UNIVERSITY COMPUTER CENTER

CONTENTS

YOU ARE WELCOME TO SEND IN ARTICLES FOR
PRINTING IN THIS NEWSLETTER. DEADLINE
FOR THE AUGUST ISSUE IS JULY 24.

BULLETINS

§§§

CYBER 74 USERS:

DON'T FORGET THE NOS TEST PERIODS IN JULY
AND AUGUST: JULY 16, 23, 30, AUGUST 6, 13.

NOS IS SCHEDULED FOR FULL IMPLEMENTATION
BEGINNING AUGUST 20TH.

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♪♪♪

CYBER 172 USERS:

PRODUCTION HOURS NOW ARE:

MONDAY - FRIDAY:	0800	- 2100
SATURDAY :	0800	- 1600
SUNDAY :	NONE	

♪♪♪

The University of Minnesota adheres to the prin-
ciple that all persons shall have equal oppor-
tunity and access to facilities in any phase of
University activity without regard to race, creed,
color, sex, age, or national origin.

A NEW BINARY FILE CONVERTER

A new binary conversion utility called CONVBF has been added to the system. It is used to convert either blocked or unblocked FTN3 and FETCH(MNF) binary files to the current blocked binary structure (BT=I,RT=W) used by FTN4 and MNF. A file, so converted, may be read by unformatted READ statements.

Magnetic tapes containing binary data may also be converted. If a tape written in X, S, L, E, B, or F format is to be converted, the data file must be copied to a disk file. This intermediate file should be rewound and supplied as input to CONVBF.

Tapes written in SI or I format may be processed directly.

CONVBF has three position dependent parameters:

    CONVBF(I,O,OPT)

where

    I is the input file in FTN3 format
    O is the output file in FTN4 format
    OPT is any of the following:
        B means that the FTN3 file is blocked.
        U means that the FTN3 file is unblocked;
            this should be used for files
            created after an unblocking call to
            FTNBIN.
        MR=xxxx where xxxx specifies the maximum
            logical record size in words for
            tapes in FTN3 unblocked format; the
            parameter need be specified only if
            the record size is greater than 1023
            decimal words; xxxx is decimal
            unless suffixed with a B to indicate
            octal.

Neither I nor O is positioned before or after the conversion by CONVBF; conversion proceeds until end-of-information on file I.

CONVBF replaces BBTO6RM which has been removed from the system.

S.A. Reisman, 376-1755

S Y S T E M   2 0 0 0   U S E R S

When the NOS operating system is brought up on the Cyber 74 on August 20, all PLI users must recompile their programs. This is required because the location of the file containing the PLI overlays will be changed. This does not affect those of you who only use the natural language processor.

All questions should be directed to John Cosgrove, 376-1761.

S.A. Reisman, 376-1755

CYBER 74/172 INTERACTIVE ACCESS

We are planning to convert all the dial-up access on the Cyber 74 and Cyber 172 systems to autobaud service on July 17, 1978. Autobaud is automatic baud rate detection. This means that the same set of telephone lines can service either 110 baud (10 cps) or 300 baud (30 cps) terminals. Only one telephone number will be needed for each system:
    Cyber 74 : 376-5730
    Cyber 172: 376-5930

In order for the computer to know the speed that you are operating at, you must press the RETURN key from one to five times after you have dialed into the desired system. When the speed has been determined, the computer system will print the normal log-in information on your terminal.

This change has been precipitated by the need to transfer the 6676 multiplexer from the Cyber 74 to the CDC 6400 system (MERITSS) by the start of the 1978 Fall Quarter. The remaining multiplexers, the PDP-11/34 (Cyber 74) and the CDC 2551 (Cyber 172) are both capable of detecting the speed of a terminal. Autobaud service should result in better telephone line utilization and simplified telephone access (one telephone number per computer system).

In the process of moving telephone lines around, the number of dial-up lines connected to the Cyber 74 will be reduced from 52 to 35. The number of dial-up lines connected to the Cyber 172 will be increased from 21 to 44.

A. Nelson, 376-5607

PERMANENT FILE ARCHIVING

The first permanent file archive was performed on Cyber 172 permanent files on July 1. Identical procedures are used on both the Cyber 74 and the Cyber 172 computers. The archive procedure has been published on several occasions and is being repeated here mainly for the benefit of new users.

On the first day of each month, all files not accessed since the first day of the preceding month are first dumped to tapes and then purged from the disks. That is, on July 1, all files not used since June 1 were archived. Tapes containing archived files are saved for one year; they are then reused.

Files are restored from tape upon request. Forms for this purpose are available at the high speed stations (ExpEng, West Bank, or Lauderdale) or with the control statement:

    WRITEUP,AFLISTS=FORM.

The restoration charge is $5.00 per file or $20.00 (whichever is less) for files restored from one

user number on one archive date.

Listings of archived permanent files from each archive date for the past twelve months can be found at the high speed stations listed above. These lists are also available on the indexed writeup, AFLISTS. Execute the control statement:

    WRITEUP,AFLISTS=INDEX.

for information on how to use this writeup. A column was added to the archived file list that indicates which machine the file was archived from. Files archived from the Cyber 172 have MI=72 in this column; files archived from the Cyber 74 have MI=74.

Archiving on the Cyber 74 has been done for the past three years. The procedure has proved necessary to prevent unused permanent files from taking up valuable disk space. On the first of June, for example, 25,109 files were scannned on the default disks. Nine 7-track tapes were filled with the 2,750 files that were archived.

Please call if you have any questions or comments concering this subject.

                        B. Hursh, 376-5605

BACK AND FORTH
MOVING JOBS BETWEEN MACHINES

To make it easier for you to move files and processed output between the Cyber 74 and the Cyber 172, two new utilities have been provided.

ASEND sends files between the two machines; this is similar to the Cyber 74/6400 SEND program.

AROUTE moves print, plot, and punch files from the Cyber 172 to the Cyber 74 for processing on the proper output devices (high-speed site printers, plotters, 1004's, etc.).

For full information on either of these two utilities, see either of these:

    WRITEUP(ASEND)
    WRITEUP(AROUTE)

The document is two pages long; either WRITEUP gives you the same information.

Note: These routines are temporary and may be replaced in the future.
                        T.J. Hoffmann, 376-5262

FORTRAN
STANDARD FORTRAN VS MNF VS FTN

A number of tests for Fortran processors have been developed since the X3.9-1966 Fortran standard was first published. Before a FUTURE version of MNF is installed, it is verified by tests against the specific errors that are being corrected. Then, we have it compile our 12,000 line validation decks (VALIDA, VALIDB, VALIDC, and VALIDD, developed by E.J. Mundstock) to test that all normal FORTRAN statements are working correctly. We also test the new version of the compiler against a series of 30 University of London and 95 University of Lausanne jobs that were used to benchmark CDC Fortran compilers. Additional runs are made on programs that test formatted and binary I/O. If the new version of the compiler passes all of these tests, we consider it ready to put into the system; although even then, as you may have noticed on June 11, there can be errors between the version running from a permanent file as opposed to a version running from a system file.

Of tests that we run, we like those which only produce messages if there is an error (such as VALIDA). It takes many hours to compare source, data output, and error messages between previous versions of the compiler and the new one.

Two years ago we sent for the 121 Fortran test programs prepared by the National Bureau of Standards for use on Fortran processors in accordance with ANSI Fortran X3.9-1966. The listing of these programs and the execution results meant that we had to examine 474 pages when Clive Schofield ran the tests this spring. The following MNF errors were pointed out by these programs.

1. A PROGRAM statement (which is non-ANSI) is required if units other than 5 for INPUT and 6 for OUTPUT are used by the program. That this is an error is controversial within the MNF group, since some of us contend that the information on the PROGRAM card somehow would have to appear whether as a job control statement or otherwise for these programs, while another claims that since PROGRAM is a Fortran statement it must be considered in that context only.

2. MNF prints true zero as '0' using floating point format conversions rather than '0.0' or '.000E+00'. Since I designed the I/O, this must be blamed on me, but I did it for good causes since .0000 rather than ⋀⋀⋀0 for an F5.4 field shows that in one case (.0000) the internal value is non-zero but smaller than the number of places allowed whereas the other value is a true 0. In addition, the drum printers (CDC 1612 on the 1604, CDC 501 on our 6600) always have the 0 character wear out first because of its high usage. This form of printing 0 thus saved the drums (ruffles and flourishes for MNF on this, at least).

3. MNF prints 9.9E+02 using 1PG12.2, whereas the

NBS standard program states that this should be 9.88E+02 for an internal value of 987.654321. This seems to be a conflict in the 1966 standard since 7.2.3.6.2.2 states "the numeric field descriptor Gw.d indicates that the external field occupies w positions with d significant digits..." Even though Gw.d escapes to nPEw.d "for n > 0, there will be exactly n significant digits to the left of the decimal point and d−n+1 to the right for a total of d+1 significant digits. (I rest my case and think that d significant digits for G has priority.)

4. Only one un-named BLOCK DATA subprogram is allowed. This is considered a bug and will be fixed on FUTURE,MNF.

5. MNF states that OP is non-standard; since in a late fix to MNF to discover $_\wedge$X, OX, and $_\wedge$P in FORMATS as non-standard, OP was also included. This will be fixed on FUTURE,MNF.

6. MNF generates and prints −0 on output for various integer arithmetic such as −1*0 and INT(−.4) and for all values that were blank fields on input. A clarification to the standard says that only +0 or 0 can be printed. This will not be fixed.

It was also interesting to note that MNF found four cases in which NBS standard programs do not conform to the standard:

1. Several cases of commas used next to a slash (/) in a FORMAT.

2. A missing comma in (2H0 2X).

3. DSIGN(−−−,0D0) with the second argument zero; 8.2 states "the intrinsic functions AMOD, MOD, SIGN, ISIGN, and DSIGN are not defined when the value of the second argument is zero."

4. The NBS program states that 9.87655 should print as 987.65 using 2PF12.2 whereas MNF correctly prints 987.66.

The following FTN errors were pointed out by these programs:

1. A PROGRAM statement is required for every NBS test program since FTN does not allow the implicit Unit 5 for input and Unit 6 for output when there is no PROGRAM statement.

2. CDC uses a short form of 0. or 0.0 for zero with D and E FORMAT specifications.

3. FTN cannot handle the standard repeat of a complex constant in a DATA statement, i.e., 2*(1.0,0.0). Three programs failed due to this.

FTN, in turn, pointed out the same errors (2 and 4) that MNF had found in the NBS test set.

MNF also points out numerous cases of GOTO the next statement, unlabeled CONTINUE cards, adds and

subtracts of 0, and multiplies and divides by 1 that are not illegal, but are of dubious value.

L.A. Liddiard, 373-5239
C.F. Schofield, 373-5239

FROM THE ASSISTANT DIRECTOR'S DESK

We have recently begun to think about developing an inventory of machine readable data files (MRDF) at the University of Minnesota. In general, the eventual goal will be to make certain large or specialized data bases available without the need for duplication. Large bases are expensive to maintain and update, consuming large amounts of people time and computer storage space.

There is no question that this inventory would serve many differing kinds of needs in research and instruction. A major problem is finding out where the files exist and how to access any particular one. At present, there is no complete list of such data files at the University. In fact, it may be that many of you unknowingly own data files that could be useful to others.

The actual project of defining what we want to do in regard to a list or a catalog will probably be undertaken by a data base committee at some time in the future. Meanwhile, to start the ball rolling, we have asked our friends at the Minnesota Analysis and Planning System (MAPS) to describe their data files. Their article and a brief listing of the MAPS data bases are printed in this issue of the newsletter.

If you have data files that could be made available, with or without the addition of security and privacy guards, please tell me about them. At this time we are hoping only to collect the information; we will not publish it without your express consent.

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As many of you have no doubt painfully noticed during this summer lull, the Cyber 74 is swamped with batch jobs during peak hours. You may wish to consider putting in your jobs at or near 8:00 AM when the system first comes up. As the Cyber 172 begins to pick up the big (over 55K) interactive jobs later this summer, we should begin to experience improved throughput on the Cyber 74.

T.D. Hodge, 373-4599

M A P S

The Minnesota Analysis and Planning System is a comprehensive computer-based information system located on the University of Minnesota's St. Paul Campus.

Initially, MAPS was implemented to provide a data facility for the Agricultural Extension Service. But, since it began in 1976, MAPS has evolved into a system that serves not only Extension, but also individuals and organizations throughout the University community.

Its clientele also includes people in business, public and private agencies, other educational institutions, and government. Users at the University include faculty, staff, and students.

Designed for massive storage of socio-economic data, MAPS assists its users by being a central source of information. The extensive data base contains the 1960 to 1970 Census of Population and Housing, and the Agricultural and Economic censuses. A large number of specialized economic, fiscal, and demographic files on the State of Minnesota is also part of the data base. A basic purpose of MAPS is to take public information and make it readily accessible, with new information being added all the time.

The MAPS terminal, on the St. Paul Campus in 415 Coffey Hall, provides on-line and batch processing and is connected to the University Computer Center. Faculty, researchers, computer system analysts, programmers, keypunchers, and civil service personnel provide the necessary knowledge and resources.

The system offers such services as creation of special files, custom programming, statistical packages, tape copies, specific aggregations of data base information, and information exchange.

The MAPS Users' Seminar, held quarterly on the St. Paul Campus, introduces or re-acquaints users with the MAPS operation. Publications available include the bi-monthly MAPS newsletter, the Data File Inventory brochure, the Data Display Samples booklet, and the MAPS Information Brochure.

Essentially, MAPS is a computer-based program that provides users with a fast, low-cost, easy-to-use facility for retrieving and analyzing data. For further information, contact the MAPS office, 415 Coffey Hall, 376-7003.

David Nelson, 373-7003
Tom Ehlen, 373-7003

(Ed. note: the following list is abstracted from the MAPS Data File Inventory Brochure; the list is by no means complete, so please see the brochure for a full list.)

ABSTRACT OF ASSESSMENTS
ABSTRACT OF TAX LISTS - PAYABLE/ASSESSED PREMIUM
ACCIDENT RECORDS
ADDRESS CODING GUIDE
ASSESSMENT/SALES RATIO STUDY
BRIDGE INVENTORY
BUILDING PERMIT FILE
CENSUS: (12 files listed)
COMMERCIAL BANK INCOME
COMMUNITIES: (3 files listed)
COUNTIES: (3 files listed)
CRIMES IN MINNEAPOLIS
ELECTION RESULTS
LEGISLATOR PROFILES
MEDLIST
METRO TRACT COORDINATES
MIGRATION DATA
MINNESOTA DEMOGRAPHICS
MINNESOTA DIRECTORY OF MANUFACTURING
MINNESOTA VS. THE WORLD
MUNICIPAL STATE AID
NUTRIENT FILE
POPULATION PROJECTIONS 1970-2000
PUBLIC USE SAMPLES: (3 files listed)
REVENUE SHARING - 1973 POPULATION ESTIMATE
SCHOOL DISTRICTS: (9 files listed)
SEA MIGRATION
SNOWMOBILE LICENSE FILE
STATE AUDITOR (6 files listed)
STATE OUTDOOR RECREATION FACILITY FILE
TEACHER PERSONNEL (CERTIFICATION) FILE
URBAN INSTITUTE - MINNESOTA SCHOOL DATA
WATERCRAFT LICENSE FILE

PRODUCTION USAGE SUMMARIES

	May, 1978		May, 1977	
CDC Cyber 74				
Number of Batch jobs and MIRJE sessions	111,246 (	123,724)	98,039 (	113,219)
Total Central processor hours inc. DELAY	220 (	270)	152 (	196)
DELAY queue processor hours	72 (	76)	-	
MIRJE terminal hours	9,265 (	10,779)	-	
Mass storage transfers (KPR)	287,965 (	358,512)	208,672 (	257,471)
Magnetic tape transfers (KPR)	7,249 (	10,213)	5,094 (	6,762)
Pages printed, charged from UCC	1,133,265 (	1,223,131)	943,790 (	1,044,753)
Cards punched	457,406 (	471,608)	451,190 (	473,827)
Microfilm frames produced	83,317 (	416,181)	13,714 (	271,546)
Statos plotting production (feet)	7,255		5,946	
Tapes mounted	10,361		9,240	
Average file storage (2347M available)	1,535.4 million char		1,065.6 million char	
Mean time between failures	37.2 hours		87.1 hours	
Available during scheduled hours	95.3 percent		99.9 percent	
SUPIO uptime during available hours	97.0 percent		94.4	

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

	May, 1978	May, 1977
CDC 6400		
Number of jobs run	199,485	168,917
Central processor hours	154	117
MERITSS terminal hours	27,140	23,624
Number of terminal sessions	56,049	46,579
Maximum number of simultaneous users	122	102
Average file storage	307.2 million char	262.0 million char
Mean time between failures	66.0 hours	31.0 hours
Available during scheduled hours	95.9 percent	98.6 percent

DOWNTIME SUMMARY: June, 1978 (Column 1, Cyber 74 : Column 2, Cyber 172)

	Monday-Friday 0800-1800		other		total	
Total possible scheduled uptime hours	220.0	220.0	316.0	84.0	536.0	304.0
Total downtime hours (see Schedule A)	1.1	7.0	4.5	2.1	5.6	9.1
Total uptime hours	218.9	213.0	311.5	81.9	530.4	294.9
Uptime (percent)	99.5	96.8	98.6	97.5	99.0	97.0
Average downtime per occurrence (minutes)	13.3	23.2	54.2	25.0	33.6	23.6
Mean time between failures (hours)	73.3	15.7	63.2	16.8	67.0	16.0
Subsystem failures						
SUPIO	4	-	4	-	8	-
TELEX	0	0	0	0	0*	0**
EXPORT	11	-	7	-	18	-

Schedule A: downtime hours

	Number		Total hours		Average minutes	
(1) Preventive maintenance over-runs	1	3	0.3	1.0	20.0	20.0
(2) Software related problems	1	11	0.1	1.2	6.0	6.5
(3) Hardware related problems	4	4	1.4	4.4	21.5	65.8
(4) Indeterminate software/hardware problems	1	1	0.2	1.1	10.0	66.0
(5) External Problems	3	4	3.6	1.3	71.3	20.0

*TELEX front-end (autobaud) aborted 15 times.
**TELEX front-end aborted 9 times.
Cyber 74: of the 5.6 hours of downtime this month, 2 power outages accounted for 3.5 hours.

CYBER 74 OPERATING HOURS

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Sun|                              ||||||||||||||||
Mon| *|                  <><><><><><><><><><><><><$$|
Tue| ******|              <><><><><><><><><><><><><$$|
Wed| ******|              <><><><><><><><><><><><><$$|
Thu| ******|              <><><><><><><><><><><><><$$|
Fri| ******|              <><><><><><><><><><><><><$$|
Sat| **************|$$$$$$$$$$$$$$$$$|
     ^       ^      ^                   ^              ^
   0115    0400   0800               1600           2400
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******* Lauderdale only, DELAY rate
||||||| Lauderdale, ExpEng, DELAY rate
<><><> Lauderdale, ExpEng, West Bank
$$$$$$$$ Lauderdale, ExpEng, West Bank, DELAY rate

SUPIO (RJE terminals) comes up 1/2 hour after operation begins and closes down 1/2 hour before operation ends.
TELEX (MIRJE terminals): the operator will issue a 10 minute warning before TELEX is dropped.
See WRITEUP,HOURS for schedule of batch job pickup/delivery service at Lauderdale and Experimental Engineering.

TWIN CITIES CAMPUS REMOTE JOB ENTRY SITES

Site	ID	supervisor	phone	keypunches*
East Bank				
ElectE 38	4V	J. Guentzel	373-5404	2
		M. Cook	373-3895	
EltH N640	4W	D. Anderson	373-5827	2
ExpEng 130	4B	Shift Supervisor	373-4596	7
FrontH	4E	M. Kilbury	373-2740	1
		B. Adams	373-6885	
KoltH S191	4Z	G. Schuette	376-7375	4
		N. Mullaney	373-2348	
HS-A 1-752	4C	L. Ellis	373-0331	1
MinMet 321	41	J. Lucas	373-3156	3
		M. Weber	373-2302	
Physics 69	44	R. Scarlett	373-0243	3
		D. Olson	373-5320	
SpaSci 134	43	R. Weinberg	373-7881	1
TerrH W106	4I	R. Baker	373-3567	1
Zoology 314	4J	E. Cushing	373-2232	1
West Bank				
SocSci 167	4X	R. Dykstra	373-3608	2
SocSci 1009	4K	R. Anderson	373-0177	1
St. Paul				
BioSci 257A	47	R. Comstock	373-0979	1
		P. Kaufman	373-0927	
ClaOff 125G	48	C. Bingham	373-0988	3
		S. Weisberg	373-1068	
		Consultant	373-0829	
		Consultant	376-3846	
CofH 415	21	D. Nelson	376-7003	1
		T. Ehlen	376-7003	
NorH 24	40	J. Colten	373-0990	2
Lauderdale				
User's Room	49	Secretary	373-4912	5

*additional keypunches in 131 ExpEng(1), 86 BlegH(11) and 90 BlegH(1).

CYBER 172 OPERATING HOURS

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Sun|                                                    |
Mon|            <><><><><><><><><><><><|                |
Tue|            <><><><><><><><><><><><|                |
Wed|            <><><><><><><><><><><><|                |
Thu|            <><><><><><><><><><><><|                |
Fri|            <><><><><><><><><><><><|                |
Sat|            <><><><><><<|                            |
                 ^                    ^            ^
               0800                 1600         2100
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<><><><> up, attended

CDC 6400 OPERATING HOURS

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Sun|                                    |><><><><><>|
Mon|                   |><><><><><><><><><><><><><|
Tue| <>|              |><><><><><><><><><><><><><><><>|
Wed| <>|              |><><><><><><><><><><><><><><><>|
Thu| <>|              |><><><><><><><><><><><><><><><>|
Fri| <>|              |><><><><><><><><><><><><><><><>|
Sat| <>|              |<><><><><><><>|***************|
      ^       ^^                 ^      ^            ^
    0130    0730/0745          1600   1800         2400
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****** up, not attended
<><><> up, attended

TWIN CITIES CAMPUS INSTRUCTIONAL COMPUTER LABORATORIES

Site	Supervisor	phone	equipment
East Bank			
CentH	R. Rickgarn	373-2289	TTY(1)
DiehlH 535	N. Sauro	376-7005	CRT(2)
EltH 121,125	D. Anderson	373-5827	TTY(6)
			CRT(5)
			Printer(1)
FrontH	M. Kilbury	373-2740	TTY(1)
HS-A 1-752	L. Ellis	373-0331	TTY(6)
			CRT(2)
LindH 25	M. Schneider	373-7582	CRT(6)
			Decwriter(2)
			Printer(1)
MechE 308	D. Riley	373-2977	TTY(10)
			CRT(2)
TerrH	R. Baker	373-3567	TTY(1)
VincentH 4	W. Stenberg	376-7529	TTY(11)
			CRT(2)
WaLib 204*	R. Estelle	373-5195	Decwriter(10)
			CRT(4)
West Bank			
MdbH	W. Bakkenist	373-9818	TTY(1)
SocSci 167	R. Dykstra	373-3608	TTY(8)
			CRT(4)
			Decwriter(1)
SocSci 1009	R. Anderson	373-0177	TTY(3)
			CRT(2)
St. Paul			
ClaOff 125	S. Weisberg	373-1068	TTY(9)
			CRT(3)
			Decwriter(2)
			DI/AN(1)

*for CAI use only

**** NOTE: No classes will be held on Monday, 3 and Tuesday, 4 July. ****

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-----------------------------------------------------------------------
    Beginning FORTRAN...........: 2:15-4pm, 19 Jun - 7 Jul (mwf), Lind H 54, RTF
    Introduction to UCC.........: 2:15-4pm, 20 Jun (t), Mech E 221, RTF
    Advanced FORTRAN............: 6:15-8pm, 20 Jun - 13 Jul (tth), Lind H 54, RTF
    PLOTPAC.....................: 7:30-9:30pm, 20-22 Jun (twth), Laud Conf Rm, KM
    Introduction to SYSTEM 2000.: 2:15-4pm, 26 Jun - 7 Jul (mwf), Lind H 315, JC
    NOS Control Statements......: 2:15-4pm, 27 Jun - 11 Jul (tth), Lind H 54, RTF
    SPSS........................: 2:15-4pm, 10-12 Jul (mtw), Arch 45, SPY
    NOS Control Language........: 2:15-4pm, 13 Jul (th), Lind H 54, RTF
    SYSTEM 2000/PLI.............: 2:15-4pm, 24-28 Jul (mwf), Lind H 54, JC
    SYSTEM 2000/Report Writer...: 2:15-4pm, 31 Jul - 4 Aug (mwf), Lind H 54, SPN
    Introduction to Timesharing.: 2:15-4pm, 8-10 Aug (tth), Lind H 54, RTF
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RETURN TO:

UNIVERSITY COMPUTER CENTER
227 EXPERIMENTAL ENGINEERING
UNIVERSITY OF MINNESOTA - TWIN CITIES
208 UNION STREET SE
MINNEAPOLIS, MINNESOTA 55455