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Director: Peter C. Patton
Editor : Naomi Miner

Comments about the content of this newsletter, or suggestions for changes may be directed to the editor, 235a Experimental Engineering, or call 612/376-4668.

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, national origin or handicap.

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tests of standard FORTRAN functions - part two

Last month in part one of this article I discussed tests of standard FORTRAN REAL and DOUBLE PRECISION functions. You may want to refer to that article for definitions of relative error and root mean square error as methods of measuring accuracy of FORTRAN functions. This month I will analyze the COMPLEX functions available on M77, FTN4.7 and MNF.

the COMPLEX function

There are only seven (six standard) COMPLEX FORTRAN functions compared to 14 REAL and DOUBLE functions. However, the analyst of compiler accuracy of COMPLEX functions must examine two variables rather than one. These two variables are usually described as the real and imaginary parts of the equation:

$$z = x + iy$$

COMPLEX functions are composite functions made from the elementary building block functions ATAN2, COS, COSH, EXP, LOG, SIN, SINH and SQRT. For example, the composite equation for COMPLEX exponential is:

$$CEXP(Z) = EXP(X) * COS(Y) + i*EXP(X)*SIN(Y).$$

To implement this function efficiently we would need a function that would supply both COS(Y) and SIN(Y) for a given Y. This is also true for CSIN and CCOS which in addition require a function supplying COSH(X) and SINH(X) for a given X. The CABS, CLOG, CLOG10, CSQRT functions require an efficient evaluation of the equation

$$r = \text{abs}(\max) * \text{SQRT}(1 + (\min/\max)**2)$$

where max is max(X,Y) and min is min(X,Y). Finally, efficient calling of composite functions coupled with their accurate integration will produce fast and robust COMPLEX functions.

accuracy measurements

The table accompanying this article uses the maximum relative error measure, described in last month's article, to illustrate the accuracy of the COMPLEX FORTRAN functions on our standard compilers. All the accuracy and timing measurements given in this table were taken from uniform varying arguments in the unit square, that is

$$-1 \leq X \leq 1 \text{ and } -1 \leq Y \leq 1$$

I have included figures for MNF in addition to presenting figures for FTN4.7 and M77 routines. If you compare these figures, you will note the improved accuracy and speed of the new M77 routines. These new routines have smaller maximum errors and on the average take 25% and 10% less execution time on the Cyber 74 and Cyber 172 respectively. The decreased time for the Cyber 74 compared to the Cyber 172 is due to use of the 74's simultaneous instruction execution. The Cyber 74 has 10 independent instruction execution units, whereas the Cyber 172 must complete one instruction before going on to the next. The ratios of the execution time for the function given in the table of the Cyber 172 to the Cyber 74 are 2.80 for MNF, 2.68 for FTN4.7 and 3.44 for M77, all above the ratio of 2.06 we use for accounting purposes.

Next month in the final installment of this article I will discuss relative error and timing for the REAL functions.

L. A. Liddiard, 373-2539

Complex vs. Double Complex Routines				Complex Function Timing						
Maximum Relative Error *10**15				in microseconds						
		MNF	FTN4.7	M77	Cyber 74			Cyber 172		
					MNF	FTN4.7	M77	MNF	FTN4.7	M77
CABS	R	- 9.4, 5.0	- 9.6, 4.2	- 7.3, 7.0	32.6	33.9	22.4	64.0	64.0	55.6
	I									
CCOS	R	-12.2, 8.1	-13.9, 10.2	-10.2, 6.4	73.5	82.5	58.9	238.4	248.2	229.9
	I	-10.4, 10.3	- 8.7, 8.0	- 7.7, 7.8						
CEXP	R	-13.2, 7.9	-11.9, 7.6	- 8.7, 5.9	59.8	61.6	50.8	198.4	198.9	191.2
	I	- 9.0, 9.4	- 9.7, 8.6	- 6.6, 8.4						
CLOG	R	-42.5, 22.2	-26.5, 15.0	-28.2, 22.3	93.7	93.3	69.5	230.5	230.5	230.3
	I	- 9.0, 8.0	- 7.6, 7.8	- 9.0, 8.0						
CLOG10	R			-16.6, 12.7			71.2			233.5
	I			- 9.0, 8.1						
CSIN	R	-23.6, 23.6	-23.8, 23.8	- 9.0, 13.2	73.3	79.7	59.7	238.9	243.8	227.8
	I	-20.8, 22.5	-23.6, 15.1	-11.5, 10.7						
CSQRT	R	- 5.3, 4.4	- 6.4, 4.7	- 5.1, 4.8	72.1	68.4	40.6	163.0	139.8	104.4
	I	- 5.4, 7.1	- 6.3, 5.2	- 5.5, 4.9						

I = Imaginary
R = Real

HOLIDAY HOURS

	-----DOWN-----	-----UP-----
Lauderdale	1600 Wed (24 Dec)	0800 Fri (26 Dec)
	1745 Fri (26 Dec)	0800 Sat (27 Dec)
	1730 Wed (31 Dec)	0800 Fri (2 Jan)
Experimental Engineering	2400 Tue (23 Dec)	0800 Mon (29 Dec)
	1600 Wed (31 Dec)	0800 Fri (2 Jan)

This is a change from the holiday schedule printed in the December issue of the UCC Newsletter.

holiday hours

Christmas

	Down	Up
Laud	0400 12-24 (Wed)	1600 12-28 (Sun)
Exp	2400 12-23 (Tues)	0800 12-29 (Mon)

New Year's

	Down	Up
Laud	1730 12-31 (Wed)	0800 1-2 (Fri)
Exp	1600 12-31 (Wed)	0800 1-2 (Fri)

bulletin

On January 1, 1981 we will again reduce our rates for mass storage use. We will decrease our charges by 16% from \$0.024 KSH to \$0.020 KSH. Since we average 545 user hours per month, this reduction will translate into a cost of approximately \$17.00 per month per million characters of mass storage.

software costs

With the cost of software development and maintenance increasing in proportion to overall computing costs, it has become necessary for us to recoup some of these software development costs. As a result, a new pricing policy for software was initiated on August 15, 1980. As of that date, we no longer furnish software to any user or organization free of charge. Most of our software will be sold without provision for maintenance. Customers can, however, purchase maintenance for M77, MNF and XEDIT for an annual fee.

We offer software in four classifications:

1. Compilers and Editors (e.g., M77)
2. Utilities (e.g., ARCHIVE)
3. Libraries (e.g., MINNLIB)
4. System features and enhancements (e.g., EXAMINE)

For information concerning fees for frequently requested software, see WRITEUP(SWPRICE). If you have further questions call

R. Stille, 376-2943
S. Nachtsheim, 373-7878

S2000

The System 2000 Data Base Management System (DBMS) user's group will hold a meeting Thursday, December 18 at 2:30 PM in 45 Law. Since the group has not met for several months, the major purpose of the meeting will be to reorganize the group and elect new officers. The group is open to anyone interested in data base management. We encourage new users to attend.

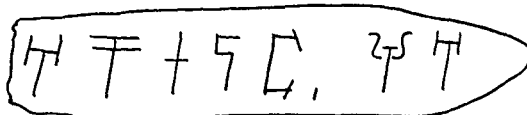
John Proshek of the Minnesota Human Rights Department will give a presentation on data base applications that use System 2000. A discussion of problems affecting DBMS users will follow the presentation.

Direct any questions about the group to Elaine Tourville, Minnesota Department of Natural Resources, Division of Waters, 296-1423.

SIR

Anyone interested in starting a SIR users group should drop a note to

Lois Geer
Department of Sociology
1114 Social Science Building
267 19th Avenue South
Minneapolis, Minnesota 55455



humanities news

You may now purchase our User's Manual supplement, Guide to Computing in the Humanities, at our Computer Store (211 ExpEng) or in Williamson Hall bookstore. The price is \$3.35 plus tax. We recommend this Guide for humanities researchers and for others interested in, or just beginning to use the computer. The Guide explains common computer jargon and gives examples of computer applications in humanities projects.

We have also recently published a new Brief, entitled Humanities Computing Services, that outlines the consulting assistance available for all humanities faculty and students. The Brief also contains information on various associations for computing in the humanities, and on some application packages of interest to humanities researchers.

We are planning weekly demonstrations of the Terak microcomputer for those interested in using it for research or text processing. These demonstrations will be held in 304a Folwell, and the time and date will be posted on the door. For more information, call

V. Walsh, 373-5780

humanities lecture

Tuesday, January 13, 1981, Dr. Peter Patton will address the Humanities User Group at 3:30 PM in 107 Folwell. His topic will center on the forthcoming book, Computing in the Humanities, edited by P. C. Patton and Renee Holoein. The public is welcome.

P. Staneslow, 373-7827

TSP

We have installed Version 3.4C of TSP, Time Series Processor on our Cyber systems. New features include dynamic allocation of memory at run-time, hashed table look-up, 80 column print option, improved error trapping, support for a data base, tracing, a random number generator, and a normal distribution generator. Please see the Time Series Processor Version 3.4 manual on reserve in our Reference Room. Questions/problems? Call

J. Woolsey, 376-5262

editor's note

The following article was submitted by Professor P. Hodge and by P. Tait of the Aero Engineering Department. We welcome your submissions. Our deadline is the 15th of the month for publication in the next month's issue.

BEAMPLT

We have written a FORTRAN computer program for finding the collapse load of transversely loaded structural grids. A grid consists of two sets of parallel beams at right angles to each other, and a set of transverse loads applied to the nodes where two beams intersect. The objective is to find the maximum safety factor of the grid, defined as that multiplier of the given loads such that the grid will just collapse under the loads but will support any smaller multiplier of the loads.

The program BEAMPLT solves this problem by expressing it as a linear programming problem and calling on Professor P. Hoffmann's program LPKODE to solve it. A driver program PATIE ties in the programs used in the solution process.

PATIE is designed for interactive use, but may be used through batch. As soon as PATIE has been called, it will ask for necessary information with self-explanatory questions. Basically, this information must define the size and spacing of the grid, the boundary conditions, the loads, the values of the yield moments, and the symmetries.

A detailed writeup is being prepared and should be available in the near future. For further information see

P. Tait, Aero Engineering
P. Hodge, Aero Engineering

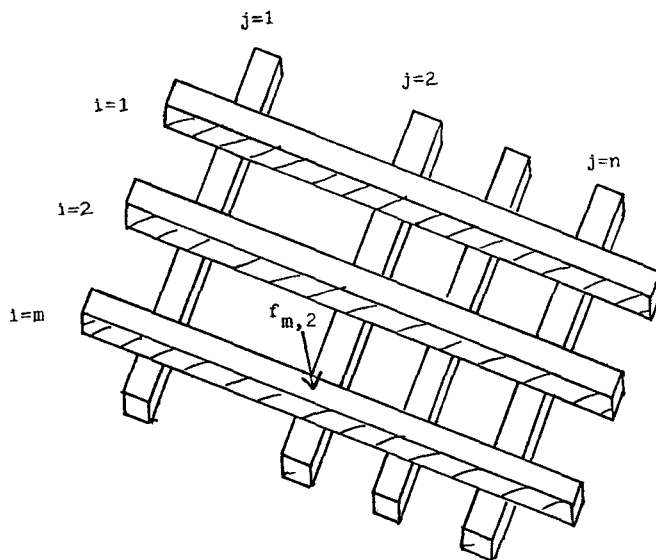
for sale

Apple Clock, \$160.00 (negotiable). Call Jayne Grady, 376-2940 for details.

Data General NOVA 2/10 with the following features:

- 32k x 16 bit main memory
- Diablo model 30 removable cartridge disk drive
- Console serial I/O port
- Centronics parallel printer interface
- General purpose 16 bit I/O port
- Real time clock
- Tektronix 4501 scan converter and interface
- RDOS real time multitasking operating system
- ALGOL, FORTRAN, BASIC, and assembler
- Miscellaneous software
- Documentation

For further information call Stephen Tursich, 376-7125.



Generic grid. (P. Tait and P. Hodge)

1981 UCC Extension Courses

These classes are offered through University of Minnesota Continuing Education and Extension (CEE). You may obtain more information and registration materials by calling (612) 373-3195 or by going to 101 Westbrook Hall, U of M Minneapolis campus.

quarter	w s	class; cost	dates (days), times, location
CEE course number			
* PIC 0811		Computing: What is it?; \$24..	6 Jan - 15 Jan (tth), 7:15-9pm, Arch 15.
* PIC 0812		Intro. to Computers; \$12.....	26 Jan - 2 Feb (m), 6:30-8:30pm, Ramsey HS 253 Roseville
* * PIC 0821		Introduction to UCC; \$6.....	14 Jan (w), 6:15-8pm, Arch 15. 8 Apr (w), 6:15-8pm, Arch 15.
* * PIC 0818		Intro to Microcomputers; \$12.	26 Jan - 29 Jan (mth), 7:15-9pm, Arch 15. 11 May - 14 May (mth), 7:15-9pm, Arch 15.
* PIC 0822		NOS (for beginners); \$24.....	14 Apr - 23 Apr (tth), 6:15-8pm, Aero 225.
* PIC 0824		Interactive System Commds; \$6	21 Jan (w), 6:15-8pm, Aero 211.
* PIC 0825		Batch Introduction; \$6.....	20 Jan (t), 6:15-8pm, Aero 225.
* PIC 0813		Programming: It's all in how you do it; \$48.....	20 Jan - 12 Feb (tth), 7:15-9pm, Arch 20.
* PIC 0815		COBOL; \$48.....	26 Jan - 23 Feb (mw), 7:15-9pm, Arch 20.
* PIC 0823		NOS (specialized topics); \$18	12 Jan - 22 Jan (mth), 6:15-8pm, Aero 225.
* * PIC 0820		Using Micros (AppleII); \$24..	2 Feb - 2 Mar (m), 7:15-9pm, Arch 15. 19 May - 9 Jun (t), 7:15-9pm, Arch 20.
* * PIC 0819		Using Micros (TERAK); \$24....	5 Feb - 26 Feb (th), 7:15-9pm, Arch 30. 21 May - 11 Jun (th), 7:15-9pm, Arch 30.
* PIC 0817		Beginning FORTRAN; \$48.....	20 Jan - 12 Feb (tth), 6:15-8pm, Aero 211.
* PIC 0814		Pascal for Programmers; \$48..	13 Apr - 6 May (mw), 7:15-9pm, Arch 20.
* PIC 0816		Advanced COBOL \$48.....	27 Apr - 20 May (mw), 7:15-9pm, Aero 211.

Note: No classes held on 16 February 1981 (m) because of University holiday.

University Computer Center Short Courses

Winter 1981

Winter 1981

Monday	Tuesday	Wednesday	Thursday	Friday
January 5	6	7	8	9
	<u>Computing: What Is It?*</u>		<u>Computing: What Is It?*</u>	
<u>Computing: What Is It?</u> 12	<u>Computing: What Is It?</u> 13	<u>Computing: What Is It?</u> 14	<u>Computing: What Is It?</u> 15	16
<u>NOS (specialized topics)*</u>	<u>Computing: What Is It?*</u>	<u>Introduction to UCC*</u>	<u>Computing: What Is It?*</u> <u>NOS (specialized topics)*</u>	
<u>NOS (System configuration)</u> 19	<u>Introduction to UCC</u> 20	<u>NOS (files/jobs)</u> 21	22	<u>NOS (files/jobs)</u> 23
<u>NOS (Special topics)*</u>	<u>Programming: How You Do It*</u> <u>Batch Introduction*</u> <u>Beginning FORTRAN*</u>	<u>Interactive Sys. Commands*</u>	<u>NOS (Special topics)*</u> <u>Programming:How You Do It*</u> <u>Beginning FORTRAN*</u>	
<u>NOS (permanent files)</u> <u>Pascal for Programmers</u> <u>Comparing DBMS</u> <u>SPSS (basics)</u> 26	<u>Microcomputing</u> 27 <u>Interactive Sys. Commands</u> <u>SPSS (data manipulation)</u>	<u>NOS (program execution)</u> 28 <u>Pascal for Programmers</u> <u>Intro to System 2000</u> <u>SPSS (files)</u>	29	<u>NOS (Intro to tapes)</u> 30 <u>Pascal for Programmers</u> <u>Intro to System 2000</u> <u>SPSS (On-Line)</u>
<u>Intro to Computers*(Ramsey)</u> <u>Intro to Microcomputers*</u> <u>COBOL*</u>	<u>Programming:How You Do It*</u> <u>Beginning FORTRAN*</u>	<u>COBOL*</u>	<u>Programming:How You Do It*</u> <u>Intro to Microcomputers*</u> <u>Beginning FORTRAN*</u>	

XEDIT Pascal for Programmers Intro to System 2000 Intermediate FORTRAN <u>Using Micros(Apple II)*</u> Intro to Computers*(Ramsey) COBOL*	Microcomputing	XEDIT Pascal for Programmers Intro to System 2000 Intermediate FORTRAN COBOL*	XEDIT Pascal for Programmers Intro to System 2000 Intermediate FORTRAN <u>Using Micros (TERAK)*</u> Beginning FORTRAN*	XEDIT Pascal for Programmers Intro to System 2000 Intermediate FORTRAN
Intro to System 2000 <u>What Computing Can Do</u> Text Formatting Pascal for Programmers Intermediate FORTRAN Graphics <u>Using Micros(Apple II)*</u> COBOL*	Microcomputing COBOL Graphics Programming:How You Do It* Beginning FORTRAN*	Intro to System 2000 What Computing Can Do Text Formatting Pascal for Programmers Graphics Intermediate FORTRAN COBOL*	COBOL Graphics Workshop Programming:How You Do It* Using Micros (TERAK)* Beginning FORTRAN*	Intro to System 2000 What Computing Can Do Text Formatting Pascal for Programmers Intermediate FORTRAN Graphics
H O L I D A Y	Microcomputing COBOL	Intermediate FORTRAN <u>SIR</u> COBOL*	COBOL <u>System 2000/v260-v280</u> Using Micros (TERAK)*	Intermediate FORTRAN SIR
<u>System 2000/PLEX (PLI)</u> SIR Using Micros (Apple II)* COBOL*	Microcomputing COBOL	System 2000/PLEX (PLI) SIR	COBOL Using Micros (TERAK)*	System 2000/PLEX (PLI) SIR
March Using Micros (Apple II)*	COBOL		COBOL	

* indicates course offered through University Extension.

UNDERLINING indicates first day of class.

See other side for details.

Please Post

UCC Short Course Schedule for Winter 1981

^Computing: What is it?.....; 2:15-4pm, 12-15 Jan (mtwth), Arch 15
^NOS (system configuration)....; 3:15-5pm, 19 Jan (m),
^Introduction to UCC.....; 3:15-5pm, 20 Jan (t),
^NOS (files/jobs).....; 3:15-5pm, 21-23 Jan (wf),
^NOS (permanent files).....; 3:15-5pm, 26 Jan (m),
^NOS (program execution).....; 3:15-5pm, 28 Jan (w),
NOS (intro to tapes).....; 3:15-5pm, 30 Jan (f),
Microcomputing.....; 2:15-4pm, 27 Jan-24 Feb (t), Ex 193
Pascal for Programmers.....; 3:15-5pm, 26 Jan-13 Feb (mwf),
Comparing DBMS's.....; 3:15-5pm, 26 Jan (m),
SPSS (SPSS basics).live.....; 3:15-5pm, 26 Jan (m),
SPSS (data manipulation).live.; 3:15-5pm, 27 Jan (t),
SPSS (SPSS files).live.....; 3:15-5pm, 28 Jan (w),
SPSS (On-Line).live.....; 3:15-5pm, 30 Jan (f),
^Interactive Systems Commands..; 3:15-5pm, 27-29 Jan (tth),
Introduction to System 2000...; 3:15-5pm, 28 Jan-13 Feb (mwf),
^XEDIT.....; 2:15-4pm, 2-6 Feb (mwf),
Intermediate FORTRAN.....; 3:15-5pm, 2-20 Feb (mwf),
Text Formatting.....; 2:15-4pm, 9-13 Feb (mwf),
Graphics.....; 3:15-5pm, 9-13 Feb (mtwf),
Graphics Workshop.....; 7:30-9:30pm, 12 Feb (th), Laud# (see note)
What Computing Can Do For You.; 2:15-4pm, 9-13 Feb (mwf),
COBOL.....; 3:15-5pm, 10 Feb-5 Mar (tth),
SIR.....; 3:15-5pm, 18-27 Feb (mwf),
System 2000/v260 to v280.....; 3:15-5pm, 19 Feb (th),
System 2000/PLEX (PLI).....; 3:15-5pm, 23-27 Feb (mwf),

NOTE:

^: up-arrow (^) indicates this course is a basic prerequisite for other, unmarked courses.

HOLIDAY: 16 February (m) is a University holiday. No classes will be held.

#: Class held at Lauderdale conference room, Lauderdale computer site, 2520 Broadway Drive, Lauderdale, MN.

For any more information concerning these short courses, see WRITEUP(CLASSES) or call Lincoln Fetcher at 376-1637.

**For more information see WRITEUP(CLASSES)
or call 376-1637.**

SEASON'S GREETINGS



All the best during this holiday season from all of us. Represented here are some members of our Systems Group, User Services, Engineering Services, Operations, and by proxy for the MERITSS group, the Cyber 720.

statistics

***PRODUCTION USAGE SUMMARIES: Cyber 74+172

	October, 1980	October, 1979
System resource units (SRU)	1,249,780 (1,586,750)	1,105,740 (1,435,085)
Batch jobs and MIRJE sessions	126,137 (137,779)	117,271 (128,866)
Total central processor (CP hours)	144/190 (166/287)	165/155 (187/255)
DELAY queue CP hours	45/ 32 (52/ 42)	59/ 22 (60/ 31)
NO FRILLS queue CP hours	7/ 14 (8/ 14)	--/ -- (--/ --)
Mass storage transfers (KPR)	435,223 (580,508)	400,858 (514,324)
Magnetic tape transfers (KPR)	11,049 (15,034)	10,843 (14,952)
Pages printed, charged from UCC	869,199 (1,035,799)	887,184 (1,014,077)
Cards punched	310,878 (374,552)	405,020 (427,476)
Microfilm frames produced	17,602 (516,599)	53,523 (505,423)
MIRJE terminal hours	16,752 (19,086)	13,811 (16,076)
Number of terminal sessions	40,130	30,484
Status plotting production (feet)	8,221	6,097
Tapes mounted	12,020	12,303
Average file storage (char)	3,191.3 million	2,394.1 million
Mean time between failures	77.7/272.0 hours	38.9/68.0
Available during scheduled hours	99.6/99.6 percent	99.2/ 99.4 percent
(totals in parentheses include staff development, accounting, and maintenance runs)		

***DOWNTIME SUMMARY: November, 1980 (Column 1, Cyber 74 : Column 2, Cyber 172)

	0800-1800 M-F		other		total	
Total possible scheduled uptime hours	180.0	180.0	285.3	285.3	465.3	465.3
Total downtime hours (see Schedule A)	0.4	1.4	0.1	0.1	0.5	1.5
Total uptime hours	179.6	178.6	285.2	285.2	464.8	463.8
Uptime (percent)	99.8	99.2	99.9	99.9	99.9	99.7
Average downtime per occurrence (min)	13.0	16.4	4.0	8.0	10.0	15.0
Mean time between failures (hours)	60.0	30.0	142.7	142.7	116.3	66.5
Subsystem failures						
SUPIO	11	-	6	-	17	-
TELEX	2	1	0	0	2	1
EXPORT	6	-	1	-	7	-

Schedule A: downtime hours

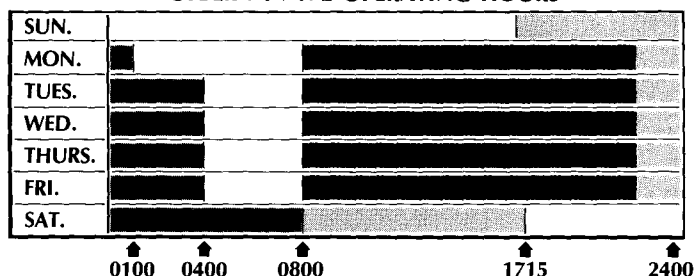
	Number		Total hours		Average minutes	
(1) Preventive maintenance over-runs	0	0	0.0	0.0	0.0	0.0
(2) Software related problems	0	1	0.0	0.1	0.0	1.0
(3) Hardware related problems	1	3	0.4	0.3	22.0	6.3
(4) Indeterminate problems	2	1	0.1	0.5	4.0	30.0
(5) External Problems	0	1	0.0	0.7	0.0	41.0

***PRODUCTION USAGE SUMMARIES: Cyber 720 (MERITSS)

	October, 1980	October, 1979
Number of jobs run	341,910	243,833
Central processor hours	180.8	139.3
MERITSS terminal hours	40,704	31,701
Number of terminal sessions	96,521	67,407
Maximum number of simultaneous users	178	141
Average file storage (char)	466.2 million	431.1 million
Mean time between failures	71.0 hours	82.7 hours
Available during scheduled hours	98.7 percent	99.5 percent

operations

CYBER 74 + 172 OPERATING HOURS



Lauderdale, ExpEng, NORMAL rate
 Lauderdale, ExpEng, DELAY rate
 Lauderdale only, DELAY rate

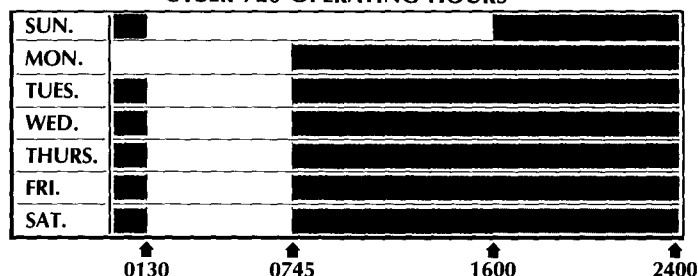
See WRITEUP(HOURS) for schedule of batch job pickup/delivery service.

TWIN CITIES CAMPUS PUBLIC REMOTE JOB ENTRY SITES

SITE	ID	SUPERVISOR	PHONE
East Bank			
ElectE 38	4V	V. Zahhos	373-5346
EltH N640	4W	D. Anderson	373-5827
ExpEng 130	3L	I/O Coordinator	373-4596
ExpEng 130	4B	I/O Coordinator	373-4596
ExpEng 130	4N	I/O Coordinator	373-4596
FrontH	4E	D. Schumacher	373-2740
KoltH S191	4Z		
MinMet 321	4I	R. Larson	376-2668
Physics 69	44	L. Whitney	376-7627
TerrH W106	4I	B. Hackett	373-6621
D388 Mayo	24	L. Croatt	373-7714
Zoology 314	4J	E. Cushing	373-2232
West Bank			
SocSci 167	4X	D. Lund	373-3608
SocSci 1009	4K	M. Mongiat	373-0168
St. Paul			
BioSci 257A	47	M. Simmons	373-1961
ClaOff 125G	48	C. Bingham	373-0988
McN H	42	G. Wahlert	373-0939
NorH 24	4G	J. Colten	373-0990
NorH 24	40	J. Colten	373-0990
Lauderdale			
User's Room	49	Secretary	373-4912
User's Room	3F	Secretary	373-4912

Keypunches provided at each site.

CYBER 720 OPERATING HOURS



Up, not attended
 Up, attended

See WRITEUP(LABHOUR) for a schedule of open hours in the student computer laboratories.

TWIN CITIES INSTRUCTIONAL COMPUTER LABORATORIES

SITE	SUPERVISOR	PHONE	EQUIPMENT
East Bank			
CentH	R. Rickgarn	3-2289	TTY33(2)
ComH	C. Youngdale	3-2453	TTY43(1)
DiehlH 535	N. Sauro	6-7005	CRT(2)
EltH 121, 125	D. Anderson	3-5827	TTY33(6) CDC713(1) Hazeltine(3) Telera(1)
FrontH	D. Schumacher	3-2740	TTY33(1)
HS-A 1-752	L. Ellis	3-0331	TTY33(4) TTY43(2) Telera(1) CDC713(6) Decwriter(5) Tektronix4013(1) Telera(1) TTY43(11) TTY33(4) Telera(3) Decwriter(5) TTY33(1)
LindH 25	M. Schneider	3-0137	TTY33(2) TTY33(2) CDC713(2) Decwriter(7) Telera(2) TTY43(10) CRT(2)
MechE 308	D. Riley	3-0340	TTY33(4) Telera(3) Decwriter(5) TTY33(1)
SanFH	M. Kilbury	3-3434	TTY33(1)
TerrH	B. Hackett	3-3567	TTY33(1)
VincentH 4	W. Stenberg	3-2586	TTY33(2) CDC713(2) Decwriter(7) Telera(2) TTY43(10) CRT(2)
WaLib 204	R. Estelle	3-2538	
West Bank			
BlegH 140	D. Lund	3-3608	TTY43(13) Telera(1) TTY33(1)
MdbH	R. Baker	3-9818	TTY33(1)
SocSci 167	D. Lund	3-3608	TTY33(5) Telera(3) Decwriter(2)
St. Paul			
ClaOff 125	C. Bingham	3-0988	TTY33(6) Hazeltine(2) Decwriter(4)

phone numbers

Accounting	373-4548, 373-2521	Image Processing Center	373-7878
Computer-Aided Instruction	376-2975	Information, Experimental Engineering	373-4360
Computer Hours (recorded message)	373-4927	Information, Lauderdale	373-4912
Computer Store	373-4877	Information Systems	373-7878
Consulting		Instructional Labs	373-5754
HELP-line	376-5592	Job Status, ExpEng (recorded message)	373-4994
9 AM—5 PM, Monday—Friday		Lauderdale Operations	373-4920
Business Data Products	376-1761	Lauderdale Services	373-7538
10-11 AM and 1-3 PM, Monday—Friday		Lauderdale Users Room	373-4921
COBOL Language	376-1761	MECC Interface	373-4573
11 AM—12M, Monday, Wednesday, Friday		Microcomputers	376-4276
Statistics Packages	376-5062	Microfilm Operator	373-4995
1-2 PM, Monday—Friday		Newsletter Subscription	376-4668
Data Bases	376-1761	Permanent File Restoration	376-5605
10-11 AM and 1-2 PM, Monday—Friday		Professional Services Division (PSD)	376-1764
Microcomputers	376-4276	Project Assistance	376-1764
10-12 AM and 2-4 PM, Monday—Friday		Program Librarian	376-1636
Humanities	373-5780	Programming Languages	376-7290
10:30-11:30 AM, Monday, Wednesday, Friday		Reference Room	373-7744
2-3 PM, Tuesday, Thursday		Remote Batch (RJE) Services	373-5754
Contract Programming	376-1764	Short Courses	376-1637
Data Base Applications	373-7878	Shuttle Bus Service	376-3068
Educational Services	376-3963	System Status (recorded message)	373-4927
EDUNET Interface	373-7745	Tape Librarian and EBR Operator	373-4995
Equipment Purchase or Lease	376-8153	Technical Writing	373-2522
Experimental Engineering I/O	373-4596	User Numbers	
Field Engineering	376-7584	Instructional Batch	373-2521
Graphics Software	376-1636	Instructional Timesharing	373-7745
HELP-line	376-5592	Research Batch	373-2521
9 AM—5 PM, Monday—Friday		Research Timesharing	373-2521
HOURS-line (recorded message)	373-4927	User Services	373-4599

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