UNIVERSITY COMPUTER CENTER

UNIVERSITY COMPUTER CENTER, UNIVERSITY OF MINNESOTA-TWIN CITIES, MINNEAPOLIS, MINNESOTA

CONTENTS

DEADLINE FOR THE NOVEMBER NEWSLETTER
IS OCTOBER 25.....

BULLETINS

Cyber 74/172 users*************************************

Don't forget to look at WRITEUP(UPGRADE). Three new documents have been added:

  WRITEUP(UPGRADE=DIFF) Cyber 74-172 differences
  WRITEUP(UPGRADE=NOSCLAS) NOS short courses
  WRITEUP(UPGRADE=PUNCH) Punch conversion information

You can have these documents printed on a high-speed ASCII printer thus:

From the Cyber 74:

  WRITEUP(UPGRADE=name/L=MINE,PT=AS)
  ROUTE(MINE,DC=PR,EC=A6,TID=BC,BIN=*EA)

From the Cyber 172:

  WRITEUP(UPGRADE=name/L=MINE,PT=AS)
  ROUTE(MINE,DC=PR,EC=A9,TID=BC,BIN=*EA)

****

CYBER 74/172 DIFFERENCES

The Cyber 172 compare/move unit

There are some cases where a binary program which runs properly on the Cyber 172 will not work when run on the Cyber 74. This is because the Cyber 172 interprets some instructions as COMPARE/MOVE instructions while the Cyber 74 does not.

The Cyber 172 and the Cyber 74 central processors are very similar in operation. The Cyber 74 has many "functional units" individually designed to handle central processor instructions of a common type. For example, all "branch" instructions are interpreted by the branch control unit; the shift unit handles floating point to integer and integer to floating point conversions as well as the left and right shift instructions. Other units exist to perform floating point arithmetic, integer arithmetic, boolean operations, and so on. For each functional unit in the Cyber 74, there is an analogous section of hardware in the Cyber 172. Thus, the Cyber 172 processor is able to execute binaries created for the Cyber 74.

However, the Cyber 172 has a functional unit that does not exist on the Cyber 74. This is the COMPARE/MOVE unit (CMU). The CMU gives you the ability to manipulate data at the character level. For example, a string of characters may be moved from a field starting at, let's say, character position 3 of a word to a field whose first character starts at character position 7. Also, if the starting character position is 0, and the string length is a multiple of 10 characters, then whole words are moved. This is a very fast way of moving around large blocks of data within central memory. In addition, the CMU can compare two character strings of equal length and indicate which one is greater than the other.

Once an instruction is issued to the CMU, its execution is much more efficient than simulating the process with non-CMU instructions. However, since the Cyber 74 does not have a CMU, execution of code containing CMU instructions will cause unpredictable results. Therefore, if you use CMU instructions or compile your programs with a language processor that generates CMU instructions, you will only be able to use the binary program on the Cyber 172.

S.A. Reisman, 376-1775

FROM THE ASSISTANT DIRECTOR'S DESK

A warm welcome back to all of our users who have been away for the summer!

Much has happened that you may wish to know about. In summary, we changed from the KRONOS operating system to the NOS operating system; we changed character sets to the CDC 63-character set (a subset of the full ASCII set); and we changed accounting systems.

I urge you all to see the summer issues of the Newsletter and to read

WRITEUP(UPGRADE=*)

for explanations of many details of these changes, including the new way in which we calculate our charges to you. If you have a problem getting a copy of WRITEUP(UPGRADE), call 373-7744.

* * *

As you will see when you browse in the Twin Cities, the UMD, the UMM, and the UMW campus bookstores, we have published a new modular user's manual. In fact, we have been publishing the supplements to the manual over the past few years. However, the core unit which bears the formal name, UCC User's Manual, took longer than most of our staff members believed possible. It has taken the dedicated work of many highly motivated, if sometimes discouraged, people to produce it. We hope you find it helpful, readable, in fact, usable. We are still here to answer questions but we may, in addition, refer you to the User's Manual where the answer is more clearly explained.

The manual consists of seven fundamental chapters. The supplements, which you may already have, include various special items. For instance, the "Guide to Magnetic Tapes" is an example of the modular supplements we publish. If you never intend to use magnetic tapes, you will have no reason to add that particular module to your collection. At any given time, your collection of our documents should reflect your individual way of using the UCC facilities.

The manual comes in a blue looseleaf binder which has space for some of the supplements plus at least one year's set of UCC Newsletters.

May I suggest right now that you call our Reference Room (373-7744) and ask that your name be added to our newsletter mailing list, if you do not already receive your own copy. Anyway, do go to your nearest campus bookstore and see what our staff has brought forth to assist you.

* * *

To those of you who publish the results of your research: we appreciate receiving recognition for any contributions we have made in the way of direct grants or consulting and advice. Where a grant has been made, it is appropriate to note this fact in a footnote on the first page of the article being published.

* * *

The new NOS manuals we are receiving from CDC describe the NOS system at "Level 472" (manual revision letter "F") but this description does not exactly match our current system. We are running under an earlier system with local modifications. We try, as far as we are able, to document the items in our running system that differ from the NOS manual. Read

WRITEUP(UPGRADE=CONTROL)
and
WRITEUP(UPGRADE=DIFF)

We will continue to do our best to keep you informed.

T.D. Hodge, 373-4599

COBOL, COBOL 5, and Record Manager

Now that the KRONOS to NOS conversion has been made, I think I should summarize the status of the business data products.

All the BDP packages on the system are NOS versions. There are no KRONOS products available. For COBOL 4 users, this means that there is no PAST version of either COBOL or CB4LIB. Additionally, the current version of COBOL has been upgraded to NOS level 460. Control Data has stopped accepting Program Status Reports (PSRs) for COBOL 4 and is removing programmer support of it in favor of COBOL 5 so I do not expect too much more corrective code for it from CDC. COBOL 4 will remain on our system as long as we are running the NOS operating system. CDC will continue to support COBOL 5, which is the successor product to COBOL 4.

A current version of COBOL 5 is now on both the Cyber 172 and the Cyber 74. The COBOL 5 on the Cyber 172 contains the interface to CDC's data management package, DMS-170. The Cyber 74's version of COBOL 5 does not have this interface, and we have no plans for placing any DMS-170 product on the Cyber 74.

Within a few weeks, FUTURE versions of SYSIO (Record Manager), COBOL, COBOL 5, SORTMRG, and QUERY UPDATE will be placed on the Cyber 172 only. These FUTURE versions will make use of the 172's COMPARE/MOVE unit (CMU).

Reports from other sites say that use of the CMU greatly enhances program performance. These products will remain up during Fall quarter while I run tests to verify these reports. Remember, programs compiled with these products, or linked with this version of Record Manager will only execute properly on the Cyber 172 (see the article on page 74).

Application Notes

I have created a new indexed writeup called BDPNOTE. This writeup file will be updated at sporadic intervals. I will try to place helpful application hints or ideas in it.

Many users are not aware of all the capabilities of our products such as FORM, SORTMRG, or Record Manager. By example, I will try to show how to do such things as sort a data file, merge two pre-sorted files together, read a tape generated at an IBM installation, set up indexed sequential files, and more.

These notes will not attempt to teach complete knowledge of the packages being used, but they will contain references to manuals containing the appropriate documentation. For a list of current notes, use the control statement:

    WRITEUP,BDPNOTE.

                              S.A. Reisman, 376-1755

System 2000

During the summer break, minor changes were made to System 2000. Additionally, Control Data's data management system, DMS-170, was installed on the Cyber 172 only.

We have received Versions 2.70 and 2.75 of System 2000. These products are fully compatible with Version 2.60. Data bases created by any one of these three packages may be freely accessed by either of the other two. Also, data bases created by System 2000 Version 2.40 may be accessed by any of the other three versions. However, your 2.40 data base will be automatically restructured so that future accesses must be made by a 2.60 compatible version.

Essentially, System 2000 now comes in three sizes: small, normal, and large. The large size is Version 2.70. By combining overlays and increasing the size of I/O buffers, 2.70 is faster and more efficient that 2.60. Likewise, by decreasing I/O buffers and eliminating the natural language interface, Version 2.75 was made significantly smaller than 2.60. Remember, since all these versions are compatible, Version 2.60 natural language can be used with a data base created by a Version 2.75 PLI program. The following tables summarize the versions of the products supplied normally or when preceded by PAST, FUTURE, or FETCH control statements (--- means not applicable):

	PAST	current	FETCH
S2000	2.40	2.60	----
PLICOB	2.40	2.60	----
PLIFOR	2.40	2.60	----
PLILGO	2.40	----	2.60
RWEXIT	2.40	----	2.60

	FUTURE	FETCH
S2000S	2.60	----
PLICOBS	2.75	----
PLIFORS	2.75	----
PLILGOS	----	2.75
S2000L	2.60	----
PLICOBL	2.70	----
PLIFORL	2.70	----
PLILGOL	----	2.70

During the summer, the DMS-170 package was added to the library on the Cyber 172. DMS-170 is Control Data's entry in the data management field. It consists of a schema compiler, query language, COBOL 5 interface, and some data base utilities. Here is a short list of manuals covering DMS-170 topics. They can be ordered from the UCC Reference Room by stopping in room 235a Experimental Engineering or by calling 373-7744.

60498900 DMS-170 General Information
69498700 Cyber Database Control System Version 1
60498800 Data Base Utilities
60498400 DDL2 - Scheme Definition

60498500 DDL2 - COBOL Sub-schema Definition
60498600 DDL2 - QUERY UPDATE Sub-schema Definition
60493300 QUERY UPDATE Reference Manual
60499000 QUERY UPDATE User's Guide
60497100 COBOL 5 Reference Manual
60497200 COBOL 5 User's Guide

I will also hold a one or two day seminar late in November to introduce DMS-170 to the user community. After that, I will try to set up a regularly scheduled short course for Winter and Spring quarters.

S.A. Reisman, 376-1755

Scientific Information Retrieval System (SIR)

The rapid advance in research technology has led to large increases in the gathering of research data. In consequence, a need for a data base system to assist in integrating this data has developed. Up to now, however, most large integrated data base systems have been developed for business applications.

A new data base management system, SIR, has been designed to meet the needs of a scientific research worker. This was accomplished by adopting a language syntax similar to that of SPSS, which is easily learned and often used by a researcher; by strict adherence to the use of minimal computer resources; and by letting SIR interface directly with major statistical systems such as SPSS and BMDP.

SIR can be called with the control statement:

    SIR.

The version that we have is appropriate for both interactive and batch users. A SIR User's Manual is available in the Minnesota Book Center, Williamson Hall. If you need more information or have questions about SIR, call

J.C. Cosgrove, 376-1761
S.P. Yen, 373-4886

FORTRAN AT THE UNIVERSITY OF MINNESOTA

Fortran is currently the most widely used programming language on the Computer Center's Cyber computers. It is not clear that this should be the case, because more modern languages, such as Pascal, are better than Fortran for teaching purposes – at least. This discussion is limited to Fortran.

There are two Fortran compilers available at UCC. These are the University of Minnesota Fortran compiler, known as MNF, and the Control Data Fortran Extended Version 4 compiler, known as FTN. Both compilers will accept programs written in "Standard Fortran" as defined in the American National Standard X3.9-1966. Neither compiler will accept the new 1977 standard Fortran language. In general, MNF will run programs written for FTN without change, but MNF has several major features (such as IF-THEN-ELSE blocks) which will not work on the FTN compiler.

MNF was written and is maintained by us. FTN was written and is maintained by Control Data. In practice, this means that support for both compilers is efficient. They both work well and have virtually no errors – if any user suspects that a compiler is wrong, this should be reported to us so that the error may be quickly corrected. However, if your program goes wrong, the probability that the compiler is at fault is of the order of 100,000 times less than that of there being a mistake in your program or its data. This ratio is non-trivial.

There would be no point in having two compilers if they had the same properties. Both MNF and FTN are good for particular kinds of jobs, and the relative merits of the two are now discussed.

MNF is good for debugging — that is, all the runs of a program until it is known to work correctly and efficiently (a paradisial state that is seldom, if ever, achieved). MNF is good at debugging for four main reasons:

(1) MNF detects as many errors in the source program as is humanly (or machinely) possible. Error messages are printed in the source listing for all obvious errors, and many possible errors (or peculiar coding) are also detected. The error messages of FTN are very good, but do not compare with those of MNF – which is, in this regard, a leader in its field. Many programmers do not like, and do not read, error messages – an attitude which is plainly foolish and certainly unprofessional.

(2) MNF has a control card option, MNF(T), which causes many execution tests to be done to verify the correctness of the running program. Use of MNF(T) makes the program run slower and use somewhat more storage, but not to an unreasonable extent. If your program prints wrong numbers, or stops in some unexpected way, it makes sense to re-run it using MNF(T). FTN also has a 'test-mode', known as "FTN DEBUG." However, DEBUG is hard to use, and extremely inefficient. In comparison to MNF(T), it is a poor fish, and is not recommended.

(3) MNF has a package called Mantrap which was written at the Universities of Leicester and Manchester in England (with extensive revision done here). Mantrap is ideal in that it "takes over" when an MNF job fails during execution, and prints a diagnosis (a 'post mortem dump') describing the error in terms of the Fortran names and line numbers used in the source program. No longer need users try to read 'octal dumps.' At Minnesota, Mantrap is not available under FTN, so FTN jobs will print an octal dump if they fail during execution.

(4) MNF compiles programs at lightning speed. This means that it is cheap and reasonable to compile a program many times using MNF. The FTN compiler is much less efficient and, therefore, is more costly.

There are four ways to use the FTN compiler; these correspond to the control card options FTN(TS), FTN(OPT=0), FTN(OPT=1), and FTN(OPT=2). FTN(TS) is, we feel, not as good as MNF — it is not maintained at Minnesota and should not be used here.

The OPT levels of FTN correspond to compile speed/execution speed "trade-offs." OPT=0 gives the slowest (very slow) execution speed with the fastest (pretty slow) compilation speed, compared with MNF, that is. OPT=2 gives the fastest (superbly fast) execution speed with the slowest (not all that slower) compilation speed. OPT=1 is somewhere between the two.

MNF will perform better than FTN(OPT=0) in both compilation and execution, therefore, there is never any point in using OPT=0; you would simply be wasting money. (Use of DEBUG turns on OPT=0.) OPT=1 usually compiles at about the same rate as OPT=2 but programs compiled using OPT=2 will nearly always run faster. Therefore there is no point in using OPT=1 (although it is the default value of OPT).

These options make sense for sites that do not have MNF — which is why CDC invented them. If you decide to use FTN, it always makes sense to use the FTN(OPT=2) option. In the following discussion, 'FTN' means 'FTN(OPT=2)'.

FTN is good for running debugged programs — especially programs that run for a long time (say, more than 30 CP seconds), or programs which are executed very often (production programs). In some cases, a program compiled using FTN will execute twice as fast as it would if compiled using MNF. Although this factor of two is not typical, the use of FTN over MNF will nearly always result in some gain in execution speed. In addition, the code generated by FTN is usually smaller than for MNF programs. Unfortunately, for most jobs, this small gain in core storage under FTN is more than wiped out by the size of the FTN execution library. The MNF execution library is very much smaller, and for a small job, use of MNF will usually result in a saving of about 10000B words during execution compared with FTN. There are simple ways to reduce execution storage, which the consultants can explain.

A further advantage of FTN is that it needs less storage to compile a program than MNF does (this is one reason why it is slow in compilation — the other reason is that it optimizes the program, leading to fast execution).

Compilation storage needed by MNF can be very high (over 100000B words) for a huge subroutine containing thousands of cards. Of course, you should never write a huge subroutine — there are better ways to program — but if you get stuck with one and have limited storage available, you may be able to compile it using FTN, where MNF would fail.

In summary, MNF is the best compiler to use for little jobs which are only run a few times. FTN(OPT=2) is best for programs which use a lot of execution time, or are to be run many times. At this Center, about 70 to 90 percent of jobs are in the former category. It makes sense to debug production programs under MNF and finally run them

under FTN(OPT=2), but you will have to steer clear of some special MNF features not possessed by FTN. These are listed in the "MNF Guide" (below).

Documentation

Four main documents describe FTN and MNF:

(1) The MNF Guide — available free from the Computer Center, or by use of the WRITEUP(MNF) control statement. The MNF Guide is about 30 pages long and is not suited to printing at a terminal. This Guide is essential reading for MNF users. The "MNF Reference Manual" is no longer published — and existing copies are no longer accurate. The accurate MNF documentation consists of the "MNF GUIDE" and:

(2) The CDC "Fortran Extended Version 4 Reference Manual." This is the complete reference work for FTN — and, because MNF accepts nearly all FTN features, it is also recommended as the reference work for MNF. Of course, most users (of MNF, at least) will not need a full reference manual — the "MNF Guide" contains all the information most people will need. The FTN reference manual is not free, but many chained down copies are available.

(3) The "Mantrap Guide" — available, free, from the Computer Center, or by use of the WRITEUP(MANTRAP) control statement. This is the definitive work on Mantrap, and contains about 20 pages. It is required reading for MNF users, at least those users who encounter execution errors.

(4) The CDC "Fortran Extended User's Guide" — available, at cost, from the Computer Center. Whilst not 'required reading' this manual contains many good tips not available elsewhere. Some of the information is specific to FTN, but much of it is of general interest.

(5) "MNF: Optimization" — available, free, from the Computer Center. It contains much good information, but omits to mention that the easiest way to optimize an MNF program is to run it under FTN(OPT=2). My view is that the Fortran programmer should not have to optimize a program — the compiler ought to do it. FTN by and large does do this, but there are some things a compiler cannot know and these are discussed in (5).

(6) "MNF: Storage Usage" — this short document is no longer accurate. Copies are floating around and should be resolutely ignored.

Timesharing

Many timesharing users use the MNF and FORTRAN Telex subsystems in conjunction with the RNH command. What is really going on here (largely hidden from the user) is that the MNF compiler is used to compile and then execute the user's primary file. Because storage is at a premium under timesharing, the MNF compiler used is slightly different from the one used for batch (card) jobs. The timesharing version of MNF is sometimes known as TSF — it is the same as the regular MNF, except that it has the MNF(I=primary file name,K,D) options set on by default (see the

"MNF Guide") and it has some features removed in order to make it smaller. The features of MNF that are not in TSF are:

(1) TSF has no cross reference map - R option.
(2) TSF has no object code listing - O option.
(3) TSF does not optimize DO loops, thus causing some programs to execute slower under TSF.
(4) TSF has smaller internal buffers, thus limiting the maximum size of a single source statement (this does not matter).
(5) On the 6400, double and complex are not available.
(6) TSF does not issue compiler dayfile messages (such as time time and storage used for compilation).

There are no other differences between MNF and TSF. Mantrap works fine under both batch and timesharing, but there is a difference. Under timesharing, Mantrap works (or will soon) interactively - this is fully described in Section 4 of WRITEUP(MANTRAP).

Changes from last year

(1) On the Cyber computers (not the 6400) the Cyber loader must be used for all MNF and FTN jobs (it is, of course, now the default loader on the Cybers). Use of the LOADER(LINK) control card will cause errors in loading of Fortran jobs, and will cause Mantrap to stop with the message "/// NO LOAD MAP". The Cyber loader takes more core than LINK. This may be alleviated by putting large arrays into blank (unlabelled) common.

(2) Under timesharing (on the Cybers, at least) Mantrap will shortly be interactive in its operation. Overlay jobs hoping to make use of Mantrap must now include the control statement LDSET(MAP=B/ZZZZMP) in the load sequence. For normal (non-overlay) jobs, Mantrap no longer destroys the load map.

(3) MNF(R=1,P=2000) are now default options, as opposed to MNF(R=3,P=5000) a year ago. Introduction of Mantrap has made the (still useful) MNF cross reference map less essential than it used to be.

No other significant changes were made. On the Cyber 74 and 172, the MNF compilers are now identical. On the 6400, the versions of MNF and especially Mantrap in use are rather different. Please consult Michael Skow for details of the 6400 implementations. (In particular, the LINK loader is still in use on the 6400.)

Very old MNF programs

There is still somewhat substantial use of MNF 4.3, a pre-Record Manager version of MNF, which is available by means of FETCH(MNF) on the Cyber computers. We most strongly urge users of this version to convert to current versions of MNF or FTN. There may be cases where conversion is not trivial - such as programs doing their own I/O file handling in COMPASS subroutines (and it is doubtful if these are really 'Fortran' programs at all - they are really COMPASS programs with Fortran subroutines; but at least the Fortran parts could be updated). Whilst we have no plans to remove the FETCH version, we will not maintain

it and it is known to contain errors. Probably most of the programs currently using FETCH could very easily use the current version of MNF. WRITEUP(NEWMNF) (no longer all that new) describes how to convert very old MNF programs to use the current versions of MNF. In addition, the consultants will give advice where needed - and, in tough cases, Jim Mundstock and myself will help you. The once popular view that the new version of MNF uses much more execution storage than old versions is a false view (except for programs that do random I/O). If you try it, and find me wrong, bring the program in - and we will sort out the problem. It is not wise to use archaic software, and we simply do not have the staff to maintain two versions of MNF. Note that, whilst the FETCH version can use either loader, Mantrap cannot be used with it. The FETCH version is forever frozen.

The future

Over the past year or so, we have tried to stabilize MNF; to change it only when there was good reason. To a fair extent, this has been achieved. Over the next months and, I hope, years, MNF should be modified very seldom, and, then, very little. This is only possible when a very high degree of reliability has been achieved. We have achieved it, because MNF contains, at present, no known errors. Stability is also admired by experienced users who (quite rightly) prefer the devil they know to the good guy they don't. We will continue to update FTN(OPT=2) as CDC release their standard changes. FTN(OPT=2) has been very reliable, and CDC provides an excellent service, so there should be no problems in this regard - except that FTN will adapt to system changes (such as a radically new version of Record Manager), whereas MNF will not do so (it will stay with Michigan State University Record Manager). This is not expected to cause major problems. In the long term, it simply means that free interchange of pre-compiled binary routines between MNF and FTN may be somewhat limited.

M77, the new ANS-1977 compatible version of MNF, is still far from ready and it would be unwise to give a release date. FTN Version 5 (the ANS-77 FTN) has a possible release date in mid-1979. CDC may well be ready before we are - they have more resources. In any case, most of the really desirable ANS-77 features (like END=, IF/THEN/ELSE, PARAMETER, etc.) are already in MNF, but not FTN. (See the "MNF Guide.") Many of the other new features are (in my view) nasty, like type CHARACTER. If you want to use type CHARACTER, the best way is to use Pascal. Which is where we came in.

C.F. Schofield, 373-5239

LIBRARY CHANGES AND ADDITIONS

Yale sparse matrix package

A sparse matrix package has been purchased from
Yale University and installed on the Cyber 74 and
172. it solves symmetric and nonsymmetric systems
of equations and the problem must fit in core.
The package has been made available in binary form
as a user library called YSMPLIB. Below are
sample job decks:

MNF Example	FTN4 Example
Job card	Job card
USER card	USER card
MNF(B)	FTN.
FETCH(YSMPLIB)	FETCH(YSMPLIB)
LGO.	LGO.
7-8-9 card	7-8-9 card
(Fortran program with CALLS	
to YSMPLIB routines)	
.	.
.	.
.	.
END	END
7-8-9 card	7-8-9 card
data cards, if any	
6-7-8-9 card	6-7-8-9 card

The routines were tested by UCC with a program
written at Yale and the test deck ran
satisfactorily. Documentation for YSMPLIB is
available from the Program Librarian,

M.J. Frisch, 376-1636

INSTRUCTIONAL VIDEO TAPES

Four new instructional video tapes were produced
by UCC this summer. They are:

Introduction to SPSS: Part 1   (20 minutes)
    This tape covers the basic job structure for
    running an SPSS job, the SPSS program
    structure, and the SPSS control statement
    format. An example job is illustrated and
    discussed; data structure is discussed.

Introduction to data base management systems and
    System 2000   (28 minutes)
    The tape provides a general introduction and
    description of data base management systems
    and their structure. System 2000 is
    described: its modules, structure, and
    capabilities. A CRT demonstration is given
    showing how to create, load, change, and
    release a data base by using System 2000
    commands. The demonstration includes
    procedures for tape backup of the data base
    and describes report writing feature of System
    2000.

University of Minnesota
    computer system configuration   (45 minutes)
    This tape is directed toward all users and
    describes UCC and the University's computer
    configuration. It describes how the hardware
    is connected, what the operating system is,
    and how the operating system controls the
    hardware and user programs. There is also a

discussion of the path a user's job would take
through the system, from input, to the waiting
queues, to the CPU for computing, and
eventually to output.

The Univac 1004 RJE terminal   (20 minutes)
    This is a revision of the previous 1004
    instructional tape. It is a demonstration of
    the different aspects of operating the 1004
    terminal, from powering up, to dial-up, card
    reading, dealing with card jams, paper
    changing, powering down, and problem
    procedures.

In addition to the four new video tapes, there are
three old tapes available:

The how-to's of keypunching   (35 minutes)
    Instruction and demonstration on the operation
    of the 026 and 029 keypunches. The tape does
    not include instruction on use of programmed
    keypunching or verifying.

Using a timesharing terminal   (30 minutes)
    Instruction and demonstration on the operation
    of timesharing terminals (TTY, DECwriter, CDC
    713, Teleray), use of the University of
    Minnesota computer systems and some basic
    commands.

A video tour of the Cyber 74   (30 minutes)
    A tour of the University of Minnesota CDC
    Cyber 74 computer system; showing and
    explaining the different aspects of the
    hardware and software, and their functions.

These tapes are available for viewing in the
Learning Resource Centers in Walter Library,
Temporary South of Coffey, Diehl Hall, and the
Engineering Library in Lind Hall.

Some or all of the tapes are also available for
viewing on the Duluth, Morris, Crookston, and
Waseca campuses.

If you would like copies of any of the tapes,
plase send a blank tape (1/2 inch reel to reel or
3/4 inch cassette) of the appropriate length (30
minutes or 60 minutes). Send your requests and
tapes to:

    Lincoln Fetcher
    University Computer Center
    227 Experimental Engineering
    University of Minnesota
    208 Union Street SE
    Minneapolis, Mn 55455

Include postage to cover the cost of returning
your tapes. Please allow 3-4 weeks for copying.

For more information, call

L. Fetcher, 376-1637

UCC User's Manual

We are proud to announce the arrival of the UCC User's Manual. This manual has been in production for three and one-half years and is the joint work of many dedicated people at UCC.

The User's Manual has been designed to be a definitive source of information about UCC and its computing facilities. The manual contains sections on documentation at UCC, computer terms and definitions, UCC computing facilities, the organization and manipulation of data, job flow in the computer system, how to run jobs, and UCC operations policy. A glossary and an index are included to help the reader use the manual to its fullest.

Since a complete description of all the detail a person would have to know to use all aspects of a large-scale computer system would probably run into thousands of pages, several supplements to the User's Manual have been published. Others are planned for the future. The supplements now available are:

1. Guide to User Libraries (free)
2. Guide to Magnetic Tape Usage ($2.20)
3. Guide to Record Manager ($1.30)
4. Guide to Graphics Facilities ($1.60)

Future supplements may cover such topics as text editing, mathematics and statistics packages, permanent file usage, information interchange among computing centers, etc.

The User's Manual contains fairly stable data; the more routinely changing and detailed information is contained in the supplements. The User's Manual will be updated and corrected with periodic addenda and will probably be completely re-issued every two to three years. The first addendum with corrections and references to the NOS operating system will be distributed during Winter Quarter. The supplements are reviewed annually and revised when necessary.

The UCC User's Manual and the User's Manual Supplements can be purchased from the University bookstores. You are encouraged to use these manuals and to report any comments to User Services at UCC.

A.B. Mickel, 376-7290
M.C. Boyd, 373-2522

An Interim MNF Manual

The many requests for an MNF (Minnesota Fortran) Reference Manual have prompted us to issue an interim MNF manual called "Abbreviated Guide to MNF." This document has been extracted and reprinted, largely without editing, from Revision 4 of the MNF manual. It contains substantially all the material from the first nine chapters of the 1976 manual except that material covered better in the UCC publications "MNF: A Simple Guide" and "MNF: Mantrap" has been excluded, most features no longer available have been omitted, and details of features unlikely to be used by students have been excised.

Matter from Chapter 10 and from most of the appendices of the manual is also not reprinted. Most of the omitted material is available in other references. Of course, the UCC Reference Room copies of the MNF manual contain all the missing material.

"MNF: A Simple Guide" and "MNF: Mantrap" should be adequate references for most users who already know Fortran. The debugging and tracing information in them is generally much more helpful than similar information in the MNF manual. With the addition of the CDC "Fortran Extended Version 4 Reference Manual," this collection of documents should provide a useful set of reference materials for most UCC users.

S.K. Graffunder, 376-1637
M.C. Boyd, 373-2522

Where do you find printed documentation?

The printed software documentation that has been located in the hallway outside the UCC Reference Room, 235a Experimental Engineering, has been moved to shelves in the User's Room, 140 Experimental Engineering. This should be a convenient pickup site for all users.

This collection covers documentation for UCC-written Fortran subprograms (Minnesota subprograms), graphics software, data base management systems, editors, conversion aids, language processors, and statistics packages. All of the introductory student publications may also be found in room 140.

So, remember, if you need to update your current documents collection, or if you need documentation that will introduce you to the facilities at UCC, you should go to 140 Experimental Engineering.

M.C. Boyd, 373-2522

Publications

1. WRITEUP(DOCLIST) has been modified. You will find it now includes the most recent NOS documentation.
2. Price on the 'UCC User's Manual' (see above) is $5.00.
3. The 'Student Guide to Batch Computing' has been revised and is available, free, in 140 ExpEng.
4. User Manual Supplement, 'Guide to User Libraries' has been revised and is available, free, in 140 ExpENg.
5. A new 'BMDP Update' was issued and is available, free, in 140 ExpEng.
6. A revised copy of 'A Guide to Data File Conversions' was printed and is available, free, in 140 ExpEng.
7. The 'Abbreviated MNF' is available, free, in 140 ExpEng.

WRITEUP documents

These WRITEUPs were new or revised in September:
AFLISTS, AROUTE, ASEND, BDPNOTE, CLASSES, CONSULT, CPDEBUG, FORSUBS, GENCORD, KCL, MULTI, PTRFORT, PTRKR, PTRMISC, PTRNOS, PTRSTAT, PTRS2K, SYSLIB, UPGRADE, VIDEO.

If you are unable to get copies of these WRITEUP documents, please call 373-7744 and request a copy. We will have one printed and sent to you.

PRODUCTION USAGE SUMMARIES: Cyber 74/172

	Cyber 74 August, 1978	Cyber 74 August, 1977	Cyber 172 July-August, 1978
System resource units (SRU)	1,058,157 (1,230,263)	-	172,955 (485,083)
Batch jobs and MIRJE sessions	85,456 (93,379)	75,343 (83,908)	16,517 (26,439)
Central processor hours inc. DELAY	218 (252)	165 (211)	66 (196)
DELAY queue processor hours	79 (83)	42 (46)	-
MIRJE terminal hours	8,056 (8,916)	8,129 (9,944)	4,326 (7,123)
Mass storage transfers (KPR)	286,343 (333,860)	219,196 (277,566)	86,876 (182,778)
Magnetic tape transfers (KPR)	6,416 (8,610)	7,027 (8,920)	597 (1,883)
Pages printed, charged from UCC	946,422 (1,027,464)	719,195 (811,299)	23,527 (103,629)
Cards punched	374,336 (400,358)	466,556 (482,878)	-
Microfilm frames produced	25,685 (247,024)	7,433 (259,422)	0 (172,697)
Statos plotting production (feet)	8,332	7,433	-
Tapes mounted	10,341	9,765	3,158
Average file storage (char)	2,025.2 million	1,106.0 million	-
Mean time between failures	9.8 hours	32.7 hours	20.4 hours
Available during scheduled hours	97.3 percent	96.8 percent	97.5 percent
SUPIO uptime during available hours	85.8 percent	96.4 percent	-

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

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

	Monday-Friday 0800-1800		other		total	
Total possible scheduled uptime hours	200.0	200.0	297.0	184.0	497.0	384.0
Total downtime hours (see Schedule A)	5.1	5.4	2.8	0.0	7.9	5.4
Total uptime hours	194.9	194.6	294.2	184.0	489.1	378.6
Uptime (percent)	97.5	97.3	99.1	100.0	98.4	98.6
Average downtime per occurrence (min)	9.6	19.1	20.8	0.0	11.8	19.1
Mean time between failures (hours)	6.5	13.3	37.1	---	12.7	25.6
Subsystem failures						
SUPIO	10	-	0	-	10	-
TELEX	1	0	1	0	1*	0
EXPORT	24	-	3	-	27**	-

Schedule A: downtime hours

	Number		Total hours		Average minutes	
(1) Preventive maintenance over-runs	1	2	0.1	0.3	3.0	9.0
(2) Software related problems	26	8	4.7	0.9	10.7	6.8
(3) Hardware related problems	10	3	2.6	2.9	15.7	58.3
(4) Indeterminate problems	2	2	0.2	0.2	5.5	7.5
(5) External Problems	1	2	0.4	1.1	23.0	31.5

*There were intermittent problems with hung ports during the month. The 2551 (which has most of the dial-up
lines) had to be taken down twice during the month and also failed once (down for 3 hours).
**15 of the failures occurred on September 15th.

PRODUCTION USAGE SUMMARIES: CDC 6400

	August, 1978	August, 1977
Number of jobs run	86,732	100,778
Central processor hours	98	122
MERITSS terminal hours	10,585	12,742
Number of terminal sessions	19,538	24,547
Maximum number of simultaneous users	66	76
Average file storage (char)	344.3 million	270.4 million
Mean time between failures	98.8 hours	70.9 hours
Available during scheduled hours	99.2 percent	99.6 percent

Here is a table of language processor usage statistics on the Cyber 74/172 and 6400
computer systems for the periods July 1, 1977 through June 30, 1978 and (for
comparison) July 1, 1976 through June 30, 1977. PASCAL, COBOL, and BASIC enjoyed
a substantial increase in usage.

LANGUAGE PROCESSOR		1977-1978			1976-1977		
		TOTAL	6400	CY74/172	TOTAL	6400	CYBER 74
ALGOL	CDC ALGOL 3 COMPILER	366	321	45	2,214	1,453	761
APLUM	CDC APL 2.20 INTERPRETER	12,820	3,843	8,977	15,018	4,801	10,217
ASM11	U OF M PDP-11 CROSS-ASSEMBLER	158	43	115	-	-	-
ASM68	MOTOROLA 6800 CROSS-ASSEMBLER	53	39	14	-	-	-
BASIC	CDC BASIC 2.1 COMPILER	429,276	372,398	56,878	284,952	240,667	44,285
BATCHER	U OF M BATCH FORTRAN COMPILER	36,596	-	36,596	48,626	-	48,626
COBOL	CDC COBOL 4 COMPILER	154,517	-	154,517	60,440	-	60,440
COBOLX	U OF M INTERACTIVE CDC COBOL 3	2,336	2,150	186	2,116	1,886	230
COMPASS	CDC COMPASS 3 ASSEMBLER	50,914	23,491	27,423	49,884	31,086	18,798
EMULATE	U OF M CDC3200 ASSEMBLER	10,674	-	10,674	6,031	-	6,031
FTN	CDC FORTRAN 4 COMPILER	82,752	-	82,752	81,038	-	81,038
GPSS	CDC GPSS 5 TRANSLATOR	515	-	515	3,668	-	3,668
LISP	U OF TEXAS LISP 4.1 INTERPRETER	3,380	1,364	2,016	7,179	3,432	3,747
MAC80	INTEL 8080 CROSS-ASSEMBLER	1,184	758	426	1,416	1,048	368
MIMIC	CDC MIMIC INTERPRETER	213	-	213	420	-	420
MIXAL	U OF M MIX ASSEMBLER	8,959	2,291	6,668	10,174	1,392	8,782
MIXBYTE	U OF M MIX INTERPRETER	780	-	780	1,184	-	1,184
MNF	U OF M FORTRAN 5.3 COMPILER	380,675	48,021	332,654	414,996	103,051	311,945
MP	U OF M MICROPLANNER INTERPRETER	139	-	139	-	-	-
PASCAL	ETH ZURICH PASCAL COMPILER	272,583	223,756	48,827	161,064	120,281	40,783
PL1	NEW YORK U PL/1 COMPILER	220	-	220	105	-	105
PLM80	INTEL 8080 PL/M CROSS-COMPILER	28	12	16	-	-	-
SIMS	CDC SIMSCRIPT 2 COMPILER	45	-	45	17	-	17
SIMULA	CDC SIMULA 1.0 COMPILER	1,936	-	1,936	574	-	574
SNOBOL	U OF COL. SNOBOL 3.10 INTERPRETER	3,034	-	3,034	2,005	-	2,005
SNOBOLC	U OF CALIF. SNOBOL INTERPRETER	54,057	44,879	9,178	44,915	34,555	10,360
SYMPL	CDC SYMPL 2 COMPILER	125	-	125	51	-	51
TSF	U OF M INTERACTIVE FORTRAN	525,633	432,270	93,363	476,859	417,189	59,670
UMRPG	U OF M RPG TRANSLATOR	953	-	953	895	-	895

CYBER 74/172 OPERATING HOURS

Sun			‖‖‖‖‖‖‖‖‖‖‖‖		
Mon	*		<><><><><><><><><><><>$$		
Tue	*******		<><><><><><><><><><><>$$		
Wed	*******		<><><><><><><><><><><>$$		
Thu	*******		<><><><><><><><><><><>$$		
Fri	*******		<><><><><><><><><><><>$$		
Sat	**************	$$$$$$$$$$$$$$$			

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      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 N64U	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).

CDC 6400 OPERATING HOURS

Sun				<><><><><>	
Mon			><><><><><><><><><><><>		
Tue	<>		><><><><><><><><><><>		
Wed	<>		><><><><><><><><><><><>		
Thu	<>		><><><><><><><><><><>		
Fri	<>		><><><><><><><><><><><>		
Sat	<>		<><><><><><><><>	**************	

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      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

FALL QUARTER 1978 SHORT COURSE SCHEDULE

Form is: Course, Time, Dates (days), Location, Instructor.

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Introduction to System 2000.: 2:15-4pm, Sept 25 - Oct 6 (mwf), 2 VH, JCC
Introduction to UCC (Mpls)..: 2:15-4pm, Sept 28 (th), 18 MechE, RTF
Beginning FORTRAN...........: 2:15-4pm, Oct 2 - 20 (mwf), 321 Aero, RTF
Beginning COMPASS...........: 2:15-4pm, Oct 3 - 19 (tth), 211 Aero, KCM
Introduction to UCC (StP)...: 2:15-4pm, Oct 5 (th), 835 ClaOff, RTF
Pascal......................: 3:15-5pm, Oct 9 - 27 (mwf), 211 Aero, JPS
NOS Control Statements......: 2:15-4pm, Oct 10 - 31 (tth), 215 Aero, RTF
System 2000/Report Writer...: 2:15-4pm, Oct 16 - 20 (mwf), 2 VH, JCC
System 2000/PLI.............: 2:15-4pm, Oct 23 - 27 (mwf), 2 VH, SPN
SPSS (computer neophytes)...: 2:15-3:30pm, Oct 30 (m), 18 MechE, SPY
SPSS (SPSS neophytes).......: 2:15-3:30pm, Oct 31 (t), 18 MechE, SPY
SPSS (SPSS intermediates)...: 2:15-3:30pm, Nov 1 - 2 (wth), 18 MechE, SPY
SPSS On-Line................: 2:15-3:30pm, Nov 3 (f), 18 MechE, SPY
Graphing and Graphics.......: 7:30-9:30pm, Oct 31 - Nov 2 (twth), Laud.*, KMM
NOS Control Language........: 2:15-4pm, Nov 2 (th), 215 Aero, RTF
Introduction to Timesharing.: 2:15-4pm, Nov 7 - 9 (tth), 211 Aero, RTF
COBOL.......................: 2:15-4pm, Nov 13 - Dec 1 (mwf), 2 VH, JCC
Record Manager..............: 2:15-4pm, Nov 13 - 17 (mwf), 115 ForH, SAR
Sort/Merge..................: 2:15-4pm, Nov 14 - 16 (tth), 306 FolH, SAR
SPSS (Crosstabs)............: 2:15-3:30pm, Nov 14 (t), 211 Aero, SPY
SPSS (Regression)...........: 2:15-3:30pm, Nov 16 (th), 211 Aero, SPY
Scientific Info Retrieval...: 2:15-4pm, Nov 28 - 30 (tth), 306 FolH, JCC
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* Lauderdale Conference Room, Lauderdale Computer Site, 2520 Broadway Dr.

(asterisk (*) after course indicates change from first publication)

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