University Computer Center newsletter

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MEETINGS AND DISCUSSIONS

OPEN MEETING FOR USERS

A meeting open to all users was held at 2:15 PM on October 30th to present a status report on KRONOS and to answer questions. A KRONOS Status Report, written by L.A. Liddiard, Associate Director for System Operation, was handed out and discussed. An edited version of this report appears on page 2 of this newsletter; complete copies are available in the UCC Reference Room, 235a ExpEng. Also distributed at the meeting were a short, preliminary writeup on tapes (updating the KRONOS Tape Conversion Guide) and copies of PTRLIST (containing information on known errors and current system information). Excerpts from the tape writeup appear on page 3 of this newsletter and full copies are available in the Reference Room. Part of the PTRLIST appears on page 4 of this newsletter.

OPEN DISCUSSION ON TAPE PROCESSING

UCC will hold an open discussion to help us coordinate all known information on KRONOS tape processing. Since so many tape formats exist it is not possible for Computer Center staff to become familiar with all user-encountered bugs, needs, and required options. This meeting is intended to fill this gap in our knowledge. UCC staff members will be present to answer questions, take suggestions, consider bugs, and offer suggestions. If you use tapes we would appreciate your attending this session. The discussion will be held:

Tuesday, November 19
2:00 - 4:00 PM
Room 193 Experimental Engineering.

THE SEPTEMBER NEWSLETTER AND THE SEPTEMBER VERSION OF THE UCC POCKET GUIDE CONTAINED ERRORS IN THE LISTS OF CHARGES WHICH WERE PUBLISHED. THE FOLLOWING IS A CORRECTION FOR THE STORAGE CHARGES LISTED:

1) MAGNETIC TAPE STORAGE @ LAUDERDALE SITE $1.00 PER TAPE PER QUARTER
2) SHELF STORAGE $2.00 PER SHELF PER QUARTER

A MEMO DIRECTED TO "NEW USERS OF MIRJE", MAILED IN OCTOBER, CONTAINED THE ABOVE ERRORS AS WELL AS AN ERROR IN THE PUBLISHED CENTRAL PROCESSOR & MEMORY CHARGES. THE CP CHARGES SHOULD BE:

CENTRAL PROCESSOR AND MEMORY (COMMERCIAL USERS) $16.00/MINUTE
              CP IN SECONDS $ .26 2/3 PER SECOND

KRONOS STATUS REPORT

HISTORY--The MOMS 1.0 system, in use for four years, was an amalgam of older operating systems and relatively undocumented. CDC had several new desirable compilers available on their new operating systems. KRONOS 2.1 ran well on the University-managed MERITSS system. CDC had announced a new operating system, NOS, based on KRONOS 2.1, but costing 4 times as much. All these considerations outweighed the stability of an old system and we decided to convert our operating system to KRONOS on September 1 (after the 1974 summer session).

Six lengthy conversion guides were written and distributed in February and March. Numerous classes were offered through the spring and summer. Free testing times were made available in July and August. Up-to-date "Instant" conversion guides were prepared and distributed in July and August.

A major memory upgrade from the 65K CDC 6600 to a 98K CYBER 74 was completed in March to insure hardware stability for the software changeover. In May, because the delayed decision of the MECC statewide timesharing selection process threatened to jeopardize timesharing service for the 1974-75 academic year, the University offered to expand the MERITSS system to 256 ports and to add 32 ports of timesharing (MIRJE) service to the CYBER 74. The Advisory Committee accepted this offer, requiring, however, that MIRJE service not degrade batch service on the CYBER 74. This necessitated the addition of more PPU's to the CYBER 74. The MERITSS devices were delivered by September but could not be delivered until October for the CYBER 74. With extreme pressure to provide MIRJE service, UCC had the additional PPU's and channels installed over the October 19-20 weekend. Complications delayed the completion of the installation to 1:30 PM on October 23.

OPERATION AND STABILITY, FIRST SEVEN WEEKS--A high turnover rate and difficulty in becoming accustomed to a new operating system caused some confusion and problems in Operations. The short staffing problems are now solved and our operators are now familiar with the system and we consider operations to be well in hand.

Operating system stability can be measured by the number of times that the system has to be reloaded because of hardware/software problems. On the CYBER 74 there are two levels of recovery: NORMAL, meaning that the I/O queues are lost, and LEVEL 3, meaning that only jobs currently inputing must be re-read. The recovery record for the first seven weeks is:

```
SEP  6  (9 NORMAL, 10 LEVEL 3)    SEP 20  (4 NORMAL, 8 LEVEL 3)    OCT  4 ( 8 NORMAL, 23 LEVEL 3)
SEP 13  (9 NORMAL, 10 LEVEL 3)    SEP 27  (4 NORMAL,12 LEVEL 3)    OCT 11 (12 NORMAL, 21 LEVEL 3)
                                                                  OCT 18 ( 2 NORMAL,  5 LEVEL 3)
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showing that the operating system and the hardware were less stable than we desired but that improvements were being made. The unstable first two weeks in October reflect the increased and different job load at the beginning of the quarter. The seventh week (after detection and correction of problems by the Systems staff and before the PPU's were installed) shows what KRONOS 2.1 is capable of doing.

PROBLEMS ENCOUNTERED IN THE FIRST TWO MONTHS--

Magnetic Tapes: Two to eight hour tape assignment delays early in September were caused by shortage of staff and our not using the correct KRONOS FIFO field. These have since been corrected. KRONOS still seems slower than MOMS. An afternoon peak in the number of jobs requesting tapes often slows tape jobs. The 'FA=' parameter on the BLANK card has a problem; use it only on the LABEL card. The parameter 'F=L' for long tape records causes problems and should not be used. TDUMP does not work on all tapes. Other problems have occurred and are being investigated. UCC considers magnetic tapes a major problem area and we are concentrating efforts here.

Mass Storage, Permanent & Local Files: The early saturation of the disk files has since been alleviated with the cooperation of all users. Early in September and again in October the files on one logical unit were lost. Investigation continues into the causes.

ECS Storage: An early version bug in USER ECS allowed rollouts of up to two hours. Since more people are using this feature, we are implementing a rollout of ECS (if the user has a tape request) to help correct the delay. CDC code for USER ECS is not due until 3rd quarter 1975.

Remote Job Entry, SUPIO, EXPORT, TELEX: KRONOS services SUPIO more slowly than did MOMS. We are investigating ways of regaining the previous speed. The *H display and the SEND control card will be implemented within two weeks, bringing SUPIO back to its MOMS level of service. TELEX trial runs for MIRJE users began on October 29 and full scale operation will begin as soon as possible. The ExpEng IMPORT station has had problems with missing and duplicated cards and physical records. This is under investigation. Normal deadstart recoveries have been responsible for loss of jobs from remote job entry stations. Operators now checkpoint the system before pushing the deadstart button, allowing LEVEL 1 recoveries rather than NORMAL recoveries with the resultant loss of I/O queues.

Unit Record Equipment: Sections of punch and print files were lost in early October when a BATCHER-called routine did not work correctly. This serious error was corrected within a week. Dumps using excess pages at ExpEng were corrected. ExpEng was changed to accept the standard KRONOS separator cards and 80 column binary input in early October. The missing site ID on punch output files caused several decks to be misplaced in early September and was corrected.

Accounting: A new control card, COST, will give job cost information to the user. Pages printed and cards punched messages will be in the dayfile within a month. We are working at reducing the cost of using tapes with small length records. The time limit on the job card will be the actual time limit, rather than a multiple of 8.

Compilers and Packages: BATCHER did not work well until the second week of the quarter. The KRONOS version of MNF produces relocatable code but the massive changes required caused a number of bugs. SCOPE Indexed Sequential (SIS) files failed until a binary version was brought over from MERITSS. SYSTEM 2000 failed for the first two weeks. CALLPRG also gave us several problems during the first two weeks.

IN THE FUTURE--UCC installed the last major hardware change and is currently trying to generate a stable system using the level 5 version of KRONOS 2.1. During the next few months our major concern is to document and correct (if possible) all errors in our system. You can help by reporting and documenting all errors you find. Some errors cannot be corrected until CDC provides the corrective code but the documentation will help others avoid such errors. Several of the highly rated new CDC processors (such as FTN 4.2 and COBOL 4) that use Record Manager will be made available. These will not replace any current version until they are better in all respects. MNF is undergoing a severe validation and bug correction shakedown that should raise it to new levels of stability.

-- L. A. Liddiard
October 30, 1974

SOME INFORMATION ON TAPES

--by W. Elliott

Deciding how to read or write a tape is no longer an easy task. Instead of the two formats available in the past (binary and coded) the user of the CYBER 74 must now choose among eight different formats in which to read and write his tapes. The tape format is set by using the "F" parameter on the LABEL card. To help make an intelligent choice on which format to use, the following explanations are provided:

FORMAT	TYPE	DESCRIPTION
I	KRONOS Internal	BINARY only. Labelled/Unlabelled. 0-512 words. First choice when creating a tape to be used exclusively at this site or at another KRONOS 2.1 installation. When labelled, provides the greatest security, best read/write reliability, and best error recovery possible.
SI	SCOPE Internal	BINARY/CODED. Labelled/Unlabelled. 0-512 words. Used to read tapes created as "internal" under the SCOPE operating system. Format is very similar to the "I" format but they are not interchangeable.
X	EXTERNAL	BINARY only. CANNOT be labelled. 0-512 words. Simplicity of format makes this a candidate for interchange of data with other sites. This is the standard KRONOS 2.0 binary tape.
E	LINE IMAGE	CODED only. CANNOT be labelled. 0-5120 characters. Produces a constant length record, space filled when necessary. Default length is 136 characters (use the "FC" parameter on the LABEL card to set other lengths). An ideal format for the exchange of coded information with other sites. The COPY utility routines SHOULD NOT be used when tapes are destined for non-KRONOS sites.
F	FOREIGN	BINARY/CODED. CANNOT be labelled. 0-512 words. A perfect solution if not sure what parity the tape is written. If read parity error is encountered the mode will be switched. The maximum block size must be specified using the "FC" parameter on the LABEL card. As a general rule, this format should be used only with the COPY utility routines. Use of this format to create new tapes is not recommended.
B	BLOCKED	CODED only. CANNOT be labelled. 0-5120 characters. Almost identical to the "E" format except that a variable length record is produced. The buffer is not space filled to a preset length prior to writing the record. Default record size is maximum 150 characters rather than 136.
S	STRANGER	BINARY/CODED. Labelled/Unlabelled. 0-512 words. The least complicated format; every block written is considered to be a record. No block terminators or noise blocks are written as with the "X" format. First choice when interchanging binary information with non-KRONOS sites.
L	LONG RECORD Stranger	BINARY/CODED. Labelled/Unlabelled. Identical to the "S" format except that a continuous record of more than 512 words may be written. This is the only format which reads or writes a continuous record of more than 512 words (5120 characters). The block size is automatically computed from the FET as LIMIT-First-1. Use the FORTRAN "BUFFER IN/OUT" statements (or their equivalents) when using this format. Use with the COPY utilities is not recommended. (This format is not presently available; scheduled to be available by December 1, 1974.)

There are eight formats and twelve possible ways to read a tape. After deciding on a format, the question of labelling arises. When using X, E, F, and B formats no choice is possible. These must be unlabelled.

A tape is initially labelled using the BLANK control card. Before BLANK labeling, the tape should have been assigned storage at the computer site by the tape librarian. Once a tape has been successfully labelled by BLANK it is impossible for the user's program to destroy it. When a tape is labelled in this manner it is said to be KRONOS LABELLED (LB=KL).

Physically, the label is an 80 character record followed by an endfile. The user may create his own non-standard labels (LB=NS) by writing an 80 character record at the beginning of his tape followed by an ENDFILE. The system skips over this label without attempting to process it. If an unlabelled tape is declared to be non-standard labelled, the system will skip forward to the first endfile it finds.

If the tape has no labels, it is considered a KRONOS UNLABELLED tape (LB=KU). Even though the tape is declared unlabelled, a check is made. If a KRONOS format label is found, it is skipped over making it impossible to overwrite the label. If the user wishes to change his non-standard label, he can declare the tape to be KRONOS UNLABELLED and proceed to change the information in the first record (his label record).

A LABEL card is required to get a magnetic tape mounted and available for use. Shown below is the <u>minimum</u> amount of information the LABEL card requires for each of the three different label formats:

KRONOS LABELLED	LABEL(MYTAPE,VSN=SN1234)	assumes F=I, LB=KL, D=HI.
NON-STANDARD LABELS	LABEL(MYTAPE,VSN=SN1234,LB=NS)	assumes F=I, D=HI.
KRONOS UNLABELLED	LABEL(MYTAPE,VSN=SN1234,ID=$MY TAPE JOB$,LB=KU) assumes F=I, D=HI.	

See the "Tape Users' Conversion Guide" and the KRONOS 2.1 Reference Manual for more detailed information.

In summary, unless there is a compelling reason to the contrary, the use of the KRONOS INTERNAL ("I" format) is strongly recommended. Experience has shown this to be the most trouble free format available.

KRONOS 2.1 PROGRAM TROUBLE REPORTS

--by B. Stahl

1. A job requesting more than available central memory will hang on input indefinitely.
2. SCOPE long block tapes do not work (F=L).
3. TDUMP used on tapes may give *BUFFER ARGUMENT ERROR* when pointers are correct.
4. A bad address is given for ERROR FLAG=2.
5. A FORTRAN formatted write to a stranger tape does not work.
6. Not yet available: UTALGOL, PLONE.
7. Copy utilities do not work with long tapes.
8. PO=N option for tapes does not work.
9. LB=NS on LABEL statement does not work.

To get a complete list of known system software bugs, use:
     FETCH,PTRLIST.
     CBF,PTRLIST,OUTPUT.

Please report possible bugs to a consultant and/or file an orange PTR form (available in Room 131 or through a consultant). Questions concerning PTR reports should be addressed to Betty Stahl, 217 ExpEng.

LOOKING AT LIBRARIES

--by D.R. Lienke

At least one user has expressed a desire to find out what resides on library files and how to get access to them. Unfortunately, files SYSLIB and FT3LIB are part of the locked common file SYSTEM and are therefore not easily accessible. Of course, the loader uses them and so may the interested user, see the KRONOS 2.1 Reference Manual, page 7-36 on how to use the ASSIGN macro for system library file access.
Other libraries and how to gain access to them are described below:

NAME	DESCRIPTION	USE THESE CONTROL CARDS
UOFMOPL	A MODIFY OPL of University of Minnesota Subprograms.	FETCH,UOFMOPL. CATALOG,UOFMOPL,R.
CPL	A MODIFY OPL of common decks (see KRONOS 2.1 Reference Manual, Appendix A).	ATTACH,CPL/PN=STF,UN=LIBRARY. CATALOG,CPL,R.
OLDSYS or OLDFT3	Relocatable binary user libraries from previous operating system.	FETCH,OLDFT3. CATALOG,FT3LIB,U,R. CATALOG,SYSLIB,U,R.

FIELD LENGTHS FOR BMD PROGRAMS

--by S.P. Yen

A two-page writeup describing the use of the BMD programs is now available in Room 140 ExpEng. The following field length table is copied from that writeup.

Program Name	Field Length	Program Name	Field Length	Program Name	Field Length	Program Name	Field Length	Program Name	Field Length	Program Name	Field Length
BMD01D	45600	BMD01M	72700	BMD01R	75100	BMD01S	76000	BMD02T	111100	BMD01V	101400
BMD02D	106200	BMD02M	71000	BMD02R	62700	BMD02S	101000	BMD03T	101500	BMD02V	100300
BMD03D	103500	BMD04M	100200	BMD03R	66100	BMD03S	51700	BMD04T	42500	BMD03V	74400
BMD04D	106000	BMD05M	102200	BMD04R	65500	BMD09S	54500	BMD05T	76000	BMD04V	57000
BMD05D	111100	BMD07M	114100	BMD05R	67300	BMD10S	101600			BMD05V	104700
BMD06D	77600	BMD08M	112600	BMD06R	76200	BMD11S	70000			BMD06V	61500
BMD07D	77700	BMD09M	60100	BMD07R	62000	BMD12S	72000			BMD07V	105300
BMD08D	100100	BMD10M	66000			BMD13S	104000			BMD08V	76000
BMD09D	75300					BMD14S	*			BMD09V	*
BMD10D	76200									BMD10V	67000
BMD11D	71700									BMD11V	43500
BMD12D	74000									BMD12V	74000
BMD13D	70000										

*program not available.

THE SUGGESTION BOX

Questions may be re-worded for clarity. Unsigned cards are ignored.

Q/S *I submitted a job at ExpEng and, when I attempted to pick it up the next morning found "MAGNET NOT ACTIVE" on my dayfile. Why doesn't someone at ExpEng or Lauderdale re-run these jobs?*

A   MAGNET NOT ACTIVE is a message which means that the magnetic tape subsystem is not active. This should never happen, but it does occasionally due to difficulties in the operating system. We are attempting to correct the MAGNET problems so that this message will not occur. However, until the bugs can be found, this message will occur and a few unfortunate jobs will be aborted. The operators try to re-run any jobs they know about when a subsystem such as MAGNET malfunctions. However, they cannot check the dayfile of each job and so this problem will continue to occur (very infrequently, we hope) for the next few months.   (K. Matthews)

Q/S *As a transient tape user, I think it's awful to have to incorporate the input station letters in my TT name. I often switch between using the tape and program at Lauderdale and at ExpEng, depending on where I am for other things, and therefore must re-punch LABEL cards and replace paper labels. This is wasteful and time consuming. Why not go back to the old way of labeling transient tapes?*

A   We agree and are changing the transient tape policy. Some new gummed tape labels are being printed; these will then be used. The new transient tape policy will be explained in the December newsletter (by which time the labels should be ready). In the meantime, the transient tape VSN can be TTxxxx where xxxx is any four alphanumeric characters.   (K. Matthews)

Q/S *We have an extensive tape library and we would appreciate your returning our tapes in the original cases that they were submitted in, as they are all pre-marked for filing.*

A   Operators will try to return tapes in the original cases if there are large distinctive labels on the tape and on the face of the case.   (L. Liddiard)

Q/S *The magnetic tape charges imply that even parity will cost 4 times as much as odd parity. Is this true and if so, why? It can't take 4 times as long. Sometimes it's necessary to make an even parity tape to take to another installation. Sometimes it's even necessary to use 80 character physical records. Would this cost 64 times as much?*

A   In changing operating systems one of the difficult charging algorithms to change was PP time to PRU's transferred. KRONOS reports tape usage in PRU's transferred and not the total time that it takes to write the tape. The following table shows the PP time in seconds required to write Kilo PRU's of 5120, 800, and 80 character records:

D		RECORD	LENGTH	
E		5120	800	80
N 800 bpi		53 seconds	17 seconds	11 seconds
S 556 bpi		72 seconds	20 seconds	11 seconds
I 200 bpi		180 seconds	37 seconds	13 seconds
T				
Y				

At the previous rate of $1.25/minute of PP time, the current charge of $1.50 per KPR tape transfer represents 72 seconds which equates to 5120 character records at 556 density. UCC will look into a lower charge ($0.35/KPR) for records less than 1000 characters if KRONOS can be made to differentiate record lengths. $0.35/KRP would correspond to 17 seconds to write a Kilo PRU and would correspond well with the time used to write such a record. This is one case in which MOMS accounting for tape usage by PP time was fairer to the user and to the Computer Center. Your question on 4 and 64 times as much under KRONOS as under MOMS are correctly 3.6 and 6.5 times as much.   (L. Liddiard)

Q/S *You would save money be providing free access to a lister for all students. It is a waste of machine time and storage space to run a job without first using a lister.*

All of the 1004 terminals may be run as off-line (i.e., not connected) listers. Set switches #3 and #4 (also #2 if double spacing is desired) and place the cards in the reader. After the reader is turned on, push START,CLEAR,FEED,RUN and the cards will be read and listed until the end of the deck is reached. Many potential problems can be found by first listing your deck.   (R. Franta)

Q/S *Why can't we use a multi-punch of some sort to be recognized as a backspace? It would save cards and hours of keypunching. Also, a multi-punch representing end-of-line would be helpful so we could flip a deck over and use the other end, especially in COMPASS where one uses only half the card.*

A   The backspace character is a 'control character' and would be difficult to put into the 64-character set used by KRONOS as all of the lower case characters are already used. There are some proposals for new ASCII character sets that include control characters and future implementation of such a set may answer your first question.

Some programming languages have an end-of-line character that allows multiple program statements to be put on one line, but such an implementation would not allow the use of old cards that you desire. We recommend that you use new cards for programming and suggest that putting the scrap cards into our re-cycling bins and boxes will help preserve our forests almost as well as trying to re-use the old card.   (L. Liddiard)

Q/S *When will KRONOS print 66 lines per page at Lauderdale instead of the present 62? I use SCLPLT and the plots sure look funny.*

A   You may print 66 lines per page if the printer is not in the auto eject mode. In the auto eject mode a new page is started after 62 lines. KRONOS originally had the auto page eject selected as default. Early in September this was changed and several utility routines were also changed to reduce the number of blank lines produced.

     Printer mode can be controlled from the user's output file. The character R in column 1 will select the auto page eject mode and the character Q will de-select it. Note that once the printer is set in either mode it will remain so for the rest of the output file or until it is re-set. You should also be aware that the rest of a line is ignored if the characters R or Q appear in column 1.

     We attempted to change all the utility routines to conform to this procedure. However, some may have been overlooked and we would appreciate a call if you notice any that are still selecting the auto page eject mode, or are still producing a large amount of wasted blank lines.   (M. Riviere)

Q/S *One thing we have done for years at HCL is to have 2 logical units for each line printer driver, one with FORTRAN format control and the other with none. Many runs do not need the neat appearance that numerous ejects and line spaces provide. The compacted list is still readable with a little effort and the paper savings are very noticable.*

A   We will investigate this as part of the paper saving recommendations.   (L. Liddiard)

Q/S *Why not use plastic coated cards for BIN and EOI? They last a long time and are not that expensive. We've had good luck with them at UMD.*

A   This will be investigated and implemented if feasible.   (L. Liddiard)

Q/S *Some months ago I asked if you would provide up to date listings of libraries, OPL's, etc., and you (quite reasonably) replied that any user should get his/her own. However, under KRONOS, it is unclear exactly where the various files in question are or even what they are. So, how about it?*

A   See the separate article (page 4) in this newsletter.   (D. Lienke)

Q/S *I think the index to control cards is very nice but some of the listed control cards aren't on the system and the only way of discovering this is by painful experience, so how about listing the absent ones on your PTR?*

A   You are correct about the inconsistency. The index is designed for the 'ideal.' However, reality as we have experienced it during the conversion period, has only asymtotically approached the 'ideal.' The PTR list should be referenced for current information. The KRONOS "Instant" Conversion Guide had previously played this role. The index was worked on at a time when many things were not available and it did not seem to make sense expending effort to keep it precisely current because many things worked only partially and to a degree (up and down). The index was meant as a guide to documentation first and then an informative list of what is available. After another month (when TELEX comes up) the index should be quite accurate.   (A. Mickel)

Q/S *Would it be possible for the PP routine that reads in jobs to put the time in the comments area of the job card so we can tell how long we were on the input queue?*

A   This suggestion will be implemented in a different manner using the system sector associated with each disk file. Under KRONOS the input queue is usually empty, but the rollout file for tape-requesting jobs is currently the queue causing delays in job turnaround.   (L. Liddiard)

Q/S *As a summer visitor to the University, I would like to say that generally UCC services and turnaround are quite good with the exception of digital plotting service. I submitted a short (less than 1 hour) plot over 24 hours ago and its still not done.*

A   Improvements in operator communication procedures about STATOS plot tapes that fail to plot should result in faster turnaround of these jobs. Current plans call for having STATOS plotting on-line by the end of December which will mean that STATOS plotting will be handled much as printer and punch output and will have the same turnaround as printing and punching.   (L. Liddiard)

Q/S *Please fix the KRONOS DMP so that it dumps words 0-100 like DMPX. The dump is 75% useless without this information. Also, please provide some capability for reading column binary cards under KRONOS. I have many jobs that do this.*

A   Your suggestion about DMP will be implemented. For your other suggestion, use a card punched 5-7-9 in column 1, bottom 6 rows in column 2, and then punch something unique in the following 78 columns (something that does not match any of the following binary cards). Finally, follow the binary cards with an identically punched 5-7-9 card as a terminator. A 6-7-8-9 card cannot be one of the column binary cards under this scheme since that would cause following user jobs to be lost. Such a 6-7-8-9 card stops the job.   (L. Liddiard)

Q/S *The default value for the DUMPPF parameter FS is 'secure.' This is dumb! Nobody is ever going to dump his secured files, that's your job.*

A   Sorry. The default value for DUMPPF was FS=US but was accidentally documented as FS=SC. The preliminary documentation has been corrected and the correct default value will be published in the final documentation.   (K. Matthews)

Q/S *Would it be possible for the new MNF to implement a non-standard FORTRAN statement like "USE OTHER TRANSMISSION FOR list" where "list" is a list of externals? This could allow people who have many COMPASS routines to use the routines as is, without the need to convert to the FTN method of passing parameters.*

A   We do not plan to implement such a suggestion for this reason: the difficulty of insuring that the programmer makes consistent use of this in every subprogram for a specific external routine.   (*L. Liddiard*)

Q/S *Would it be possible for MNF to detect file names used in the program but which do not appear on the program card and give a non-fatal message? The sequence:* PROGRAM SAM(INPUT,OUTPUT)

                                         ⋮
                                   READ (7) GEORGE

     is almost always an error.

A   This suggestion will be implemented for constant unit numbers, but note that integer variables used as unit numbers will not be detected. That is,

                    PROGRAM SAM(INPUT,OUTPUT)
                    I = 5LINPUT
                    READ(I,20)G ORGE
     or
                    PROGRAM SAM(INPUT,OUTPUT)
                    I=6
                    READ(I,20)GEORGE   (*L. Liddiard*)

Q/S *Would it be possible for new MNF to give absolute addresses rather than relative address during compilation? I'm sure that the most common use is MNF.*
                                           LGO.
     so that absolute address would be easy to compute. This would help in debugging.

A   Your suggestion will be added to the list of possible future MNF changes since overlay requests and embedded COMPASS routines prohibit absolute address computations that would work for all compilation. If there is a method tht can find out exactly where the loader puts a relocatable program, some reasonable solution can be found for this suggestion.   (*L. Liddiard*)

Q/S *Is there any one palce where the complete range of arguments for MNF is to be found? If not, this might be a nice addition to the INFO file.*

A   Currently, MNF compiler options are listed on pages A-2 through A-12 and A-23 and A-24 of the <u>MNF</u> <u>Reference Manual</u> (November, 1973), and on page 15 of "A Pocket Guide to UCC Facilities" (September, 1974). Both of these are being revised, and, within the next two months, will reflect all of the current changes. Options that changed in the MOMS to KRONOS conversion (and are likely to give trouble) are the B, C, and Z options. In the MNF manual cross out the B, C, and Z options and have the B, U, and Z sections point to A.6 on page A-23 describing the relocatable B option and indicate the fact that Z and U do not work on the KRONOS relocatable version. The C option is correctly described in the Pocket Guide, i.e.,
          C=type   C=RUN for MOMS compatibility; C=FTN for Fortran Extended compatibility.
                     The default in KRONOS is C=FTN.
     New options will be J to cause page ejects between subroutines rather than the default 2 extra lines, and G to give "compile and go" compatibility with the RUN and FTN compilers.   (*L. Liddiard*)

Q/S *I must compliment the UCC staff for finding my tape when I forgot to bring it to Lauderdale for my job. Its nice to see that some people will go out of their way to help.*

A   We welcome compliments.   (*L. Liddiard*)

SPECIAL LANGUAGE PROCESSORS

PROGRAMMING IN PASCAL   --by A.B. Mickel

Because revised documentation is not ready for the new PASCAL compiler which was announced in the October newsletter, I think it's time to explain the origins of PASCAL as a language, PASCAL's usefulness, and the performance of the CDC implementation. UCC has had a PASCAL compiler for more than 2 years, being one of the first installations in the United States to have one. Usage in the last school year averaged only 100 runs per month on the CYBER 74. However, with increasing acceptance by the user community, usage has increased to about 500 runs per month at present. Several computer science courses have used (and are using) PASCAL, and, remarkably, many students at this University have taken the initiative and are now doing all of their work completely in PASCAL. However, it is unfortunate that the University of Minnesota usage of PASCAL lags far behind that of some other universities which have access to a compiler.

PASCAL had its origins with the language ALGOL-60, a language now increasingly described as being well ahead of both its predecessors and successors. ALGOL-60 was designed over the years 1958-62 by a committee of computer scientists who later broke into at least 2 main camps. One group went on to develop a language called ALGOL-68, an extensible language which has had little acceptance and few machine implementations since its inception in 1968. The other camp, led by Niklaus Wirth, developed (in 1965-66) EULER, an ALGOL-60 like language with list processing facilities, and ALGOL-W, an ALGOL-60 with different control structures and other changes. ALGOL-W is widely used in computer science department curricula at universities with IBM 360/370 machines.

PASCAL was developed in 1969-70, building on the experience of ALGOL-W. Among PASCAL's major departures with ALGOL-60 is the declaration part of a program or a procedure block. Here many data structuring relations are furnished; records, sets (powersets), files, and arrays. Dynamic allocation is provided through the use of a restructured kind of 'pointer'. The wide variety of primatives in PASCAL makes top-down programming a pleasure in producing one entrance – one exit control flow. Included are begin-end, if-then-else, case, while-do, repeat-until, and the for statement. Use of the go to statement is necessary only for error exits. Similar to the ALGOL-60 experience, the syntax of PASCAL was defined rigorously in the form of a report with accompanying semantic descriptions in English. The first PASCAL compiler widely released was written for the CDC 6000 series machines and implemented this report. In 1972 a revised version of the report was produced together with a rigorous semantic description of the language, intended for compiler writers constructing standard implementations on other computers. A new version of the compiler was released in December 1972 which implemented most of the changes in the revised report. At that time work was begun on a completely new compiler to fully implement the definitions of the revised report. This effort is now represented in the new PASCAL compiler recently made available at UCC.

PASCAL is intended to be a general purpose language used for teaching programming as well as writing large programs. In a sense it is a low-level 'high-level language' in that its facilities are close enough to the machine for controlling efficiency but clearly and uniformly designed for human readability. One of the reasons for PASCAL's success has been its brevity of description and efficient implementation. Innovations include the general facilities for declaring types, providing specifications of subranges over the scalar types, and means for defining symbols for constants, types, and within user-defined scalar types. PASCAL is an excellent vehicle for 'structured programming' in most uses of the term.

The PASCAL compiler possesses the kinds of features that make it a tool worth considering for any application to which the languages FORTRAN, BASIC, ALGOL, etc. are now being used. Diagnostics are clear, informative, and unambiguous. Run time checks may be selected to test for the range values of variables of scalar subrange types, arithmetic faults, and array and case statement bounds. A postmortem PASCAL dump is provided when a fatal run time error occurs. This maintains the philosophy that the machine should talk back to the programmer in the same language that the programmer uses to talk to the machine. PASCAL dumps contain a list of final values for each simple variable in each activated procedure at the moment the error occurred. No ordinary confusing octal machine dump is printed. Debugging therefore is greatly simplified.

The capabilities of the new compiler are formidable. It produces relocatable code linked by the standard KRONOS loader, allowing it to use the subprogram library. PASCAL programs run in times equivalent to programs run under the CDC FORTRAN compilers which allows PASCAL to overcome the unpopularity of ALGOL-60 implementations when compared to FORTRAN. CP-bound PASCAL programs are, on the average, 1.4 times slower than FORTRAN and I/O-bound programs are approximately 3 times faster than FORTRAN.

In summary, I urge every serious user who has the time to use PASCAL on new program development. The time invested in learning the language will yield a quick return in short program development time, debugging time, and in 'straightening out your thinking' when programming.

A NEW MIX ASSEMBLER IS AVAILABLE   --by S.T. Lenz

A new version (version 1.2) of the MIX assembler became available to users on October 13, 1974. This version corrects many minor problems of the previous version, the largest change being a reduction in field length from 35000 to 22000.

Version 1.2 is now the current version, accessed by the control card MIXAL. The older version (version 1.1) was discarded. The old MOMS MIXAL is still available and can be accessed with the control card sequence

        OLD,MIXAL.
        MIXAL.

Included with the new assembler is an updated simulator. Operators mentioned in volumes 2 and 3 of Knuth's books The Art of Computer Programming have been implemented. These include even and odd jump tests (JAE, JAO, JXE, JXO), binary shift of AX (SLB, SRB), floating point operators (FLOT, FCMP), and boolean operators (AND, ORR, NOT, XOR). Also implemented are the FNUM and FCHR instructions that are special to our installation. With the inclusion of these new operators our facility has a current Knuth standard version.

LISPING   --by A.B. Mickel

        In last month's newsletter, the SNOBOL corner features a solution to a problem posed at an ACM
chapter competition (see also CACM, April, 1974). LISP was not one of the 8 languages used to write programs
finding all integers from 1 to 100 whose squares are palindromes. Noting the adage found in the introduction
to The Little LISPer, by Dan Friedman, that "A student with an undergraduate degree in Computer Science who
has not learned LISP is culturally deprived," below is reproduced a LISP solution to the above problem. This
should at least expose LISP to people who may have never seen a LISP program.

```
*EVALQUOTE:
↓FIND ALL INTEGERS FROM 1 TO 100 WHOSE SQUARES ARE PALINDROMES.↓

DEFINE((
↓ GEN IS THE MAIN DRIVER.↓
(GEN (LAMBDA (N)
        (COND
        ((EQN N 101) ())
        ((ISPALIN (MAKELIST (TIMES N N)))
          (PROG2 (PRINT (LIST N (QUOTE $$$SQUARED IS A PALINDROME$)))
                 (GEN (ADD1 N))))
        (T (GEN (ADD1 N))) ) ))

↓ MAKELIST MAKES A LIST OUT OF THE DIGITS OF A NUMERIC ATOM.↓
(MAKELIST (LAMBDA (N)
        (COND
        ((LESSP N 10) (LIST N))
        (T (CONS (REMAINDER N 10) (MAKELIST (QUOTIENT N 10)))) ) ))

↓ THIS VERSION OF ISPALIN USES THE BUILT-IN LISP FUNCTION REVERSE.↓
(ISPALIN (LAMBDA (L)
        (EQUAL L (REVERSE L)) ))
))


 *VALUE:
(GEN MAKELIST ISPALIN)


 *EVALQUOTE:
GEN(1)

(1 SQUARED IS A PALINDROME)
(2 SQUARED IS A PALINDROME)
(3 SQUARED IS A PALINDROME)
(11 SQUARED IS A PALINDROME)
(22 SQUARED IS A PALINDROME)
(26 SQUARED IS A PALINDROME)

 *VALUE:
NIL


 *EVALQUOTE:
FIN

GARBAGE COLLECTIONS: 0 0



CYBER 74 EXECUTION TIME     .492 SECONDS
```

NUMERICAL ANALYSIS CONSULTANT

Kenneth M. Brown, Associate Professor of Computer, Information and Control Sciences, will serve in the capacity of UCC Numerical Analysis Consultant during the 1974-75 academic year. Dr. Brown will spend part of his time in the development of mathematical software subroutines; the rest of his time will be devoted to helping University of Minnesota researchers with their numerical analysis problems.

Professor Brown received his B.S. in Mathematics from the University of Chicago, his M.A. in Mathematics from UCLA, and his Ph.D. in Computer Science from Purdue University. He has been teaching at the University of Minnesota since 1971; prior to that he was a visiting lecturer in the Department of Computer Science, Yale University, and Assistant Professor in the Department of Computer Science at Cornell University. Dr. Brown has had industrial consulting experience with the IBM Research Center, Chevron Oil Field Research Company, the Pillsbury Company Research and Development Laboratory, the IMSL Corporation, and the Control Data Corporation. He is currently a consultant to the Applied Mathematics Division of the Argonne National Laboratory in the area of nonlinear unconstrained optimization. He is a member of the Board of Directors of SIGNUM, the ACM's special interest group in Numerical Mathematics.

For an appointment call Dr. Brown at 376-7209.

FOR BETTER MANAGEMENT OF FIELD LENGTH REQUIREMENTS

--by W. Elliott

On the MOMS operating system the user specified his maximum job field length on the job card. With KRONOS this has changed following the philosophy of allowing users to not tie up system resources (field length, mass storage, tapes, etc.) until they are actually going to be used. The hopeful result is faster turnaround time for everyone. If a small field length (for example, 10K) is specified on the job card, the job will begin processing as soon as that field length is available, assuming that there are no other jobs of higher priority waiting in the INPUT queue. The user then may make use of the RFL (Request Field Length) card to increase or decrease his job's field length as required, the only limitation being that he cannot go beyond the field length he is validated for, generally 154K for Batch users. For clarification, here are two examples:

```
JOB,CM10000,T10.            JOB,CM10000,T100.
BIN card.                   BIN card.
ACCOUNT card.               ACCOUNT card.
GET,TAPE1=FAROUT.           ATTACH(OPL)
RFL,50000.                  RFL,40000.
MNF(parameters,B=LGO)       MODIFY,N.
RLF,15000.                  RFL,55000.
LGO.                        COMPASS(I,S=PPTEXT)
(7-8-9 card)                RFL,40000.
[input deck]                MODIFY(P=NPL)
(6-7-8-9 card)              RFL,55000.
                            COMPASS(I,S=PPTEXT)
                            (7-8-9 card)
                            [MODIFY input records]
                            (6-7-8-9 card)
```

A NOTE TO ALL CHESS BUFFS

--by T.D. Hodge

Northwestern University's CHESS 4.0 took second place in the first international computer chess tournament in Stockholm in August. The Soviet Union's KAISSA (running on an ICL4/70 at the Institute of Control Science in Moscow) took first place to become the first world champion.

CHESS 4.0 ran on a CDC 6600 at the CDC Service Center in Stockholm. Third place was won by RIBBIT of Waterloo, Canada; 4th place by CHAOS of Univac. Other participants were from MIT, the Atlas Computer Lab of England, Graz in Austria, Queen Mary College of London, Oslo University, Zurich in Switzerland, Budapest in Hungary, and Hounslow in England. For a list of final scores, see Thea Hodge.

Take note, chess buffs, that the 1975 convention of the Association for Computing Machinery (ACM) will be held in Minneapolis in October 1975, one year from now. A computer chess tournament is being planned for that conference.

DOCUMENTATION/PUBLICATIONS

UCC PUBLICATIONS

An unedited copy of the *KRONOS STATUS REPORT* (an edited version of which appears on page 2 of this newsletter) is available in the Reference Room, 235a ExpEng.

An unedited copy of a preliminary writeup on tape usage is available in the Reference Room, 235a ExpEng. (Excerpts from the writeup appear on page 3 of this newsletter).

A preliminary writeup, *BMD*, is available in Room 140 ExpEng. This writeup contains a field length table for the BMD programs available at UCC and a description of job setups.

A preliminary writeup, *GPSS*, is available in Room 140 ExpEng. This 2-page writeup briefly describes GPSS as it is available at UCC.

CYBER 74 OPERATING HOURS

```
        12:01AM  2AM  3AM  4AM  8AM    4PM    Midnight
Sunday                                      |||||||||||||||
Monday    .........|              ////////////////
Tuesday   ................|       ////////////////
Wednesday ................|       ////////////////
Thursday  ................|       ////////////////
Friday    ..............|         ////////////////
Saturday  ....................|//////
```

```
        ....   (Lauderdale only)

        ||||||  (Lauderdale, ExpEng)

        ////   (Lauderdale, ExpEng, West Bank)
```

MEDIUM SPEED REMOTE TERMINAL SITES

Site		Supervisor
38	ElectE (East Bank)	J. Guentzel/373-5404
		M. Cook/373-3895
N640	EltH (East Bank)	J. DeWitt/376-7377
		N. DeWitt/376-7377
S191	KoltH (East Bank)	T. Faulkner/376-7024
		J. Abdallah/373-2348
321	MinMet (East Bank)	C. Swanson/373-5475
		R. Oelfke/373-5680
69	Physics (East Bank)	R. Scarlett/373-0243
		D. Olson/376-7175
167	SocSci (West Bank)	G. Lutgen/373-3608
257	BioSci (St. Paul)	R. Comstock/373-0979
		R. Cardellino/376-3407
125G	ClaOff (St. Paul)	C. Bingham/373-0988
415	CofH (St. Paul)	D. Nelson/376-7003
		T. Ehlen/376-7003
24	NorH (St. Paul)	J. Colten/373-0990
		D. Rignell/373-0990
Users' Room (Lauderdale)		Shift Supervisor/373-4940

REFERENCE MANUALS

[Copies are available for reference in 140 ExpEng, Lauderdale Users' Room, West Bank Computer Center, all the medium speed terminal sites, and in the Reference Room (235a ExpEng).]

ALGOL Version 3	BMD Reference (1973)
APL*CYBER	IMSL Library 3, Edition 3
BASIC	MNF Reference Manual
COBOL Version 3	OMNITAB II Programmers' Reference
COMPASS Version 3	SPSS: Statistical Package for
FORTRAN 2.3 (RUN23)	the Social Sciences
FTN Version 3	SPSS Version 5.5
FTN DEBUG Users' Guide	SYSTEM 2000 Reference Manual
KRONOS 2.1 Reference Manual	SYSTEM 2000 Users' Guide
MODIFY	UCC Users' Manual, Part 1
SIMSCRIPT Version 2	UMST Programs Reference Manual
SORT/MERGE Version 4	
T/S USERS' Reference	
TEXT EDITOR (EDIT)	
UPDATE	

TELEPHONE NUMBERS

373-4548	Account Clerk, CYBER 74
376-3963	Educational Services (R. Franta)
373-4596	ExpEng I/O
376-7067	Field Engineering
373-2521	Keypunch Supervisor
373-4940	Lauderdale Shift Supervisor
373-4995	Microfilm Operator
373-4876	Operations (R. Folden)
373-4994	Recorded Message
373-7744	Reference Librarian
376-3963	Remote Job Entry Services (R. Franta)
373-4995	Tape Librarian
373-4360	UCC Main Office
373-4599	User Services (T. Hodge)
373-4921	Users' Room (Lauderdale)
373-3608	West Bank I/O

CONSULTING SCHEDULES

LAUDERDALE USERS ROOM (general)*
Mon - Fri	1:30 PM - 3:30 PM
Mon - Thurs	7:30 PM - 9:30 PM

EXP ENG 140 (general)*
Mon - Fri	9:00 AM - 5:00 PM
Mon - Thurs	7:00 PM - 9:00 PM
Sat	10:00 AM - 2:00 PM
Sun	7:00 PM - 9:00 PM

EXP ENG 140 (statistical packages)
Mon - Fri	12:00 N - 4:00 PM

SOC SCI 167 (statistical packages)
Mon	11:00 AM - 2:00 PM
Tues	12:30 PM - 2:30 PM
Wed	2:30 PM - 5:30 PM
Thurs	10:00 AM -12:00 Noon

CLA OFF 125
Mon,Wed	8:00 AM - 10:45 AM
	1:00 PM - 8:00 PM
Tues	8:30 AM - 11:30 AM
	1:00 PM - 6:00 PM
Thurs	8:30 AM - 11:30 AM
	1:00 PM - 8:00 PM
Fri	8:00 AM - 10:45 AM
	1:00 PM - 6:00 PM
Sat	9:00 AM - 12:00 Noon

*These general consultants can also answer questions on stat pkgs: Hinkley, Yen, Eggers.

KEYPUNCH LOCATIONS

(number of keypunches is in parentheses)

East Bank	St. Paul
38 ElectE (1)	257 BioSci(1)
N640 EltH (1)	125G ClaOff(1)
130 ExpEng (2)	415 CofH (1)
131 ExpEng (1)	24 NorH (1)
208 ExpEng (14)*	
S191 KoltH (1)	
321 MinMet (1)	
69 Physics(1)	

West Bank	Lauderdale
90 BlegH (1)	Users' Room (5)*
167 SocSci(1)	

*includes 1 interpreting card punch

RETURN TO:
UNIVERSITY COMPUTER CENTER
227 EXPERIMENTAL ENGINEERING
UNIVERSITY OF MINNESOTA
MINNEAPOLIS, MN 55455

IF YOU WISH TO HAVE YOUR NAME
REMOVED FROM THIS MAILING LIST,
WRITE TO:
     EDITOR
     UCC NEWSLETTER
AT THE ABOVE ADDRESS, OR CALL
373-7744.