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BULLETINS

- ↪ MEMORIAL DAY HOLIDAY HOURS
The Lauderdale site will close at 0200 hours on Monday, May 30, and will open again at 1800 hours on Monday, May 30th.
The Experimental Engineering station will close at 2400 hours on Sunday, May 29 and open again at 0800 hours on Tuesday, May 31.
- ↪ DON'T FORGET THE USERS MEETING
Thursday, May 19
2:15 - 5:00 PM
Room 225 Aero

UCC newsletter

VOLUME 11 NUMBER 5 MAY, 1977

Director: Peter C. Patton
Editor : A. Koepke

Comments about the content of this newsletter, or suggestions for changes may be directed to the editor, 235a Experimental Engineering, 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, age, or national origin.

* A New Version of PL/1

A new version of PL/1 is now available on the Cyber 74. This compiler was written by Professor Paul W. Abrahams of New York University, and his documentation is available by using the WRITEUP(CIMSPL1) control card (this "writeup" is 38 pages long). The writeup must be read before attempting to use PL/1, because this implementation is not complete (it is, more or less, a subset of the full IBM language).

PL/1 is a complicated (and powerful) language and is not generally favored by the academic computing community. It has, perhaps, gained importance only because of its invention and support by the world's largest computer company. Despite this, PL/1 does possess interesting features. Because the language is complicated, its compiler is large and slow. This is not a criticism of Professor Abrahams' implementation, which is an efficient one. Thus, the new PL1 compiler requires a minimum of 124000B words to compile a (very small) program, and compilation speed is about 10 cards per second on the Cyber 74 (this is twice as large, and 40 times slower than MNF). Other disadvantages are the relative lack of execution time debugging features, and this Computer Center's current lack of expertise in the language (please bear with us).

The "writeup" supposes an initial knowledge of the PL/1 language which may be gained via commercial publications. To quote from the writeup:

"CIMS PL/1 is a PL/1 compiler developed by Professor Paul W. Abrahams at the ERDA Computing Center, Courant Institute of Mathematical Sciences, New York University. Questions and comments on the use of the compiler, and particularly reports of bugs and suggestions for improvements, are welcomed by the author.

The subset of PL/1 implemented in CIMS PL/1 is oriented towards compiler writing; in particular, it is that subset that was necessary in order to write the compiler in PL/1. Some estimate of the reliability of the compiler may be gleaned from the fact that it is capable of compiling itself; the compiler presently requires about 15,000 PL/1 source statements.

The language accepted by CIMS PL/1 is not completely compatible with that accepted by any of the IBM compilers. Differences are of two kinds: constructs that are implemented in one but not the other, and constructs which behave differently, or require different syntax in the various compilers. This last set is not large. Incompatibilities are detailed in the writeup.

No major revisions will be made to the current version of CIMS PL/1, but work is now underway on a completely re-written version that will implement the full standard language as defined by American National Standards Institute Document x3.53 1976. This version should be completed by the summer of 1978. Besides implementing the full language, the new version will be considerably faster and will use far less core. The present design goal is an operating size of 100K (octal), with only small increases in field length as program size increases."

There are several unusual features about the compiler, in particular the fact that it generates COMPASS assembly code (macros), rather than "machine language" as most other compilers do. This need not concern the user, except for the fact that a COMPASS card is necessary after the PL1 card in order to turn the macros into machine language. The COMPASS card also needs "G=PL1TEXT" in order to assemble the macros, which are written to the file named "CODE". Since COMPASS requires less storage than PL1, an RFL card should be inserted before the COMPASS card in order to make the job more efficient (the CPU time required by COMPASS to assemble the macros is about half the total compilation time). Since the PL1 compiler does its own field length management, a REDUCE(-) card is needed before the PL1 card. Thus, typical control cards for a small job are,

```
YOU(CM130000,T100) 130000B enough for small job
ACCOUNT card
REDUCE(-) needed for PL1
PL1. compile the program
RFL(52000) reduce storage for COMPASS
COMPASS(I=CODE,G=PL1TEXT,L=0) assemble the macros;
L=0 turns off listing
LDSET(LIB=PL1RLIB) obtain execution library
or LIBRARY(PL1RLIB)
LGO. execute the program
7/8/9 end of section card
```

PL/1 procedures, each separated by a card with an asterisk in column 1

```
7/8/9 end of section card
```

data (if any), on INPUT or 'SYSIN'

```
6/7/8/9 end of information card
```

All of the names begin with PL1 (number one). This is the simplest arrangement, and control card options may be used to select different file names and so on, as with other UCC compilers. Some of the compiler options are specified in an unusual way, however, they are placed in apostrophes after the period or right parenthesis on the PL1 card. For example, if the source program is on file A, and the source listing is wanted on file B, and a cross reference map is desired, then the following control card would be used

```
PL1(INPUT=A,OUTPUT=B) 'XREF'
```

(note that the apostrophe is equivalent to the character # and is an 8-4 punch on cards). The 'INPUT' and 'OUTPUT' compiler options are the only ones that may appear within the parentheses (i.e. in the usual place). The writeup quotes the following rule for estimating the storage needed for compilation, "115000B plus 14000B for every 100 (or part thereof) source statements".

If a compiled relocatable program (LGO. file) is saved on a permanent file and later executed, then it will need the execution library 'PL1RLIB'. Since this library is not in the system, a FETCH(PL1RLIB) card will be necessary before the LGO. (or load) card. For instance:

```
GET(LGOFIL)
FETCH(PL1RLIB)
LGOFIL.
```

would be appropriate. A further caution is that the default execution line limit on the OUTPUT

file is set to 400. This may be increased by means of a *PL=n parameter on the LGO (or EXECUTE) card as described in the writeup. Because of the field length required, PL/1 jobs cannot be run under time-sharing, nor on the 6400. The amount of support given by UCC to PL/1 will obviously depend on the amount of use it gets.

C. Schofield, 373-5239

Timesharing

"TOO MANY USERS FROM SAME PROJECT ARE ON SYSTEM"

Many timesharing users have received this message at some time or another. The following is an attempt to clarify what is happening and why such a message comes out in the first place.

User numbers are divided into groups or projects. A group can have from one to several hundred user numbers. Each group has a certain configuration of ports or access points assigned to it. For example, a group may be assigned one port on the 30 character per second (30 cps) dial-up rotary and one port on the 10 character per second (10 cps) dial-up rotary. This group is allowed at most one port at each speed at any one time. A single number in this group could use both the 10 and 30 cps ports simultaneously, or two different numbers could be in use, one at each speed. In this example, if you attempted to sign on at 30 cps and someone else from your group was running at that speed, you would receive the message "TOO MANY USERS FROM SAME PROJECT ARE ON SYSTEM." You could then try the 10 cps rotary.

Each telephone number on a rotary is associated with (connected to) a port. Each port has a unique number (terminal number) associated with it. When you log in, the message: "TERMINAL - nn" gives the terminal number. Actually, "port number" would be a better term.

If a group of user numbers is validated for one 30 cps port on the dial-up rotary, it is validated for any one port connected to that rotary. On MIRJE, there are 33 telephone numbers on the 376-5730 rotary; this group is allowed at most one port but it can be any one of 33 different ports.

To deal with this, ports are divided into groups. These groups are called rotaries. A rotary, then, is a group of ports with no distinction made between them. We say the rotary is full for a group if that group's allotted number of ports for that rotary is in use. The message received in this event will be "TOO MANY USERS FROM SAME PROJECT ARE ON SYSTEM." If a group of numbers is not validated for ports on a rotary, the message received will be "INVALID ROTARY/PORT." This is not to be confused with the message "ILLEGAL TERMINAL" which is the result of incorrectly specifying the user number or password four times.

MERITSS Twin Cities Instructional Lab users experience the "TOO MANY USERS..." message frequently, but only when accessing the dial-up rotaries. Instructional Lab user numbers from almost all departments are put in one large group. This group is validated for ports on six different rotaries. Two of these correspond to telephone rotaries reached by dialing 6-7710 or 6-7730. One rotary of 32 ports serves the Datrex system (you push the button on the modem to connect). The remaining three rotaries are for the private line terminals in Experimental Engineering, Health Science Unit, and the Classroom Office Building on

the St. Paul Campus (you push the carriage return on these to connect).

This group of numbers is validated for as many Datrex and private line ports as are connected to the machine, so the "TOO MANY USERS..." message should not occur. However, access via dial-up is in fairly high contention. Currently there are 24 dial-up ports for this group, ten at 30 cps and fourteen at 10 cps. There are 45 Lab terminals equipped to dial into these rotaries. All but 20 of these terminals can access the system via Datrex by flipping a switch. This alternate access reduces the contention for the dial-up lines considerably. In theory, the result should be minimum contention.

Why then do the Lab users who dial up have such a difficult time getting on the system? The answer is that there are much more than 45 terminals accessing these 24 ports. Terminals not in the Labs are also being used. In fact, terminals not on campus are being used. When departments do not constrain their students to keep their user number and password a secret, that number/password eventually ends in the hands of an unauthorized user (say a high school student) who simply dials in from his school or home if he has a terminal. There are enough ports for the Instructional Lab users, but not for the entire metropolitan area.

Please change your passwords often and only use terminals in the designated Instructional Labs to minimize this problem.

M. Skow, 373-7745

new software

A New Simulation Program

SPICE, a simulator program with integrated circuit emphasis has been installed on the Cyber 74 as a control card callable program. To use SPICE, you must request a minimum field length of 50,000 words. This is a sample deck setup:

```
job card with CM50000.  
ACCOUNT card  
SPICE.  
7-8-9 card
```

input data to SPICE

6-7-8-9 card

SPICE, a program designed to simulate semiconductor circuits, was developed at the University of California at Berkeley. The version we are making available is called SPICE 2D. User manuals may be ordered through the Minnesota Book Center or may be ordered directly from Berkeley. The address is:

Electronics Research laboratory
University of California, Berkeley
Berkeley, California 94720
ATTN: Mrs. Doris Simpson

The price of the reference manual (report #M592, "Program Reference for SPICE 2") is \$7.00; prepayment is required. Local documentation is available via WRITEUP, SPICE (about 20 pages).

If you run into any problems when using SPICE, please call me.

K. Fjelsted, 373-5754

A computer art program

ARTPLOT is a computer art program written for those of you interested in using the computer and its plotting equipment for drawing pictures. By using data cards for its pen movement instructions, ARTPLOT does not expect you to know any programming languages.

ARTPLOT has several shapes and curvatures in its repertoire of instructions. ELLIPSE, RECTANGLE, LINE, POLAR, EXPONENT, and TRIANGLE name a few of them. You direct ARTPLOT to place any of its allowed forms anywhere on the "drawing page" by merely specifying which form, its size and orientation, and the location at which it is to appear.

If ARTPLOT went no further, it would indeed be a tedious process to draw a picture with several hundred forms. ARTPLOT does go further however, and includes in its set of instructions a REPEAT option which will generate from 1.0 to 999.0 cards for you of the type immediately following it. Each value on each of these generated cards differs from those on the last card by an amount which you have specified on the REPEAT card. In this manner, you can "move" a form across the page, shrink it, expand it, rotate it, or distort it with a minimum of card punching.

The drawing page for ARTPLOT is 12.0 inches high by 10.5 inches wide. You specify a location on the page by telling ARTPLOT how many inches over from the left edge and how many inches above the lower edge. Hence, the reference corner or the "origin" (0.0 inches over and 0.0 inches above) is the page's lower left-hand corner.

The data cards or instructions all have the same column groupings. For convenience, each of these groups or variables is given a name. This means that although columns 21 through 25 are called "A" for each of the instructions, each instruction interprets the number appearing in the "A" column set differently. For instance, the RECTANGLE card interprets "A" as the horizontal distance from the left edge of the page to the center of the rectangle while the LINE card interprets "A" as the horizontal distance from the left page edge to the beginning of the line. The variable names and column sets are as follows:

NAME (1-10)
WORD (11-20)
A (21-25)
B (26-30)
C (31-35)
D (36-40)
E (41-45)
F (46-50)
G (51-55)
H (56-60)

Each of the values used by ARTPLOT must have a decimal point and must completely fit in the set of columns allowed for the variable, including the minus sign if it is used. The ARTPLOT program description gives the details of the individual instruction's interpretation of these variables.

ARTPLOT does not physically draw your picture as it is interpreting your instructions. Instead, ARTPLOT creates a set of location codes which can be decoded for a number of different plotters. Presently, there are four types of plotters which you may use; a Varian electrostatic or dot plotter, a Calcomp drum plotter, and a Tektronix 4010 storage screen terminal. A DICOMED color slide dot plotter is soon to be added to this

list. In terms of expense and processing time, the Varian dot plotter and the Tektronix terminal are the more practical for the initial design states of your pictures.

When using the Varian dot plotter, the ARTPLOT results are decoded by using a PLOT31 control card. The picture, having been drawn on the dot plotter at Lauderdale, is sent to the nearest high-speed input/output station to where your cards were read in. The operators at these sites will familiarize you with that particular site's "plotter output" location and procedure. Presently, turnaround time, the time until you receive the dot plotter results, is about 15 to 30 minutes at Lauderdale, 2 hours at 131 Experimental Engineering, twice daily at West Bank (90 Blegen Hall), and twice daily at the St. Paul Campus.

As a final note, ARTPLOT is small enough to be run on the timesharing system (CM50000) and can be used interactively on the Tektronix terminals by means of the VIEW control instruction. Once the desired effect is obtained, the PLOT31 and the DISPOSE control instructions will create the dot plotter copy.

The examples on the facing page have been generated by ARTPLOT. Some of the pictures have been reduced or rotated for this publication. For further information, drop me a note, give me a call at 376-1849, or leave a message at 373-4760. The ARTPLOT writeup will be available fairly soon.
K. McMahon, 376-1849

A Concordance Program

A concordance package for processing texts is now available as a UCC product. GENCORD, written by Richard Hotchkiss, produces a Keyword in Context (KWIC) concordance, other kinds of concordances, word lists, indexes, and some statistics about frequencies of words and characters from a source text supplied by the user. GENCORD has been used successfully for several years by people doing a variety of literary and linguistic studies. The user-controlled options permit a choice of methods of alphabetizing, of input formats, of what words in the text are concorded, and of output material and formats.

Documentation for GENCORD will be available early in May. To get a copy, go to the UCC Reference Room, 235a ExpEng or call (612) 373-7744. If the documentation leaves you with questions about using the program, you may consult Richard Hotchkiss, 373-5756, Sara Graffunder, 376-1637, or visit a consultant in Room 140 ExpEng.

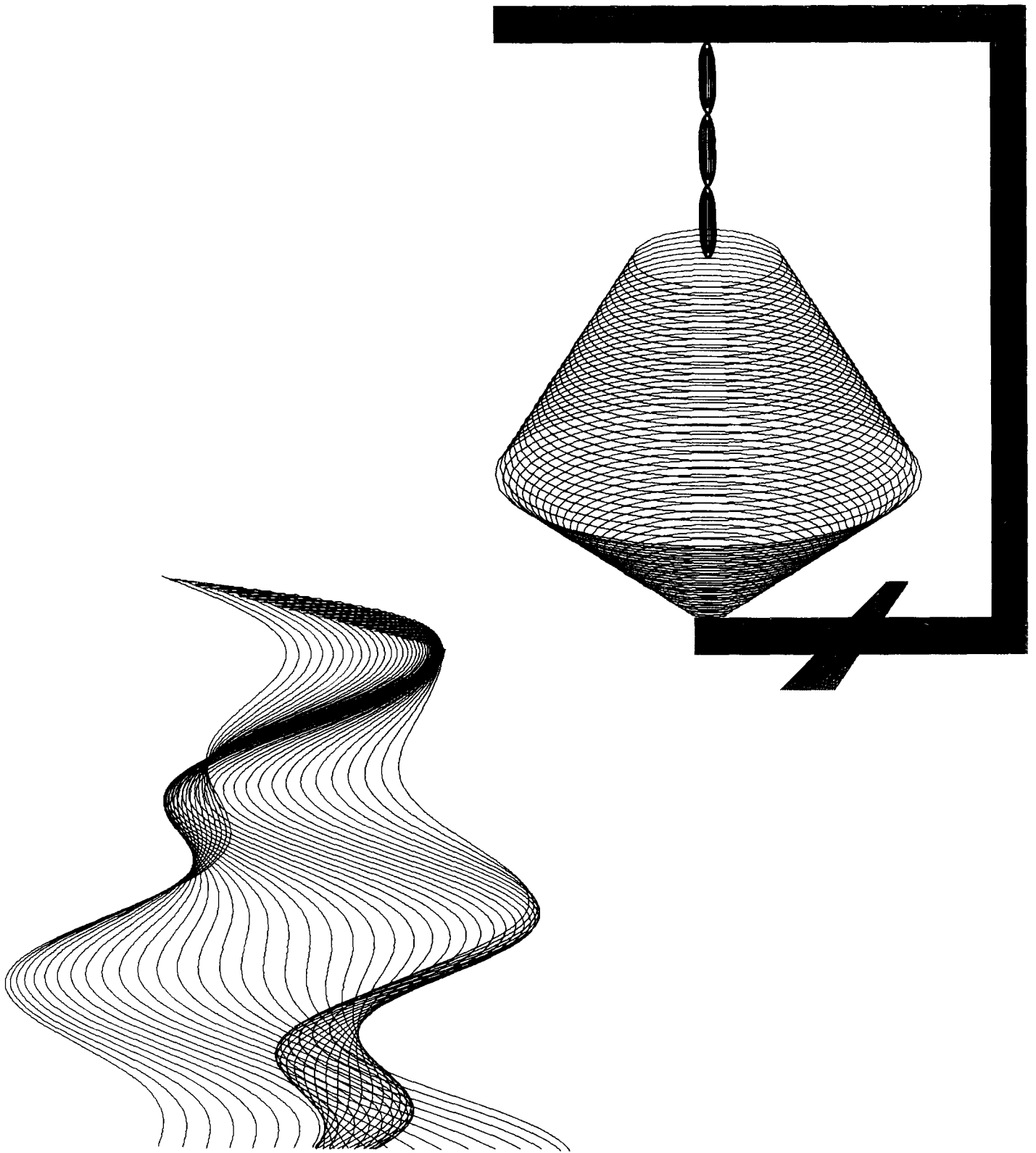
S. Graffunder, 376-1637

* Tektronix Software Library

A new version of the Tektronix Plot-10 software library, TEKLIB, which is compatible with the FTN4 compiler has been put up on the MIRJE system. All known problems with the old library have been corrected in the new version. This version of TEKLIB is not available from user number LIBRARY, but can be accessed with the FETCH, TEKLIB control statement as before.

B. Johnson, 373-4181

ART PLOT



PRODUCTION USAGE SUMMARIES

	<u>March, 1977</u>	<u>March, 1976</u>
CDC Cyber 74		
Number of jobs run plus MIRJE sessions	83,096 (97,767)	79,089 (90,211)
Central processor hours	162 (226)	157 (198)
Mass storage transfers (KPR)	208,973 (281,431)	154,775 (202,453)
Magnetic tape transfers (KPR)	5,259 (7,856)	6,276 (8,393)
Pages printed	853,824 (985,025)	378,673 (1,022,052)
Cards punched	405,426 (451,095)	456,757 (499,076)
Microfilm frames produced	95,747 (349,673)	19,444 (235,797)
Tapes mounted	8,736	8,570
Average file storage (1547M available)	966.9 million char	663.0 million char
Mean time between failures	23.2 hours	19.0 hours
Percentage available during scheduled hours	97.9 percent	96.5 percent
SUPIO availability during scheduled hours	93.8 percent	-
	(totals include staff development, accounting, and maintenance runs.)	
CDC 6400		
Number of jobs run	147,973	155,524
Central processor hours	112	95
Terminal hours	21,278	18,851
Number of terminal sessions	41,222	40,426
Maximum number of simultaneous users	110	109
Average file storage	232.3 million char	195.8 million char
Mean time between failures	44.3 hours	48.9 hours
Percentage available during scheduled hours	98.7 percent	98.6 percent

CYBER 74 DOWNTIME SUMMARY : April, 1977

	<u>Monday-Friday</u>	<u>other</u>	<u>total</u>
	<u>0800-1800</u>		
Total possible scheduled uptime hours	210.	310.	520.
Total downtime hours (see Schedule A)	2.4	0.4	2.8
Total uptime hours	207.6	309.6	517.2
Uptime percentage	98.9 percent	99.9 percent	99.5 percent
Average downtime per occurrence	14.5 minutes	5.2 minutes	11.4 minutes
Mean time between failures	20.8 hours	61.9 hours	34.5 hours
Subsystem failures			
SUPIO	2	5	7
TELEX	2	0	2
EXPORT	1	1	2

Schedule A: downtime hours

	<u>Number</u>	<u>Total hours</u>	<u>Average minutes</u>
(1) Preventive maintenance over-runs	0	0.0	0.0
(2) Software related problems	6	0.9	9.3
(3) Hardware related problems	4	1.4	21.2
(4) Indeterminate software/hardware problems	5	0.5	6.0
(5) External Problems	0	0.0	0.0

→ IMSL Maintenance Report

A maintenance update was performed on both the FTN4 and MNF International Mathematical and Statistical Libraries (IMSL versions) using modifications supplied by IMSL, Inc. These modifications are designed to correct errors found in the following routines:

BECOVM	EIGZF	EQZVF	FTCOMP	ICSVKU
MOCHI	MMKELD	MSMRAT	MMCC	MRWMP
USHIST	USHIUT	VCONVO	ZMULQQ	ZQADC
ZQADR	ZXSSQ			

If you encounter problems when using any of the IMSL routines, please call me.

K. Fjelsted, 373-5754

→ COBOL, SORT/MERGE, and RECORD MANAGER

For the remainder of this quarter, the current versions of these products will remain at PSR401, Level 10 and the FUTURE versions will remain at PSR420, Level 12. During the quarter break, these products will change as follows:

PSR401, Level 10 products will be removed
PSR420, Level 12 products will become current
PSR439, Level 13 products will become FUTURE

The next UCC newsletter will describe all these products (including all libraries and utilities) and will explain how they are accessed.

H. Kurs, 376-1762

↳ Library Changes

March 25 PLOT31 was changed to request field length correctly.

March 15 TYPESET was replaced by the latest version on both the Cyber 74 and the 6400. (TYPESET is a text-formatting program written by one of our dedicated users, Mike Huck.)

M. Frisch, 376-1636

RETURN TO
UNIVERSITY COMPUTER CENTER
227 EXPERIMENTAL ENGINEERING
UNIVERSITY OF MINNESOTA
208 UNION STREET SE
MINNEAPOLIS, MINNESOTA 55455

UNIVERSITY ARCHIVES
11 WALTER LIBRARY
UNIV OF MINNESOTA
EAST BANK CAMPUS