



# University Computer Center Newsletter

UNIVERSITY COMPUTER CENTER

UNIVERSITY OF MINNESOTA-TWIN CITIES

MINNEAPOLIS, MINNESOTA 55455

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## BULLETINS

↪ GENERAL USERS MEETING  
 Thursday, May 17  
 2:15 - 4:00 PM  
 Room 10 Blegen Hall, West Bank

The major topic at the General Users Meeting will be the new grants policy for research computing for 1979-80, as noted in Dr. Patton's article in this issue. Dr. F. Verbrugge, Director of University Computer Services, will present the details. It is very important that principal investigators attend this meeting. Please pass this message on to the principal investigators among your colleagues who may not see it.

↪ MEMORIAL DAY HOLIDAY HOURS

	down   up
	----- -----
Lauderdale	Sat May 26 1600   Mon May 28 1800
ExpEng	Fri May 25 2400   Mon May 28 1800

↪ TELEPHONE CONSULTING

STAT PACKAGES	376-5062	Mon-Fri	1:00- 2:00 PM
SIR	376-1761	Mon-Fri	10:00-11:00 AM
		Mon-Fri	1:00- 2:00 PM

## UCC newsletter

Volume 13                      Number 5                      May, 1979

Director: Peter C. Patton  
 Editor : Amy Koepke

Comments about the content of this newsletter, or suggestions for changes may be directed to the editor, 235a Experimental Engineering, 612/373-7744.

The University of Minnesota adheres to the principle that all persons shall have equal opportunity and access to facilities in any phase of University activity without regard to race, creed, color, sex, or national origin.

# computing grants

For years, the grants program for research computing has been based on the non-recurring Equipment Fund which the University has provided to University Computer Services. UCC received equipment at no cost to its own budget; in return, it provided an equivalent dollar value of computer services to research users. Over a twelve-year period, the Equipment Fund allotment has been steadily decreasing while the research computing grants, though oscillating, have shown an increasing pattern. As a result, a major change in the grants program is necessary, beginning July 1, 1979.

As has always been the case, first consideration will be given to the unsponsored user with small requirements. Second, since supplies costs are becoming increasingly difficult for some users to pay, the modified grants program will provide support for both computing costs and supplies costs for users with small requirements. Graduate student thesis-related accounts will receive grants on the same basis as small user accounts. the cost of supplies.

The modified grants program will have the following characteristics.

- . It would retain the basic principle that computing is an open resource, available to all. In fact, the aim would be that the approximately 1000 small research users who now receive a grant to cover 100% of their computing costs would continue to be so covered and would, in addition, receive support for the associated supply costs. There is \$60,000 to \$65,000 available for this program.
- . It would place a higher load on funded users who have been receiving grants. Grants for computer time will be available for these users. There will be a maximum grant, yet to be set, and the computer usage must be at least 50% user funded. There is \$60,000 to \$65,000 available for this program, and approximately 150 users in this category.
- . The grants program would combine support for computing costs and supplies costs for small users and graduate students. The limiting amounts will be set later.
- . A special grants program for large users is being reviewed by Central Administration. A final decision will be made as part of the budgeting process for the next academic year.

The new grants policy will be discussed at the May 10th UCS Advisory Committee meeting and at UCC's May 17 Users Meeting.

P.C. Patton, 373-4361

# equipment upgrade

We have requested and have received bids on hardware to upgrade our magnetic tape equipment on the Cyber systems. This upgrade will replace our existing 7-track tape equipment with new equipment, and augment our current 9-track tape equipment. The major reasons for this upgrade are:

1. Our current 7-track tape drives (model 607) and tape controllers are over 10 years old and are very expensive to maintain. Tape drives manufactured today are more reliable and not as "hard" on tapes.
2. 9-track tape usage has grown so rapidly that we now have barely sufficient numbers of 9-track tape drives and controllers to handle the current demand. The computer industry, in general, is moving more toward 9-track tape usage over 7-track, and our own experience reflects this trend.
3. Storage space for magnetic tapes is at a premium at our Lauderdale facility. The new 7- and 9-track tape drives, as well as the existing 9-track tape drives allow automatic threading from canisters that are 40% narrower and thus the current rack space can be condensed by this amount.

The upgrade will greatly enhance our 9-track capabilities. Besides increasing the number of 9-track tape drives and controllers, the upgrade will provide 6250 cpi (characters per inch) group coded recording capability in addition to our 1600 and 800 cpi recording modes. Newer and more reliable 7-track tape drives will also be part of this upgrade. The following table illustrates the current and proposed tape equipment configurations:

MACHINE	CURRENT		FUTURE	
	7-track	9-track	7-track	9-track
6400	607 (2)	-	-	669-4(2)
Cyber 172	(-)	669-4(3)	-	669-4(2)
Shared	607 (6)	-	677-3(3)	679-6(4)
Cyber 74	-	669-4(4)	-	669-4(3)

On the Cyber systems, the number of 9-track tape drives will increase from seven to nine, but four of these tape drives will be shared between both systems--allowing at least six 9-track drives on either system at any one time. The number of 7-track tape drives available to either system will decrease from six to three.

This tape equipment upgrade, together with the conversion to release 4 of NOS (level 485) next Fall will entail a number of changes:

1. The number of 7-track tape drives will decrease from six to three. Since over 60% of our tape usage is 9-track, most users will not be affected. We continue to encourage the use of 9-track tapes for new projects and as replacements for existing 7-track tapes. We are in the process of developing a tape conversion service for converting 7-track tapes to 9-track tapes for those wishing to switch to 9-track. Details for this service will be forthcoming later this quarter.

2. The new 7-track tape drives will be able to read, but not write, tapes written at 200 bpi (bits per inch). Normally, the only reason that tapes are written at 200 bpi is because the tape is of such poor quality that information cannot be written at a higher density. If the data is worth anything, it should be stored on a higher quality tape. You will still be able to read existing tapes recorded at 200 bpi.
3. Release 4 of the NOS operating system does not directly support tapes written in B, E, X, or SI coded formats. Instead, these tapes will have to be read or written with the COPY or TCOPY utilities. Therefore, you will have to access these tapes through these utilities or else use other formats. The COPY and TCOPY utilities are already available if you wish to experiment with them (they are documented in the NOS Version 1 reference manual, revision E or later).
4. A number of magnetic tape control statements will change under release 4 of NOS. The biggest change will occur with the RESOURC control statement, whereby resources will have to be specified by density (e.g., PE, HD, HY, etc.) rather than generic type (MT or NT). Also, the default tape type will change from MT to NT. This means that transient tape users will have to specify an MT parameter on the LABEL or REQUEST control statements if they wish to access 7-track tapes (currently, 9-track transient tape users must specify NT).

Manuals documenting the NOS operating system at release 4 are now available from the UCC Reference Room if you wish to examine them. In addition, our User Manual supplement, "Guide To Magnetic Tape Usage," is being updated to correspond to the NOS release 4 operating system and will be available before the actual conversion.

If you have any questions about the use of magnetic tapes under release 4 of NOS, or about changes you would like to see made to the "Guide To Magnetic Tape Usage," please give me a call.

J.J. Drummond, 376-5603

## archived files

Beginning with the May 1st archive of month-old files, a new utility called "ARCLIST" is being used in place of the AFLISTS writeups. ARCLIST is designed to make it easier to find out which files (if any) were archived to magnetic tape and then purged from disk.

You need now only issue the ARCLIST control statement from any batch job or interactive session on either Cyber machine (not from the MERITSS 6400, though). ARCLIST will report on the files archived on either Cyber machine. By default, only the files purged in the latest archive are listed, but a parameter (M=) allows up to the last 12 months to be listed.

This is the first step towards automating the procedure to reload these files. Articles in the upcoming months will be describing these new features as they become available.

For a document describing ARCLIST, use:

WRITEUP(ARCLIST)

or for more brief information:

WRITEUP(CONTROL=ARCLIST)

T.J. Hoffmann, 376-5262

## accounting records

At the request of users, UCC's Cyber Accounting Division will provide an automatic ACCSTAT after the last accounting run of each month. This brief report (no headings) would be retained as a private permanent file under the user's account number, using the account number as the file name on PN=SHA. Thus, a user with account number XYZ1234 could obtain the machine readable ACCSTAT report with this:

A(XYZ1234/PN=SHA)

Master users, with numbers such as XYZ123\*, would have both detail and summary reports recorded, with all \*s removed from the permanent file name.

If you want this type of report provided for you, send your request, in writing, to:

Quentin Roggenbuck  
University Computer Center  
212 Experimental Engineering  
University of Minnesota  
208 Union Street SE  
Minneapolis, Minnesota 55455

Please include your name, sponsor or business, and account number. Please DO NOT include your password. Your request must be signed. We suggest that you also get copies of these writeups:

WRITEUP(ACCSTAT)  
WRITEUP(ACCRATE)

WARNING: this procedure will be run every month, and the report produced will replace any existing permanent file with the same name on SHA under the user number. The user will bear all responsibility for the security and storage costs for the permanent file.

Q. Roggenbuck, 376-7256

## service contracts

UCC's Engineering Services division is in the process of sending out renewals for those of you who have service agreements on interactive terminals. If you have not received a renewal notice by May 15th, please call me at 376-8153 (mornings) or 373-4877 (afternoons).

Users of our service should also note that we have made some rate adjustments for the next fiscal year's service agreements.

D. Whealdon, 376-8153

## PDP communications

Since our first announcement, our communications package for the PDP-11 has been installed on many PDP-11s, ranging from the LSI (11/03) to the PDP-11/60. This package allows PDP-11 users to extend their capabilities by permitting them to access software and hardware resources of the Cyber systems.

Unlike some of the other emulation packages available, this one allows the user to route files to or from any system-supported device and to adjust the transmission so as not to exceed the capacity of the target device. The protocol used provides error recovery and ensures data integrity during transmission. The transmission rate is 2400 bits per second (300 characters per second).

The next release of this package will add PDP-11 standard compression (improves throughput and reduces storage requirements), binary file transfer, more operator command support, and will take advantage of the ability of the PDP-11 to communicate with other PDP-11s. For further information, please call

E. May, 376-5608

## ASCII symbols

A new record has been added to WRITEUP(ASCII). To see this information, use:

```
ASCII
WRITEUP(ASCII=SYMBOLS)
```

from your terminal, or add these statements:

```
WRITEUP(ASCII=SYMBOLS/L=xxx,PT=AS)
ROUTE,xxx,TID=ss,EC=A9,DC=PR)
```

to any batch job. (In this example, xxx is any file name and ss is the site code for the site where the printout will be produced. Do not print the output at a 1004 or 200UT site, since the writeup does contain lower case information.)

Since there are many varieties of keyboards available to interactive users, the one you own may not be fully ASCII compatible. As a result, we often are asked which character on a particular keyboard matches with a given ASCII character. This writeup is intended to help answer that question.

When listed at your terminal, each symbol on your terminal will be matched with the ASCII printer character as well as the Cyber display code. This will help you determine what to type in order to get a particular high speed printer graphic. Questions? Call

R.T. Franta, 376-3963

## SYSTEM 2000

We now have five new software products that were developed at Florida State University. They were designed to aid in the preparation of data for, and to facilitate the design and use of, a System 2000 data base. The products are:

### BUILDLS

A program to convert fixed-field data into a loader string suitable for System 2000.

### CLEAN

A program to check the validity of fixed-field data.

### S2KEST

A program to aid in the size estimation of a System 2000 data base.

### S2KNPUT

A system to do interactive data collection and verification, and to generate a System 2000 loader string.

### S2K control card

An operating system control card which allows the use of indirect access permanent files with System 2000 as well as all normal System 2000 control card parameters.

A short course on these aids will be offered on May 14th and 16th from 2:15 to 4:00 PM in room 211 Aero. For further information, please call

D. Katz, 373-4181

## SIR notes

SIR users are cautioned concerning the following two situations:

1. DISK RESTORE name,FILENAME=1fn,LOADING=n.  
The SIR manual, pages 3-4, states that the LOADING function, n, is a number between 0 and 1. This number, n, must be less than 1 and never equal to 1. The manual is in error. SIR, Inc. is aware of this error.
2. BMDP SAVEFILE.  
SIR was written to interface with the McDonnell Douglas version of BMDP. The SIR BMDP SAVEFILE is a non-Record Manager file. The UCC version of BMDP cannot read this file since the UCC version of BMDP expects W type Record Manager records. Users will need to format a file for BMDP using the WRITE command to create a summary file in the summary block for passing to BMDP.

J. Cosgrove, 376-1761

## hardware dividend

Those of you now using the Cyber 74/172 system should have received your Hardware Dividend from the University Computer Center. This dividend is a 2 1/4 inch x2 1/4 inch logic card encased, with a printed message, in a plastic container. This logic card is second generation and consists of individual transistors, diodes and resistors. Since these boards are visible, compared to the LSI and VLSI components of modern computers, we thought that those of you who have used our systems for the past 13 years would want a memento. The cards were taken from two 3256/501 line printers and a CDC 6638 disk system that had finished their life cycle. If we have omitted any deserving user, please send a postcard or note requesting the dividend, along with your name and address to:

Hardware Dividend  
University Computer Center  
227 Experimental Engineering  
University of Minnesota  
208 Union Street SE  
Minneapolis, Minnesota 55455

As long as our limited supply holds out, we will send one of the dividends to you.

L.A. Liddiard, 373-3529

## computer store

We have expanded the hours of operation for the Computer Store in an effort to offer better service to the user community. The new hours will be 9:00 AM - 11:00 AM and 1:00 PM - 3:00 PM, Monday through Friday. We hope that you will find these hours more convenient and would appreciate any comments regarding the store, positive or negative.

D. Whealdon, 373-4877

## current seminars

UCC Seminar  
IMPLEMENTING VERY LARGE PROGRAMS

Tuesday, May 22, 1979  
2:15 - 4:00 PM

Room 30 Architecture  
Presented by Steven A. Reisman

This seminar will cover techniques in implementing very large programs. That is, programs that process a huge amount of data which is kept in primary storage, or programs that are very complex with a quantity of executable code that cannot fit within the computer's available memory. The methods to be covered include ways to store data on mass storage devices, program overlaying and segmentation, and the use of available data base managers.

Quite a bit of material will be covered and we expect that attendees will be familiar with the NOS operating system and will have a working knowledge of a higher level language such as FORTRAN, COBOL, or Pascal.

## future seminars

In March, Dr. William R. Franta and I attended a Conference for Academic Computing Center Directors sponsored by IBM. We are attempting to get some of the speakers here this Spring and Fall. The speakers will address future directions in computing in general areas, and some IBM-specific areas. The series will probably begin with an orientation lecture on IBM hardware and systems and their evolution. Times, dates, and places will be announced later. This series will be co-sponsored by the Department of Computer Science and the University Computer Center.

R.L. Hotchkiss, 373-5756

## documentation

▷ The Minnesota Book Center in Williamson Hall has copies of the "SPSS Pocket Guide, Release 8" for sale. Release 8 is equivalent to SPSS Version 7.0.

▷ WRITEUP documents, new & revised after 01 April:

WRITEUP(AFLISTS) - archived permanent file lists.  
WRITEUP(ARCLIST) - archived file listing.  
WRITEUP(AROUTE) - print/plot files from 6400.  
WRITEUP(ASCII) - ASCII character set information.

WRITEUP(ASEND) - Move files from 6400 to Cyber.  
WRITEUP(BIGPROG) - Large program seminar information.

WRITEUP(CATLSYS) - Extended CATLIST utility.  
WRITEUP(CONSKED) - Consulting schedule.  
WRITEUP(NOTEINF) - User guide to NOTICE/NOTIFY.  
WRITEUP(PTRFORT) - Known MNF/FTN bugs.  
WRITEUP(PTRMISC) - Miscellaneous software bugs.  
WRITEUP(PTRM77) - ANSI 77 STANDARD FORTRAN bugs.  
WRITEUP(PTRNOS) - Known NOS system bugs.

▷ New & revised printed documents:

Brief Guide to SORT/MERGE - a 1-page guide with some hints for using SORT/MERGE, prepared by P. Voxland of SSRFC. Pick up a copy in Room 140 ExpEng.

System 2000 User Aid # 7 - Report Writer Owncode Exits: pick up a copy in Room 140 ExpEng.

MINN Subprogram writeups (revisions):

AITKENF, AMEAN, BANSOL, BESJ, BINCOF, CDFN, CINTEG, CMXCMBN, CONVERT, DOTPROD, EI, EIG3, FREQDSN, GAMMA, GAMMAF, GENSORT, GENREAD, GRIDIT, ICOUNT, ISERCH, LINT, LRSHT, LSQORPY, MXCMBN, MXLNEQ, MXTRIDI, MXTRP1, NONLIN, NUMARG, ORTHON2, PLOT3D, PLROOT1, PLTSCL, QRCMLPX, QRSYM, QSORT, RAN2F, RK, RKGILL, ROM1F, ROOT1, RVAL, RVECT, SCLPLT, SICI, SIMPSON, SNCNDN, SYMINV, SYMSOLV, TTEST, XCEINT1, XINT  
(All have been reviewed and revised since July 1, 1978: pick up copies in 140 ExpEng.)

▷ Newsletter For Computing in the Humanities -- a new letter, directed at those of you in the Arts and Humanities: want a subscription? call 373-7744.

# the suggestion box

WHEN A SKIPF OR SKIPEI CARD IS ENCOUNTERED, THE SYSTEM SHOULD COME BACK WITH THE NUMBER OF FILES SKIPPED SO THAT A USER WHO IS WRITING A TAPE WITH REPEATED JOBS CAN TELL HOW FAR DOWN THE TAPE HE IS AND CHECK IF ALL FILES ARE THERE. IN CASE OF OVERWRITES, THIS COULD HELP IN RECOVERING THE DATA, TOO.

I.N.:02APR79

All of these things are possible on magnetic tape files. The tape processing routines know how many tape blocks have been skipped and how many files have been skipped. These changes would not be trivial, however, and we have no plans to implement them. For consistency, one might like the same output for mass storage files. This could not be done very well for SKIPEI, since the positioning of a disk file at EOI is done by changing disk pointers, without actually reading along the file.

K. Matthews

WHY IS THERE NO PUBLICIZED WAY TO WRITE AN ANSI STANDARD UPPER AND LOWER CASE TAPE?

M.M.:12APR79

Because there is no publicized program to do it. One UCC staff member is currently working on a tape utility which may do this. It is still in the experimental planning stage, with no predictions as to a completion date.

K. Matthews

PLEASE MAKE THE PURGE COMMAND ECHO FILENAME PURGED. THIS IS ESPECIALLY IMPORTANT FOR TIMESHARING WHEN A TRANSMISSION ERROR MIGHT CAUSE THE WRONG FILE TO BE PURGED. IT IS ALSO NICE IN BATCH FOR PEOPLE WHO PREFER TO WORK IN A CLOSED LOOP MANNER.

B.D.:02MAR79

If the file you attempt to purge is not present, the message "filename NOT FOUND" is returned to the terminal. If the file you purge is present, but not the one you hoped to purge, this message will not be found. If you want to be sure that the system is planning on purging the file you intend, I suggest running in full duplex mode. In this mode, the computer sends back each character you type in. Then you can check whether the machine is receiving the character you type. To run in full duplex mode, the full/half switch on your terminal and modem should be set to full. The command, FULL, should be entered after you log in.

K. Matthews

I FIND IT APPALLING THAT THERE IS NO WAY TO FIND OUT IF A DELAYED JOB HAS BEEN READ CORRECTLY FROM AN OPEN SHOP TERMINAL AND IS IN THE INPUT QUEUE, SAVE BY CALLING THE HELP LINE. THE ENQUIRE(JN) CARD ONLY WORKS APPARENTLY IF YOUR JOB NAME IS THE HASH OF YOUR JOB NUMBER, WHICH DEFEATS THE PURPOSE OF USING DIFFERENT JOB NAMES FOR DIFFERENT SORTS OF JOBS. I WOULD SUGGEST EITHER LET ENQUIRE GIVE THE STATUS OF JOBS WHOSE JOB NAME IS THE SAME AS THE JOB NAME OF THE ENQUIRE JOB OR HAVE DELAYED JOBS PRODUCE OUTPUT ACKNOWLEDGING ACCEPTANCE OF DELAYED JOBS.

R.L.:01MAR79

REINSTATE AUTOMATIC DIVERT LIMITS.

E.S.:20APR79

WHEN I ROUTE A FILE TO A PRINT QUEUE FROM A TERMINAL, THE ASSIGNED JOB NUMBER IS NOT DISPLAYED, MAKING INQUIRY ON BIN LOCATION IMPOSSIBLE OR DIFFICULT. HOW ABOUT EITHER AUTOMATIC OR OPTIONAL DISPLAY OF JN ALONG WITH "ROUTE COMPLETED" MESSAGE?

R.T.:22MAR79

We modify the CDC operating system in many ways, with the hope of serving our users. The area of input/output queues is one of the most heavily modified. This is because our user community expects many more features than CDC provides in the queue area. The system RJE programs (SUPIO for the medium speed terminals, EXPORT for the high speed stations) are UCC productions and not really supported by CDC.

When the Cyber 172 was acquired last spring, major changes in the operating system queues were required. The stock CDC system supported shared permanent files between mainframes, but no shared I/O queue facilities. Our modifications allow jobs from the 74 to go to the 172 and vice-versa, and allow all the output to be processed on the 74 for final printing, punching, or plotting. We feel that there was a good reason for making these changes.

We also try to update our operating systems to be current with the latest CDC releases. We converted from KRONOS to NOS release 3 last August. We are converting from NOS release 3 to NOS release 4 this coming August. This is a very lengthy process. All of our modifications to the operating system must be inserted into the next version, and checked out again. Conflicts with CDC changes must be resolved. This affects, of course, the I/O queue area since we have so many modifications, and since these are the areas in which CDC is also changing the operating system heavily.

All of this raving boils down to this. It is hard to provide all the features we all recognize as helpful at the same time we are keeping current with CDC and while trying to maintain a stable operating system. We do, in fact, make progress. To progress faster would require a larger system programming staff which would have to raise overall costs. Now, let me address the specific requests.

We decided to implement a delay input queue. The choices were to implement it immediately, with many features missing, or to implement it later when better queue utilities were developed. Our decision to implement it immediately was made. Powerful and general queue utilities are still in the works. As you mention, if the job name were the hash of your user number, the E(JN) feature would tell you something. In the stock CDC system, the jobname is always based on the user number. We changed this when CDC began the job naming convention. The change was made in response to user requests.

(Continued on page 44)

PRODUCTION USAGE SUMMARIES: Cyber 74/172

	Cyber 74/172 March, 1979	Cyber 74 March, 1978
System resource units (SRU)	1,294,788 (1,657,584)	-
Batch jobs and MIRJE sessions	113,681 ( 124,755)	102,218 ( 114,767)
Central processor hours inc. DELAY	207/109 ( 235/205)	214 ( 273)
DELAY queue processor hours	72/16 ( 76/28 )	65 ( 72)
MIRJE terminal hours	12,528 ( 14,621)	9,326 ( 11,727)
Mass storage transfers (KPR)	418,478 ( 510,246)	267,373 ( 343,977)
Magnetic tape transfers (KPR)	8,640 ( 13,229)	6,607 ( 9,188)
Pages printed, charged from UCC	998,230 (1,117,606)	1,029,576 (1,139,764)
Cards punched	391,617 ( 576,085)	421,990 ( 495,294)
Microfilm frames produced	24,381 ( 411,867)	18,812 ( 316,504)
Status plotting production (feet)	9,376	7,705
Tapes mounted	13,629	10,454
Average file storage (char)	2,203.6 million	1,456.4 million
Mean time between failures	107.2/76.6 hours	23.3 hours
Available during scheduled hours	99.7/99.7 percent	97.2 percent
SUPIO uptime during available hours	96.8 percent	97.9 percent

(totals in parentheses include staff development, accounting, and maintenance runs)

DOWNTIME SUMMARY: April, 1979 (Column 1, Cyber 74 : Column 2, Cyber 172)

	0800-1800 M-F		other		total	
Total possible scheduled uptime hours	210.0	210.0	298.0	298.0	508.0	508.0
Total downtime hours (see Schedule A)	2.3	1.2	6.3	0.2	8.6	1.4
Total uptime hours	207.7	208.8	291.7	297.8	499.4	506.6
Uptime (percent)	98.9	99.4	97.9	99.9	98.3	99.7
Average downtime per occurrence (min)	27.6	34.5	126.0	5.5	64.5	20.0
Mean time between failures (hours)	42.0	105.0	99.3	149.0	63.5	127.0
Subsystem failures						
SUPIO	5	-	1	-	6	-
TELEX	1	0	0	0	1	0
EXPORT	3	-	0	-	3	-

Schedule A: downtime hours

	Number		Total hours		Average minutes	
(1) Preventive maintenance over-runs	0	0	0.0	0.0	0.0	0.0
(2) Software related problems	3	2	3.5	0.2	70.0	5.0
(3) Hardware related problems	3	1	4.3	0.1	85.3	8.0
(4) Indeterminate problems	0	0	0.0	0.0	0.0	0.0
(5) External Problems	2	1	0.8	1.0	25.0	62.0

SUBMISSION SITE USAGE SUMMARY (TELEX EXCLUDED): April, 1979

submitted from	total jobs	%	pages printed	%	cards read	%
Lauderdale	3,013	3.5	484,285	33.4	1,660,598	14.8
ExpEng	6,900	8.0	233,595	16.1	1,719,055	15.3
West Bank	9,252	10.7	111,978	7.7	1,373,419	12.2
6400	284	0.3				
SUBMIT jobs	13,895	16.1				
SUPIO	53,147	61.4	621,665	42.8	6,469,458	57.6
TOTALS	86,491		1,451,523		11,222,530	

PRODUCTION USAGE SUMMARIES: CDC 6400

	March, 1979	March, 1978
Number of jobs run	192,115	146,385
Central processor hours	193	153
MERITSS terminal hours	24,293	20,780
Number of terminal sessions	44,296	41,063
Maximum number of simultaneous users	129	120
Average file storage (char)	353.6 million	266.0 million
Mean time between failures	123.9 hours	40.3 hours
Available during scheduled hours	99.7 percent	97.1 percent

# from our users

## LABORATORY TEST RESULTS

by

Professor Russell K. Hobbie  
School of Physics and Astronomy

About ten years ago, I happened to meet a pathologist, Dr. Richard Reece, at a party. We got to discussing the possible uses of computers in the medical laboratory and have been collaborating ever since. I have been asked to describe the results of our work for you.

We have developed a program for reporting back to physicians the test results on specimens which they send to the laboratory. The report contains:

1. Calculation of derived values from the raw test results.
2. Comparison of the results with normal values which may depend on the age or sex of the patient, or on whether the patient is walking around or is confined to bed.
3. Standard comments about certain features of the test results.
4. A list of diagnostic possibilities based on the results. These are intended to serve as a reminder to the patient's physician.
5. Suggestions for followup tests to pinpoint the cause of whatever tests may be abnormal.

A sample report is shown below. The reporting system has grown from a single program dealing with 12 tests to a package of a dozen programs which report over 300 different possible tests and which also capture billing and quality control information for the laboratory. Data entry began with cards for a few patients a day and now consists of an on-line data gathering system for several hundred patients per day.

Data are collected by a commercial system ("LDM" System, Technicon T&T Corporation, Madison, Wisconsin). A PDP-11/03 serves as a remote batch terminal to send the captured data to the Cyber 74 and print results. Batch jobs are run several times a day.

We have made studies of physician acceptance of such reports, of the patterns of abnormal results associated with various diseases, and of the relative accuracy of different methods of generating the list of diagnostic possibilities. These have all been reported in the literature (see below), and I would be glad to discuss them with anyone who is interested.

Beware of parties: some of them never end.

### REFERENCES

- R.K. Hobbie and R.L. Reece. Computer interpretation of laboratory test results. Federation Proceedings 34:2152-2157, 1975.
- R.L. Reece and R.K. Hobbie. The use of a computer to issue interpretive reports: do clinicians find this form of reporting useful? In D.E. Young, et al., eds. Clinician and Chemist. Washington, Amer. Assoc. Clinical Chemistry, 1979, pp. 322-333.
- R.K. Hobbie and R.L. Reece. A computer reporting and interpretation system: acceptance and accuracy. in E.S. Benson and M. Rubin, eds. Logic and Economics of Clinical Laboratory use. Elsevier-North Holland, 1978. pp. 163-172.



8- 1-75

S N 142

AGE 19 MALE WALKING

DR

NORMAL TESTS	VALUE		NORMAL RANGE FOR AGE, SEX, POSTURE	
CALCIUM	8.9	MG/DL	8.6 - 10.5	
ION. CALCIUM (EST.)	3.9	MG/DL	3.8 - 4.8	
PHOSPHORUS	3.0	MG/DL	2.3 - 4.9	
GLUCOSE	90.	MG/DL	64. - 107.	
TOTAL PROTEIN	8.0	G/DL	6.4 - 8.0	
ALBUMIN	3.8	G/DL	3.4 - 5.0	
A/G RATIO	.9/1		.9 - 2.1	
URIC ACID	7.6	MG/DL	3.8 - 8.2	
CHOLESTEROL	163.	MG/DL	105. - 244.	
BUN	11.0	MG/DL	7.0 - 20.0	

  

ABNORMAL TESTS	VALUE		NORMAL RANGE	ST DEV BEYOND NORMAL LIMIT
HIGH SGOT (AST)	294.	U/L	3. - 44.	25
HIGH BILIRUBIN (TOTAL)	5.1	MG/DL	.1 - 1.2	15
HIGH LDH (LD)	454.	U/L	86. - 196.	10
HIGH ALK PTASE	240.	U/L	23. - 150.	3
HIGH GLOBULIN	4.2	G/DL	2.0 - 3.6	2

AN ALKALINE PHOSPHATASE IN THIS RANGE MAY BE DUE TO BONE GROWTH.

POSSIBILITIES	55
INFECTIOUS MONONUCLEOSIS HIGH: GLOBULIN BILIRUBIN LDH (LD) SGOT (AST) ALK PTASE	55
ACUTE OR CHRONIC VIRAL HEPATITIS HIGH: GLOBULIN BILIRUBIN LDH (LD) SGOT (AST) ALK PTASE	55
LIVER DISEASE (EG FATTY METAMORPHOSIS) HIGH: GLOBULIN BILIRUBIN LDH (LD) SGOT (AST) ALK PTASE	55
COLLAGEN DISEA. ESPECL LUPUS AND LUPUS HEPATITIS HIGH: GLOBULIN BILIRUBIN LDH (LD) SGOT (AST) ALK PTASE	55
CIRRHOSIS HIGH: GLOBULIN BILIRUBIN LDH (LD) SGOT (AST) ALK PTASE	55
OBSTRUCTION OF COMMON DUCT BY STONE OR TUMOR HIGH: GLOBULIN BILIRUBIN LDH (LD) SGOT (AST) ALK PTASE	55

POSSIBILITIES BASED SOLELY ON CHEMISTRY TESTS. LIST MAY NOT BE COMPLETE.

## SAMPLE REPORT

SUMMER 1977

UNIVERSITY COMPUTER CENTER SHORT COURSES

SUMMER 1979

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
June 18 Computing: What is it? Intro to System 2000	19 Computing: What is it? SIR	20 Computing: What is it? Intro to System 2000	21 Computing: What is it? SIR	22 Introduction to UCC Intro to System 2000
25 Intro to System 2000	26 SIR	27 Intro to System 2000	28 SIR	29 Intro to System 2000
July 2 System 2000/RW	3 System 2000/RW	4 INDEPENDENCE DAY HOLIDAY	5 System 2000/RW	6
9 SPSS(beginners)	10	11 SPSS(intermediates I)	12	13 End SS I SPSS(intermediates II)
16 Begin SS II	17	18 XEDIT	19 XEDIT	20 XEDIT
23 System 2000/PLI NOS Control Statements	24 Beginning FORTRAN (n)	25 System 2000/PLI NOS Control Statements	26 Beginning FORTRAN (n)	27 System 2000/PLI NOS Control Statements
30 NOS Control Statements	31 Beginning FORTRAN (n)	1 August NOS Control Statements	2 Beginning FORTRAN (n)	3 NOS Control Statements
6 NOS Control Statements	7	8 NOS Control Statements	9	10 NOS Control Language
13 Intro. to Timesharing	14 Beginning FORTRAN (n)	15 Intro. to Timesharing	16 Beginning FORTRAN (n)	17 End SS II
20	21 Input/Output in FORTRAN	22	23	24

University Summer Session I begins 12 June (t), ends 13 July (f) and  
 Summer Session II begins 17 July (t), ends 17 August (f).  
 Computing: What is it?.....: 3:15-5pm, Jun 18-21 (mtwth),, LF/SG  
 Introduction to UCC.....: 2:15-4pm, Jun 22 (f),, RTF  
 Introduction to System 2000.: 2:15-4pm, Jun 18-29 (mwf),, JCC  
 Scientific Info. Retrieval...: 2:15-4pm, Jun 19-28 (tth),, JCC  
 System 2000/RW.....: 2:15-4pm, Jul 2-5 (mtth),, JCC  
 SPSS (computer & SPSS begin): 2:15-4pm, jul 9 (m),, BH  
 SPSS (SPSS intermediates)...: 2:15-4pm, jul 11-13 (wf),, BH  
 XEDIT.....: 2:15-4pm, jul 18-20 (wthf),, PG  
 System 2000/PLI.....: 2:15-4pm, jul 23-27 (mwf),, SPN  
 NOS Control Statements.....: 2:15-4pm, jul 23-aug 8 (mwf),, RTF  
 Beginning FORTRAN.....: 6:15-8pm, jul 24-Aug 16 (tth),, RTF  
 NOS Control Language.....: 2:15-4pm, Aug 10 (f),, RTF  
 Introduction to Timesharing.: 2:15-4pm, Aug 13-15 (tth),, RTF  
 Input/Output in FORTRAN.....: 6:15-8pm, Aug 21 (t),, RTF

These short courses are offered by the University Computer Center.

They are free & require no registration.

For more information, please call Lincoln Fetcher (376-1637) or see WRITEUP, CLASSES.

\* Lauderdale Conference Room  
 Lauderdale Computer Site  
 2520 Broadway Drive  
 Lauderdale, Mn

\$ NOTE: Dollar sign (\$) indicates a change in the schedule since its first publication.

July 4 is a University holiday, therefore no classes will be held.



The divert limits which we had installed in KRONOS were never converted to NOS at release 3. The earliest that they could be installed now would be in release 4. The routines in which the divert limit code had originally been were completely re-done when we went to NOS. Either a re-design of our divert process or a re-design of the CDC program will be required. This will be done in the 79-80 school year unless too much time is taken up during that period converting from release 4 to release 5; a real possibility.

The job name for print jobs routed from a timesharing terminal is based on the four character job hash. This hash is constant for a given user number. So, if you log in on one number, and stay on that number, your routed outputs will have that hash as the first four characters. Your routed output will be found in Experimental Engineering, filed under those characters.

The general case is much more complicated. You can switch user numbers. You can ROUTE files from a batch card deck or from a SUBMIT job. A general message of the form

filename IN PRINT QUEUE, PRUS = nnnn.

is probably the best solution. This would clearly identify the queue file name, confirm that the file went into the proper queue, and give the file length in PRUs. This kind of proposal is on our list of things that ought to be done.

K. Matthews

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LATE NOTE:

*A meeting to discuss the formation of a USER GROUP for Arts & Humanities users  
Thursday, May 24  
3:15 - 5:00 PM  
Room 102 Folwell Hall*

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RETURN TO:

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

UNIVERSITY ARCHIVES  
11 WALTER LIBRARY  
UNIVERSITY OF MINNESOTA  
EAST BANK  
117 PLEASANT STREET SE  
MINNEAPOLIS MN 55455