase II & III, Section 1	Jan 28-30	(TTh)	1:30-4 pm	$40,$50,$80
Introduction to dBase II & III, Section 2	Mar 4-6	(TTh)	9:30 am-Noon	$40,$50,$80
Beginning Lotus 1-2-3, Section 1	Feb 4	(Tu)	1:30-4 pm	$25,$35,$60
Beginning Lotus 1-2-3, Section 2	Feb 12	(W)	9:30 am-Noon	$25,$35,$60
Advanced Lotus 1-2-3	Feb 18	(Tu)	9:30 am-Noon	$25,$35,$60

(The courses listed below are overviews only for the Apple Macintosh. Limited to 20.)

Microsoft Word for the Macintosh	Jan 22	(W)	2:15-4 pm	$15,$25,$40
Beginning MacDraw and MacDraft	Feb 14	(F)	10 am-Noon	$15,$25,$40
Microsoft Excel (Spreadsheet)	Feb 17	(M)	9:15-11am	$15,$25,$40
Statistical Programs for the Macintosh	Feb 25	(Tu)	2:15-4 pm	$15,$25,$40
Preparing Newsletters & Brochures	Mar 5	(W)	2:00-4 pm	$15,$25,$40

(includes overviews of PageMaker, ReadySetGo, & MacPublisher programs)

REGISTRATION: Registration is located at the UCC Reference Room, 128A Lind Hall. (Hours: 8:00 am to 4:30 pm, Monday through Friday). Deadline for registering is 4:15 pm on the last working day BEFORE the class begins. If you need more information on short courses, call Jerry Stearns at 376-8806.

FEES: Fees are listed above in order for the following groups: 1) University students, 2) faculty and staff, and 3) non-University persons. Course fees may be paid by cash or check or with a signed University journal voucher. We can no longer charge short courses to user accounts. NO refunds will be made after the class has begun.

NOTE: Monday, January 20, is a University holiday. No classes will be held.

PHONE NUMBERS

Access:
- CYBER(CA)—10, 30 cps 376-5730
- —120 cps 376-5706
- MERITSS(ME)—10, 30 cps 376-7730
- —120 cps...................... 376-7120
- VAX/VMS(VA)—(autobaud) 376-8070

Accounts:
- MERITSS 373-7745
- User Numbers 373-4548

Computer-Aided Instruction 376-2975
Computer Hours (recorded message) 373-4927
Consulting:
- HELP-Line 376-5592
  8 a.m.–5 p.m., Monday-Friday
- Statistics Packages 376-1761
  1–2 p.m., Monday-Friday
- Data Bases 376-1761
  10–11 a.m., Monday-Friday
- Microcomputers 376-4276
  9:30 a.m.–noon and 1:30–4 p.m., Monday-Friday
- Scribe, Text Analysis & Humanities Computing 376-2944
  1–3 p.m., Monday, Thursday, Friday

Contract Programming 376-1764
Data Base Applications 376-1764
Engineering Services 376-1023, 376-8153
Equipment Purchase/Information 376-8153
Lind Hall I/O 373-4596
Graphics Software 376-5592
HELP-Line 376-5592
8 a.m.–5 p.m., Monday-Friday
HOURS-line (recorded message) 373-4927
Information, Wulling Hall 373-4360
Information, Lauderdale 373-4912
Instructional Labs 376-2703
Instructional Services 373-7745
Lauderdale Computer Room 373-4940
Lauderdale Services 638-0523
Newsletter Subscription 376-1491
Permanent File Restoration 376-5605
Professional Services Division 376-1764
Project Assistance 376-1764
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

OPERATING HOURS

	CYBER (CA)	Low rate	CRAY (CR)	MERITSS (ME & MD)	VAX (VA)
M-F	7 a.m.- 4 a.m.	8 p.m.- 4 a.m.	7 a.m. - midnight	7:45 a.m. - 3:30 a.m.	8 a.m. - 6 a.m.
Sat	4 a.m.- 5:15 p.m.	4 a.m.- 5:15 p.m.	7 a.m. - 5 p.m.	7:45 a.m. - 3:30 a.m.	24 hours
Sun	4 p.m.- 1 a.m.	4 p.m. - 1 a.m.	4 p.m. - midnight	4 p.m. - 3:30 a.m.	24 hours

PUBLIC LABS—TWIN CITIES CAMPUS

Location	Batch	Interactive	Micro
East Bank			
Arch 148			X
CentH		X	
ComH		X	
DiehlH 207		X	
EltH 121, 125		X	
EltH N640	X		
FolH 14, 14a	X	X*	X
FronH		X	
LindH 26		X	
LindH 128B		*	
LindH 306B			X
MechE 308		X	
Physics 69		*	
PiH		X	
SaH		X	
TerH		X	
VinH 4		X	
WaLib 9		X	
West Bank			
BlegH 25		*	
BlegH 90		X	
BlegH 140		X	
MdbH		X	
OMWL 2		X	
SocSci 167			X
St. Paul			
BaH		X	
CentLib B50			X
ClaOff 125	X		

* Research cluster; access to CYBER CA and VAX/VMS
X in interactive column indicates access to MERITSS

For more information see WRITEUP(LABS)

Contents

Michael M. Skow, Acting Director

The *UCC Newsletter* is published monthly by the University Computer Center. Deadline for articles is the 10th of the month preceding publication; deadline for short announcements is the 15th. The *Newsletter* is produced with an Apple Macintosh running Microsoft Word, MacPaint, MacDraw, and Aldus Pagemaker software, with camera-ready copy produced on the Apple LaserWriter. The *Newsletter* is printed at the University Printing Department.

Comments, suggestions, articles, and announcements should be directed to the editor, 121 Lauderdale Computing Facility, (612) 376-1491.

University Computer Center Newsletter

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