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Contents

IMSL EDITION 8	p. 26
Edition 8 will replace Edition 7 later this month; new features, changes discussed	
WRITEUPDATE	p. 26
our monthly feature on writeups	
HUMANITIES NEWS	p. 27
spring quarter course, consulting hours	
FROM ENGINEERING SERVICES	p. 27
serial number must be reported for service	
VAX MAINTENANCE	p. 27
a call for information	
MINITAB 80	p. 27
FUTURE version now current	
SUGGESTION BOX	p. 27
card reader problems; missing consultants	
INTERVAL ARITHMETIC	p. 28
more on computer accuracy with an annotated example	
MICROCOSM	p. 30
peripherals, MINDEX, new release of UCSD Apple Pascal, software for sale, and more	
COMPUTER STORE-Y	p. 31
where to buy tapes, disks, manuals, micro software; including a full price list	
UCS NEWS NOTES	p. 35
university computer center directors around the state speak out	
STATISTICS	p. 38
OPERATIONS	p. 39
PHONE NUMBERS	p. 40

Director: Peter C. Patton
Editor: Naomi Miner

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

The University of Minnesota adheres to the principle that all persons shall have equal opportunity and access to facilities in any phase of University activity without regard to race, creed, color, sex, national origin or handicap.

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IMSL edition 8

Edition 8 of the International Mathematical and Statistical Library (IMSL) will replace Edition 7 on all three Cybers on March 22, 1981. Because of difficulties involving our multi-compiler library scheme, Edition 7 will no longer be available after that date; call me if this creates any problems for you.

Edition 8 is a set of 495 FORTRAN routines designed for use in the development of scientific, engineering, and statistical application programs. You can access it as a user library with the control statement

```
FETCH(IMSL/V=compilername)
```

where compilername is MNF, FTN, M77, FTN5, or PASCAL. You may find documentation for IMSL in updated manuals in our Reference Room, 235a ExpEng or you may purchase the manual at our Computer Store, 211 ExpEng. We have permission from IMSL to copy single routines on request; you will be charged a copying fee. Machine retrievable documentation for the calling sequence is found in

```
WRITEUP(IMSL=routinename)
```

where routinename is the name of the IMSL routine. The machine retrievable documentation only contains the calling sequence; see the IMSL manual for further details.

Four routines from edition 7 have been deleted:

- GGAMS - replaced by GGAMR
- GGAMT - replaced by GGAMR
- GGBIR - replaced by GGBN
- GGMLT - replaced by GGMTN

Edition 8's new routines and featured additions, by topic, include:

Exploratory Data Analysis: routines providing median polish for a two-way table; "better value" summaries; stem and leaf plots; and boxplots of several samples.

Categorized Data Analysis: routines for log linear model analysis using interactive proportional fitting; and for computation of exact probabilities for two-way tables.

Differential Equations: routines to solve ordinary differential equation two-point boundary value problems by multiple shooting; and to compute double integrals.

Eigensystem Analysis: routine to find eigenvalues and eigenvectors of banded symmetric matrices; and extensions to allow input in full storage mode for real symmetric and complex Hermitian matrices.

Transforms: routines for inverse Laplace transforms; and for fast Fourier transforms of two and three-dimensional arrays.

Random Number Generation: routines to generate order statistics from a uniform and from a normal distribution; a routine which is a second uniform random number generator using a different multiplier; a routine to generate discrete uniform deviates; routines to generate discrete general deviates using a table lookup or an alias method; and a routine to generate variates from a nonhomogeneous Poisson process.

Interpolation, Approximation, and Smoothing: routines that are easy-to-use companions to the existing cubic spline interpolation and smoothing routines; routines to do cubic spline interpolation with periodic end conditions; routine to do least squares approximation with user-supplied basis functions; and a routine to do two-dimensional smooth surface fitting from unequally distributed data points.

Linear Algebraic Equations: routines for high accuracy solution to linear least squares problems; and for the generalized inverse of a matrix.

Probability Density and Distribution Functions: routines to use a table of density function values to evaluate a general continuous distribution function or its inverse; and to use the kernel method for nonparametric estimation of the density function.

Regression Analysis: two alternatives for least squares estimation: least absolute values fit and minimum/maximum deviation fit.

Zeros and Extrema, and Linear Programming: more robust nonlinear equation solver to eventually replace ZSYSTEM; and a linear programming routine that is expected to handle large problems with greater reliability.

M. Frisch, 376-1636

writeupdate

February was a short month, so the list of significant WRITEUP modifications is brief as well. Check out these texts for information of interest.

ASML1 (all machines) - PDP-11 Assembler User's Guide.

PDPSIM (all machines) - PDP-11 Simulator User's Guide.

PFGUIDE (74+172) - Changes to the Permanent File User's Guide.

TSCOBOL (all machines) - Timesharing COBOL User's Guide.

J. T. Jaynes, 376-9490

humanities news

The schedule for spring quarter humanities phone consulting is Monday, Wednesday, Friday 10:30-11:30. Call 373-5780 for assistance with any computing questions or problems.

The Computer Science Department is offering a course on computing in the humanities spring quarter 1981. CSci 3-002, Creative and Analytical Applications of Computers in the Arts and Literature (4 cr) will meet Monday, Wednesday, Friday 2:15-3:00 in 55 Ford Hall. The course will be taught by Dr. V. A. Walsh with the assistance of Dr. P. C. Patton and will cover text processing and analysis, statistics, data base management systems, modelling and graphics. For more information, call

V. A. Walsh, 373-5780

from engineering services

We have labelled all the equipment we maintain with a special serial number. As of this notice, you must furnish this number when requesting service. If you do not, service may be delayed for an indefinite period.

D. Whealdon, 376-8153

VAX maintenance

Our Engineering Services department is interested in learning whether any other institution that has or will purchase a DEC/VAX computer system is currently maintaining or plans to maintain such equipment using their internal staff for this purpose. If so, would your organization write to

Dr. Abe. Franck
University Computer Center
208 Union Street, S.E.
Minneapolis, MN 55455

or call

A. Franck, 376-1023

minitab 80

The FUTURE version of MINITAB 80 has now become the current version. This version includes a number of new capabilities that make interactive data analysis better than ever. Five of the more important additions are: a comprehensive, new table-making capability, commands that facilitate Exploratory Data Analysis in the style espoused by John Tukey, on-line help, easy input of patterned data, and flexible data manipulation. The manual is available at our Computer Store, 211 ExpEng.

S. P. Yen, 373-4886

suggestion box

The card reader at Lauderdale (remote) has not worked properly for about 2 weeks. It reads two cards at a time. Decks that do not give problems at ExpEng will not go through the reader at Lauderdale.

C.S. 12/4

There was a problem with the card picker involving its alignment. This has been corrected. The problems due to heat dissipation in the room at Lauderdale are being resolved by other groups within the Computer Center.

A. Franck, 376-7291

It seems to me the consultants don't always show up when scheduled, especially at nights (Monday). They should at least find someone else to work.

J.A. 12/1

I'm sorry that you were inconvenienced. Two consultants were scheduled for 140 ExpEng on the Monday evening closest to the day I received your suggestion. Each says he was present, and each says the other was present. I sent you a letter asking for more details -- such as the consulting site you were at, the date, and the time -- but you have not yet replied.

When an emergency prevents a consultant from working, we try to find a substitute. If we fail, then we post a notice to say that there will be no consulting. If users find no consultant on duty during a scheduled time, I would like to know about it, but I must have complete details in order to follow up.

S. K. Graffunder, 376-1637

short course schedule

will be mailed separately.

interval arithmetic

Last month in my article "Can We Trust the Accuracy of Computer Answers?" I described some methods of error estimation. I stated that interval arithmetic is considered the best method of automatic error analysis and promised an annotated example. Before you examine this simple interval arithmetic example, you should be aware of the following:

naming convention

We have found it convenient to use the statement `IMPLICIT XOTHER(X)` in each program and subprogram to declare that all variables and arrays beginning with the letter "X" are type XOTHER. Each XOTHER name represents a double value, consisting of the lower bound (L) and upper bound (U) of an interval.

intermixed variables

INTEGER, REAL, DOUBLE PRECISION, and COMPLEX variables are allowed in mixed mode interval arithmetic, with XOTHER having the highest order of dominance. But note that REAL and COMPLEX conversion to interval always results in use of their degenerate interval (i.e., the lower bound = upper bound); only for DOUBLE PRECISION forms will a non-degenerate interval be generated. Thus the general rule is: REAL and COMPLEX variables should not be intermixed in interval expressions.

constants

An interval constant in a DATA statement is symbolically represented by a pair of REAL constants. Note the non-degenerate interval for XA and the degenerate interval for XB in the following:

```
IMPLICIT XOTHER (X)
DATA XA/ (.99998, .99999) / XB / (2., 2.) /
```

You should use the interval form or the DOUBLE PRECISION form for intermixed constants with interval names not exactly representable in a single precision word.

relational expressions

"Value" and "set" are relational operations that can be used to order interval variables. In the interval arithmetic for XOTHER the "value" relation is used in place of the standard FORTRAN relational operations .EQ., .NE., .LT., .LE., .GT., and .GE. To obtain the set relation, use the LOGICAL functions LSETnn, where nn is a standard FORTRAN relational operator. Thus XA.GE.XB implies AL.GE.BU whereas LSETGE(XA,XB) implies AL.GE.BL. and AU.GE.BU. if XA is the interval AL,AU and XB is the interval BL,BU. We have found it helpful to use diagrams of the real axis with small interval boxes to decide which relationship is needed for a particular algorithm. See WRITEUP(INTLIB) for further information.

reasonable input and output

Using standard output, values for XOTHER names are given with the lower bound, followed by the upper bound. To interpret the results you compare the initial digits of each bound until you find the first nonidentical digit. However you have to compare complement digits when the interval straddles an integral value, i.e., .9999999321,1.00000020000). The interval arithmetic library, INTLIB has a function to do this comparison for you called XWRITE(XOTHER). The double word Hollerith value returned by the XWRITE function contains the identical accuracy digits as a single En+6.n field. This is usually output with a 2A10 field in a FORMAT statement. The number of decimal digits that agree in the interval is represented by n.

Interval arithmetic can be used to test the sensitivity or loss of accuracy due to limited input data. The example shows this for integer 10 and for 10 expressed to 5 digits. In addition, the example shows the loss of all of the 11 decimal digits of accuracy in a single recurrence relation using X=4.5366202969 and order 4 in the Laguerre polynomials computation.

To use MNF and M77 with XOTHER use the control statement `FUTURE(MNF)` or `FUTURE(M77)`. To obtain the INTLIB packages use the following control statement:

```
FETCH(INTLIB/V=MNF) or
FETCH(INTLIB/V=M77)
```

WRITEUP(INTLIB) supplies more information on the interval arithmetic library. WRITEUP(XOTHER) supplies more information on XOTHER type in MNF and M77.

L. A. Liddiard, 373-5239



XOTHER example

```

00100 PROGRAM LAGUERR(INPUT,OUTPUT)
00110C
00120C THIS PROGRAM DEMONSTRATES NUMERICAL INSTABILITY
00130C IN THE FORM OF CANCELLATION ERROR FOR THE COMPUTATION
00140C OF LAGUERRE POLYNOMIALS (RECURSIVELY).
00150C
00160C THE PURE RECCURENCE RELATION USED IS:
00170C
00180C LN(X)=(1/N)((2N-1-X)LN-1(X)-(N-1)LN-2(X))
00190C
00200C INITIALLY: LN-2=1 AND LN-1=1-X
00210C
00220C THE USER ENTERS X AND THE MAXIMUM ORDER OF THE POLYNOMIALS.
00230C X IS ASSUMED GOOD TO AS MANY DIGITS AS ENTERED.
00240C
00250C VALUES PRODUCING CANCELLATION ARE X=4.5366202969 AND ORDER=4.
00260C VALUES THAT ARE STABLE ARE X=10 AND ORDER=10.
00270C
00280 IMPLICIT XOTHER(X)
00290 10 PRINT *, "MAXIMUM ORDER OF COMPUTED POLYNOMIALS=",
00300 READ *, NMAX
00310 PRINT *, "X=",
00320 CALL READX(5LINPUT,X,1,IOS)
00330 PRINT 92,XWRITE(X)
00340C
00350C INITIALIZE
00360C
00370C XLNM2=1.DO
00380C XLNM1=1.DO-X
00390C N=2
00400C
00410C COMPUTE LAGUERRE POLYNOMIAL
00420C
00430 20 XLN=(1.DO/N)*(((2*N-1)-X)*XLNM1-(N-1)*XLNM2)
00440C
00450C PRINT 91,N,XWRITE(XLN)
00460C IF(N .GE. NMAX) GO TO 10
00480C XLNM2=XLNM1
00490C XLNM1=XLN
00500C N=N+1
00510C GO TO 20
00540 90 FORMAT(2A10)
00550 91 FORMAT("LAGUERRE POLYNOMIAL ORDER",I4," = ",2A10)
00560 92 FORMAT("GOOD TO THE NUMBER OF DIGITS ENTERED, X=",2A10)
00570C END

```

+ IMPLICIT typing of names beginning with X naming convention

+ Read one free-format item into variable X
Echo the interval arithmetic item to output

+ DOUBLE PRECISION constants used to obtain good interval values

+ Use XWRITE function to count and output output significant digits

```

MAXIMUM ORDER OF COMPUTED POLYNOMIALS=? 5
X=? 10
GOOD TO THE NUMBER OF DIGITS ENTERED, X= .10000000000000E+02
LAGUERRE POLYNOMIAL ORDER 2 = .31000000000000E+02
LAGUERRE POLYNOMIAL ORDER 3 = -.45666666666667E+02
LAGUERRE POLYNOMIAL ORDER 4 = .11000000000000E+02
LAGUERRE POLYNOMIAL ORDER 5 = .34333333333333E+02
MAXIMUM ORDER OF COMPUTED POLYNOMIALS=? 5
X=? 10.000
GOOD TO THE NUMBER OF DIGITS ENTERED, X= .10000E+02
LAGUERRE POLYNOMIAL ORDER 2 = .3100E+02
LAGUERRE POLYNOMIAL ORDER 3 = -.457E+02
LAGUERRE POLYNOMIAL ORDER 4 = .110E+02
LAGUERRE POLYNOMIAL ORDER 5 = .343E+02
MAXIMUM ORDER OF COMPUTED POLYNOMIALS=? 5
X=? 4.5366202969000
GOOD TO THE NUMBER OF DIGITS ENTERED, X= .45366202969000E+01
LAGUERRE POLYNOMIAL ORDER 2 = .2217221265323E+01
LAGUERRE POLYNOMIAL ORDER 3 = .2700218641811E+01
LAGUERRE POLYNOMIAL ORDER 4 = .50E-10
LAGUERRE POLYNOMIAL ORDER 5 = -.2160174913404E+01
MAXIMUM ORDER OF COMPUTED POLYNOMIALS=? 5
X=? 4.5366202969
GOOD TO THE NUMBER OF DIGITS ENTERED, X= .45366202969E+01
LAGUERRE POLYNOMIAL ORDER 2 = .2217221265E+01
LAGUERRE POLYNOMIAL ORDER 3 = .2700218642E+01
LAGUERRE POLYNOMIAL ORDER 4 = .0E-08
LAGUERRE POLYNOMIAL ORDER 5 = -.2160174913E+01
MAXIMUM ORDER OF COMPUTED POLYNOMIALS=? stop

```

+ Integer input n produces degenerate interval (n,n) good to full 14 digits

+ Decimal input to 5 significant digits

+ Results good to 3 digits

+ Decimal input near root to 14 digits

+ Root at order 4 good to 2 digits

+ Decimal input near root to 11 digits

+ All significant digits lost

+ Algorithm recovers on next order

microcosm

For all Apple Pascal users who wanted to be able to use the D. C. Hayes Micromodem with the Computer Center COM program, there is now a preliminary version available. We are encouraging those who are thinking about buying a modem for their Apple to consider the Micromodem. Cost is about the same as a modem and interface card.

All Apple Pascal users -- if you have the older release of the UCSD Apple Pascal (II.1) you can upgrade to the new release (version 1.1). Get in touch with me at the micro Help-line for details. We are recommending you upgrade because the new version has some significant features not previously available.

Before buying peripherals for your micro you should check with the micro group and see if the item is available on contract; the price is usually cheaper than if you were to purchase one on your own. Unfortunately these contracts only apply to purchases made with University funds.

We have available for demonstration an ANSI 77 Subset Standard FORTRAN from Silicon Valley Software. It will run under the UCSD Pascal operating system on both the Apple and Terak. The manual is also available for study.

We have received the manual for the commercially available data base system called MINDEX. This program will run on the Apple and Terak (according to the documentation) and appears well suited for loosely organized data bases. If you are interested, call or stop in the micro office.

All users of the Terak A system who received systems prior to February 1, 1981, should stop by and get a copy of the new, improved Editor in exchange for the old copy. There were a few lethal bugs in the first Editor, as well as a few annoying ones that have been corrected.

M. D. Collins, 37M-ICRO

micro software

We are now selling at the Computer Store disks of the Terak A or Apple Pascal operating systems plus utilities. Single copies are available at full cost to faculty for \$36 and at reduced cost to students for \$12.

Some of the utilities available for distribution are given below:

	Terak	Apple	Description
COM	yes	yes	Communications package/file transfer to-from Cybers
Prose	yes	yes	Text formatting
2D plotting	yes	yes	Hi-plot plotter routines
Compare	yes		Compares two text files
CHEDIT	yes		Character set design utility
DECList	yes		Optimized listing to DECwriter
SPRUCE	yes	yes	Pascal pretty print program
Iron		yes	user-proof input routines

If you are a course instructor, you should call the Micro HELP-line to make advance arrangements for your students. This will give us an idea of demand and give us time to produce the disks before the students come in to buy their system. You may request for your students a "custom" system tailored to a particular application, e.g., graphics, text processing, or computer-aided instruction.

We will not be able to recoup our development, maintenance, and consulting costs by selling software at these prices. These costs amount to approximately \$300 per system. Unless we receive additional funds to support these activities, we plan to steadily reduce our subsidy of microcomputer software over the next four years.

Pick up the free, 7-page microcomputer software policy document, Buying and Owning University Microcomputer Software, from the Computer Store, 211 ExpEng. A loose-leaf catalog of current microcomputer software is also available for examination.

M. M. Skow, 373-7745

computer store-y

We would like to announce special reduced prices!
We would like to announce special give-away offers!

We would like to announce prizes to all customers!
We would like to announce a grand opening sale!

We would like to do all of these things but, alas, we cannot. All we can do is tell you that we now operate the UCC Computer Store. The store is located in 211 Experimental Engineering (actually, the hallway outside 212 Experimental Engineering) and is open for business from 9 A.M. to 3 P.M. Monday through Friday. The purpose of the store is to offer the University computer community computer-related supplies at the lowest possible cost. Items we offer for sale include:

magnetic tapes, Terak and Apple floppy disks, paper of various weights and sizes, cards, CDC manuals, and documentation from other sources, microcomputer software for Apple and Terak systems, ribbons for various terminal types, and printed copies of WRITEUP's.

All of these items may be obtained at the store and paid for with cash, check, journal voucher, or charged to your computer account. We must charge Minnesota sales tax on most cash sales.

Since we order materials in volume we can offer prices which are probably less than you would have to pay if you ordered the materials yourself. Also we usually have the item in stock so you won't have to wait 2 to 6 weeks to get what you need. For these reasons we think you will find the store a valuable service.

The Computer Store's cost of operation is funded entirely by the markup we add to the sale price of all items. This means two things to you our customers. First, we need your business to continue our operation and second we would be more than happy to stock any item for which there is a demand within the University. If you need any computer-related supply or material let us know and we may be able to stock the item on a regular basis. We won't know you need it unless you let us know what it is. Also, if the item is needed by a class and there is no other source for the item, we may be able to help by stocking the item for you and letting the students pay cash for the items they need. Give us a call and let's talk it over.

How about some quick answers to frequently asked questions.

Our large orders do allow you to save money.
Not all sales are taxed.
Sales charged to user numbers are not covered by any grants.
We will accept orders for non-stock items and quote a price.
We do take mail orders and send out materials by mail.
We do charge for mailing materials and postage.
We do not accept purchase orders.
We exchange defective materials.
We do not give refunds.
We sell printed copies of WRITEUP's.

You can get more detailed information about the store operation by getting a copy of the store writeup. Use the control statement

```
WRITEUP(STORE)
```

to find out how to get more information including a catalog and price list. I think all your questions will be answered by the writeup.

Pictured are the people involved with the operation of the UCC Computer Store. The manager of the store is Richard Franta, the senior store clerk is Carol Nau, the store clerks are Thom Hoard, Greg Schoener, and Steve Matthews. Dave Larsen programmed the Apple system to handle receipts, inventory control, sales reports, tax reports and journal voucher printing. The computer store operation is completely computerized on the Apple system, which has helped to greatly reduce overhead, therefore reducing your costs.

If you have any questions not answered by the writeup, call or write the UCC Computer Store in care of

Richard Franta
227 Experimental Engineering
208 Union Street, S.E.
Minneapolis, Minnesota 55455
612-376-3963

R. T. Franta, 376-3963

computer store

IF THE PRICE LISTED IS ZERO WE ARE
SOLD OUT OF THE ITEM TEMPORARILY
PRICES SUBJECT TO CHANGE WITHOUT NOTICE

PAPER		
1	PAPER 20# (14 7/8*11")	\$ 25.45
2	PAPER 15# (14 7/8*11")	\$ 18.55
3	PAPER TTY 43 (12*8 1/2")	\$ 21.35
4	PAPER TTY 33	\$ 1.75
5	PAPER TI 745 (100' ROLLS)	\$ 2.30
6	PAPER 8.5 X 11	\$.00
7	PAPER TAPE	\$ 2.05
COMPUTER CARDS		
51	COMPUTER CARDS (BOX=2,000)	\$ 6.70
RIBBONS		
101	RIBBON DECWRITER LA 30/36	\$ 2.75
102	RIBBON DECWRITER LA 34	\$ 7.80
103	RIBBON TTY 33	\$ 2.10
104	RIBBON TTY 43	\$ 6.55
105	XEROX 1760	\$ 7.80
106	A/J RIBBONS	\$ 2.60
MAGNETIC MEDIA		
151	MAGNETIC TAPE 600'	\$ 12.00
152	MAGNETIC TAPE 1200'	\$ 14.00
153	MAGNETIC TAPE 2400'	\$ 18.00
154	DISK PACK PDP 11	\$ 100.80
155	DISKETTES 5 1/4" (APPLE)	\$ 3.60
156	FLOPPY DISK 8" (TERAK)	\$ 2.50
157	DISK BOX 8"	\$ 1.20
INTRODUCTORY MANUALS		
301	UCC USER'S MANUAL	\$ 5.00
302	GUIDE FOR THE NEW USER	\$ 2.00
303	GUIDE TO COMPUTING IN HUMANITIES	\$ 3.35
OPERATING SYSTEMS & HARDWARE		
351	GUIDE TO MAG TAPE USAGE	\$ 4.15
352	NOS VER. 1 REF. MANUAL VOL. 1	\$ 17.30
353	NOS VER. 1 REF. MANUAL VOL. 2	\$ 16.25
354	NOS VER. 1 TIME/SHARING	\$ 8.50
355	CYBER LOADER REF. MANUAL	\$ 7.85
COMPILERS, ASSEMBLERS, HIGH LEVEL LANG		
401	BASIC V3 RM	\$ 13.00
402	COMPASS V3 RM	\$ 14.75
403	COBOL V4 RM	\$ 25.25
404	COBOL V5 RM	\$ 21.25
405	COBOL V5 USERS GUIDE	\$ 11.45
406	COBAL V5 REPORT WRITER USER GUIDE	\$ 9.00
407	FTN EXTENDED V4 REFERENCE	\$ 22.75
408	FTN EXTENDED V4 USERS GUIDE	\$ 5.60
409	FTN V5 REFERENCE	\$ 14.90
410	FTN DEBUG USERS MANUAL	\$ 9.35
411	M77 FORTRAN	\$ 6.50
STATISTICAL PACKAGES		
451	BMDP REFERENCE MANUAL	\$ 18.00
452	MINITAB REFERENCE MANUAL	\$ 3.30
453	SPSS EDITION 2 REFERENCE MANUAL	\$ 22.75
454	SPSS MANOVA	\$ 4.45
455	SPSS MULT RESP	\$.70
456	SPSS NONLINEAR	\$.95
457	SPSS NPAR	\$.80
458	SPSS RELIABILITY	\$ 2.30
459	SPSS SPECTRAL	\$.90
460	SPSS SURVIVAL	\$.85
461	SPSS REPORT	\$ 2.05
462	SPSS UPDATE 8.0	\$ 2.95
463	SPSS REGRESSION	\$ 1.90
464	SPSS ONLINE	\$ 1.40

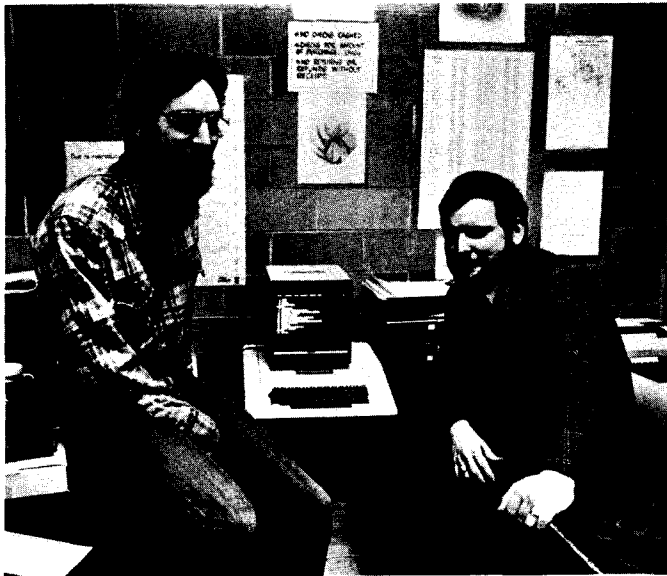
price list

DATA BASE SYSTEMS		
501	DDL V3 VOL 1 SCHEMA	\$ 10.75
502	DDL V3 VOL 2 COBAL SUBSCHEMA	\$ 9.85
503	DDL V3 VOL 3 QUERY UPDATE SUBSCHEMA	\$ 9.55
504	SYSTEM 2000 REFERENCE MANUAL	\$ 52.20
505	SIR REFERENCE MANUAL	\$ 14.40
506	SYSTEM 2000 USER AID	\$ 2.40
EDITORS, TEXT PROCESSORS, CONCORDANCES		
551	MODIFY V1 REFERENCE MANUAL	\$ 4.00
552	UPDATE V1 REFERENCE MANUAL	\$ 3.85
553	XEDIT REF. MANUAL	\$ 1.65
GRAPHICS HARDWARE & SOFTWARE		
601	PLOT PAC	\$ 1.25
602	GUIDE TO GRAPHICS FACILITIES	\$ 1.90
603	ARTPLOT	\$ 2.20
MATHEMATIC SUBPROGRAMS & LIBRARY		
651	IMSL CATALOG, LIBRARY 3 ED 7	\$ 33.05
652	GUIDE TO USER LIBRARIES	\$ 1.25
SPECIAL PROCESSORS		
701	PERT/TIME REFERENCE MANUAL	\$ 2.75
UTILITIES		
751	CYBER REC. MGR. V1 BASIC ACCESS U. G.	\$ 8.75
752	CYBER REC. MGR. V1 BASIC ACCESS R.M.	\$ 8.40
753	CYBER REC. MGR. V1 ADVANCED ACCESS U.G.	\$ 8.95
754	CYBER REC. MGR. ADVANCED ACCESS R.M.	\$ 7.00
755	GUIDE TO RECORD MANAGER USAGE	\$.00
756	SORT/MERGE V4 REFERENCE MANUAL	\$ 8.60
MICROCOMPUTER PUBLICATIONS		
801	APPLE II BASIC	\$ 6.60
802	APPLESOFT	\$ 9.60
803	APPLE II REFERENCE MANUAL	\$ 11.60
804	APPLE II DOS 3.2	\$ 13.20
SPECIAL WRITEUPS		
851	CICS 5107 TERAK WRITEUP	\$ 4.50
852	COMP 3085	\$ 2.00
853	TERAK STOCK A WRITEUP	\$ 8.35
854	TERAK STOCK 15 WRITEUP	\$ 2.15
SOFTWARE		
901	CICS 5107 TERAK DISK	\$ 9.60
902	TEXT PROCESSING TERAK(STUDENT)	\$ 12.00
903	TEXT PROCESSING DISK(STAFF)	\$ 36.00
904	PASCAL "A" STANDARD(STUDENT)	\$ 12.00
905	PASCAL "A" STANDARD(STAFF)	\$ 36.00
906	PASCAL "A" STANDARD (INSIDE)	\$ 300.00
907	PASCAL "A" STANDARD (OUTSIDE)	\$ 600.00
908	PASCAL 1.5 (STUDENT)	\$ 12.00
909	PASCAL 1.5 (STAFF)	\$ 36.00
910	PASCAL 1.5 (INSIDE)	\$ 300.00
911	PASCAL 1.5 (OUTSIDE)	\$ 600.00
912	APPLE UTILITIES (STUDENT)	\$ 12.00
913	APPLE UTILITIES (STAFF)	\$ 36.00
914	APPLE UTILITIES (INSIDE)	\$ 300.00
915	APPLE UTILITIES (OUTSIDE)	\$ 600.00

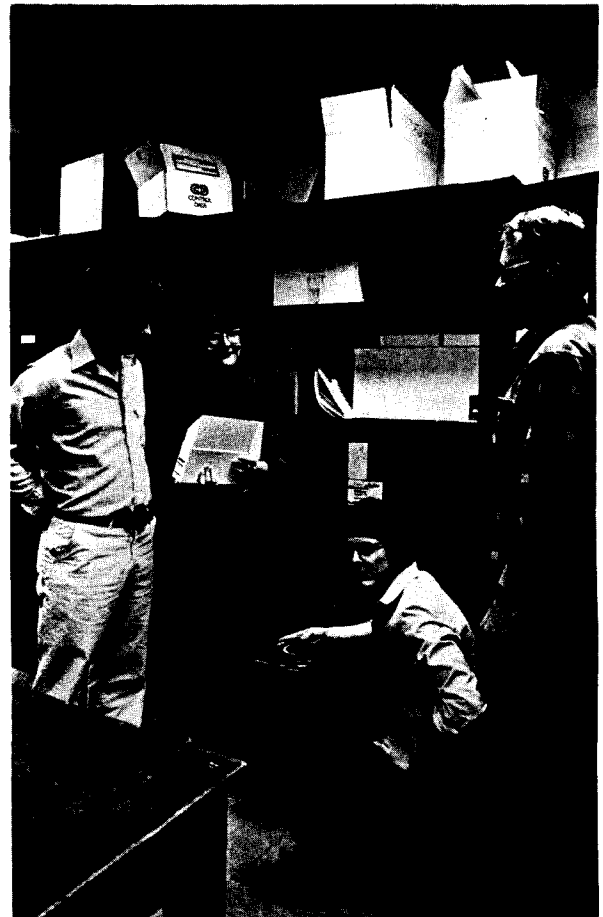


(L.-R.) Greg Schoener, Thom Hoard, Steve Matthews, Dave Larsen, Rich Franta, Carol Nau.

Computer Store



Dave Larsen, Apple II, Rich Franta.



(L.-R.) Steve Matthews, Carol Nau, Greg Schoener, Thom Hoard.

photos, R. Hotchkiss.

UCS news notes

With this issue of this Newsletter, we introduce a new section whose purpose is to describe activities within University Computer Services. This section will be a regular feature, although it may not appear in every issue.

The Office of University Computer Services (UCS) was established in 1968 to provide for an orderly enhancement of the various research, instructional, and educational computing systems that were developing at the University. UCS now has general administrative power and budgetary responsibility for the University Computer Center (UCC), and the centers at Health Sciences, West Bank, Duluth, Morris, and St. Paul. Crookston, and Waseca are part of the group, but budgetary responsibility is held by their provosts.

In the 13 years since UCS was founded, the nature of computing services has changed dramatically. In the early days of computing, a user took all necessary information for computer processing directly to the computer's location--a central facility. Today we can use the computer through a network consisting of centralized computer systems, many remote access devices, and a distribution of mini- and microcomputers.

The complexity of such a computing network requires that we devise new technologies to handle the sharing of computing resources, such as the flow of information, hardware facilities, and software packages. In UCS News Notes, we will discuss significant developments in the various areas of resource sharing--for centralized and microcomputer systems. We hope to tell our total community of users about important program developments, especially in the area of microcomputers and at the level of the individual user.

In UCS News Notes this month, we start the flow of information by introducing you to the eight computer centers that comprise University Computer Services. The director of each center has been given an opportunity to tell you about his center--its function and features. We begin with the Crookston Computer Center.

Dr. Frank Verbrugge
Director, UCS

Crookston Don MacGregor, Director

In the fall of 1972, UMCCS began providing computer services required by the two year Business Computer Systems program and to provide instructional support for other academic areas needing computing capabilities. We also provide some administrative support in areas unique to the Crookston Campus. Computing services have been made available to community organizations on a short term basis.

UMCCS currently has an IBM System 34 and four Apple microcomputers, two of these have attached printers. The Apple microcomputers are currently housed in the library. The System 34 is situated in the first-floor Computer Center with five CRT terminals available in a separate room, which is open to the students from 8:00 AM to 9:00 PM weekdays. The terminal room also contains a teletype connected to the MERITSS system.

The System 34 has 63.9 megabytes of disk storage and 128K bytes of main memory. The printer operates at 650 lines per minute. The system is equipped with communications hardware; work is progressing to establish a link to the IBM 4331 at the St. Paul Center.

The COBOL, RPGII, and BASIC languages are available on the System 34. When the link to the IBM 4331 is completed, FORTRAN, SAS, and other compilers and packages on that machine will be available. We offer BASIC on the Apples.

The System 34, Apples, and the MERITSS terminal are used by the students for problem solving. Some small scale simulations are available on the System 34 while large scale simulations will be possible through the IBM 4331. We are investigating word processing for teaching and administrative purposes.

As space becomes available, we will establish a computational lab to house the CRT terminals, microcomputers, and MERITSS terminal. This will consolidate our computing capabilities and services.

Twin Cities - West Bank Tom Hoffmann, Director

We provide computing access and services mainly to the College of Business and Social Sciences' students, staff, and faculty. We provide batch access to the Cyber 74+172 and interactive access to MERITSS. Batch access is provided by a staffed high speed station in 90 Blegen Hall and remote job entry stations in 167 Social Science Tower and the basement of Wilson Library adjacent to the Reserve Room. Interactive access is provided through instructional labs in 140 Blegen Hall, 167 Social Science Tower, and the basement of Wilson Library. Also provided in the Wilson Library Laboratory are a number of Apple II microcomputers.

We provide consulting help for Cyber 74+172 users as well as microcomputer users. The consultants are located in 167b Social Science Tower and have their schedule posted on the door.

Duluth John Skelton, Director

We serve the computing services needs of the UMD academic community which consists of 7,100 undergraduate students, 250 graduate students, and 395 faculty as well as other related units such as the Lake Superior Basin Studies Center. We operate our own Control Data Corporation Cyber 171 system and provide access to the Twin Cities Campus's Cyber 74+172 and Cyber 720 systems. We provide and support several Terak microprocessor systems in addition to the large scale systems. Our User Services Group carries out consulting and educational programs. We also provide computing services to federal, state, and local government, and to other educational institutions in the Duluth area.

Twin Cities - UCC P. C. Patton, Director

We provide computing services for instruction and research within the University community and for public service within Minnesota state government. We endeavor to provide a variety of services for our users including sales, leasing, software support, and maintenance of certain microcomputers, as well as development of special applications programs for both large and small computers.

Computing at the University has undergone many changes in its short history and we have always made an effort to keep up with new user requirements. The focus for computing applications in the 1950's was the natural sciences, in the 1960's it was the social sciences, and in the 1970's it has been the humanities. We are a national leader in the development of humanistic applications of computer technology. A report of these developments by interested Minnesota faculty will be published this spring as *Computing in the Humanities* by Lexington Books.

In the 1980's we expect the most exciting new application of computing technology will involve integration of separately developed techniques for numerical and statistical analysis, simulation, text processing, and graphics and image processing. You may find this difficult to believe if you have tried to do SPSS analysis on System 2000 data, but we think that further development of systems and application technology will accomplish this.

We also foresee continued rapid growth of microcomputer technology and continued doubling of performance of small computers to their cost every two or three years. We do not interpret the proliferation of small computers as a threat to large scale computing, but rather as future contributions in the form of potential terminals. We envision a digital communication network allowing all cooperating computer facilities in

the University to communicate; eventually it will allow any user at any terminal to access data on any machine and use it on any other. A network planning committee has been set up by Dr. Frank Verbrugge, Director of University Computer Services, and is chaired by Dr. John Skelton, Director of the UMD Computer Center. The work of this committee is to coordinate planning for academic computing for the entire University. Readers of this column will be hearing more about the Network Planning Committee's work in future issues.

Twin Cities - Health Sciences Gene Johnson, Director

We provide services which augment and enhance clinical services, and health related research and instruction. Emphasis is on developing systems which involve multiple remote access points using the same files for clinical protocols or administrative support systems. Systems analysis and application programming services are available on the new CDC Cyber 172 computer which was made operational in November with the interactive transaction software tested and made available for use during December. The system is available, except for maintenance periods, for remote interactive and remote batch all day, every day.

Morris Andy Lopez, Director

We service the instructional computing needs of the Morris Campus. In addition, we supplement the University's centrally supported administrative data processing functions by locally developed ADP applications. We also serve several off-campus, non-profit organizations.

We provide batch processing support via a remote job entry terminal into the UCC's CDC Cyber 74, ADPD's IBM 370/158, and St. Paul's IBM 4331 computers. Data entry for batch processing is through a Northern Telecom DATA 100 data entry system for punched cards. Interactive services are provided via remote access to UCC's interactive systems and MECC's MTS system. All access is at 30 cps. In addition, the Center has a Terak 8510/12 and two Apple II microcomputers. The primary users of these computing services are students taking programming classes. Other uses include statistical packages, social sciences simulations, graphics applications, and CAI lessons in syllabification, plurals, mathematics, and ear training. ADP applications include several System 2000 data bases used for ordering books for the library, student employment, Plant Services projects, and billing systems.

Over one-third of all students enrolled use our Center during any given quarter. Approximately one-fourth of the faculty give their classes assignments involving the computer.

Twin Cities - St. Paul *David Nelson, Director*

Located at 90 Coffey Hall, we serve the computing needs of the students and faculty of the University with particular emphasis on those departments located on the St. Paul Campus. We have an IBM 4331 computer system. We provide a complete computing capability but specialize in software and services requiring an IBM environment. SAS (Statistical Analysis System) is an example of a program we offer exclusively. SAS is a system for retrieving and managing data, performing statistical analysis, and writing reports. It can be used in a batch or interactive mode. In the months ahead, we plan to install a relational data base management system. An IBM product called Query-By-Example and a newly announced product, Structured Query Language (SQL), are being considered.

We operate a large data entry section. Using a key-to-disk system, we provide keypunching services to all departments on Campus.

Waseca *Marv Wolthius, Director*

Our primary purpose is to develop and encourage use of computing by the students, faculty, and administration of the College. The Computer Center functions as part of the Learning Resources administrative unit which provides a variety of support services, such as audiovisual, library, printing, and mail courier functions.

Within the Center, there is hardware available to connect via telephone to the Twin Cities Campus's system and state-wide interactive systems for: 1) generating reports, 2) accessing decision-aid packages, 3) writing computer programs, and 4) general data processing.

The Center currently uses Apple II and Terak microcomputers for smaller applications packages and to provide hands-on experience in operating a stand-alone computer system.

Instruction is limited to one course, Agricultural Data Processing, which provides a general introduction to computers, flowcharting, and programming related to agriculture. This course is taught by faculty in the Agricultural Business Division of the College.

The Center strives toward becoming a facility which can provide examples of computer applications in agriculture for students, faculty, and the agricultural community of Minnesota.

Coordinator's note

I have agreed to serve as coordinator of UCS News Notes, although in actual practice I will be doing much more than coordinating. I will gather interesting and useful information, not only from the individual centers but from computer users inside the University. Descriptions of activities at other universities which might be of special interest will occasionally appear as well. I will be free to approach any user or any provider of services for news notes that I think will be of general interest. I will then assume responsibility for putting these in a format that I think interesting and desirable. I welcome any suggestions from readers of UCS News Notes; call me at the University Computer Center-Twin Cities Campus.

M. C. Boyd, 373-2522

statistics

***PRODUCTION USAGE SUMMARIES: Cyber 74+172

	January, 1981	January, 1980
System resource units (SRU)	1,340,016 (1,659,332)	1,159,300 (1,419,233)
Batch jobs and MIRJE sessions	112,310 (123,958)	121,640 (132,081)
Total central processor (CP hours)	166/193 (180/297)	168/160 (179/250)
DELAY queue CP hours	48/ 40 (51/ 54)	48/ 35 (50/ 41)
NO FRILLS queue CP hours	20/ 13 (21/ 13)	8/ 1 (8/ 1)
Mass storage transfers (KPR)	446,705 (543,647)	396,423 (487,505)
Magnetic tape transfers (KPR)	10,791 (14,358)	12,156 (16,643)
Pages printed, charged from UCC	789,500 (909,907)	1,008,668 (1,133,568)
Cards punched	155,451 (264,005)	396,672 (415,829)
Microfilm frames produced	9,806 (478,479)	26,212 (481,033)
MIRJE terminal hours	16,630 (19,231)	14,746 (16,884)
Number of terminal sessions	41,675	36,301
Status plotting production (feet)	5,408	7,923
Tapes mounted	12,337	13,138
Average file storage (char)	3,298.9 million	2,719.0 million
Mean time between failures	43.5/40.2 hours	69.9/37.6
Available during scheduled hours	99.5/98.7 percent	96.6/99.4 percent

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

***DOWNTIME SUMMARY: February, 1981 (Column 1, Cyber 74 : Column 2, Cyber 172)

	0800-1800 M-F		other		total	
Total possible scheduled uptime hours	200.0	200.0	289.0	289.0	489.0	489.0
Total downtime hours (see Schedule A)	2.2	1.7	4.1	3.0	6.3	4.7
Total uptime hours	197.8	198.3	284.9	286.0	482.7	484.3
Uptime (percent)	98.9	99.2	98.6	99.0	98.7	99.0
Average downtime per occurrence (min)	43.0	52.0	81.3	88.5	62.2	70.3
Mean time between failures (hours)	50.0	66.7	72.3	96.3	61.1	81.5
Subsystem failures						
SUPIO	6	-	0	-	6	-
TELEX	1	1	0	0	1	1
EXPORT	5	-	0	-	5	-

Schedule A: downtime hours

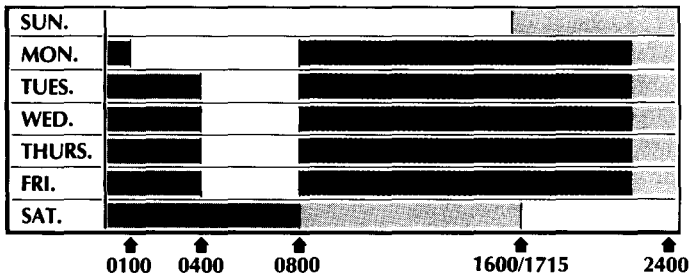
	Number		Total hours		Average minutes	
(1) Preventive maintenance over-runs	0	0	0.0	0.0	0.0	0.0
(2) Software related problems	1	0	0.1	0.0	8.0	0.0
(3) Hardware related problems	3	2	3.7	2.4	74.3	72.5
(4) Indeterminate problems	0	0	0.0	0.0	0.0	0.0
(5) External Problems	2	2	2.4	2.3	71.0	68.0

***PRODUCTION USAGE SUMMARIES: Cyber 170-720 (MERITSS)

	January, 1981	January, 1980
Number of jobs run	244,603	175,605
Central processor hours	129	134
MERITSS terminal hours	29,656	25,256
Number of terminal sessions	77,394	54,436
Maximum number of simultaneous users	178	138
Average file storage (char)	478.1 million	475.1 million
Mean time between failures	246.6 hours	68.6 hours
Available during scheduled hours	99.9 percent	99.9 percent

operations

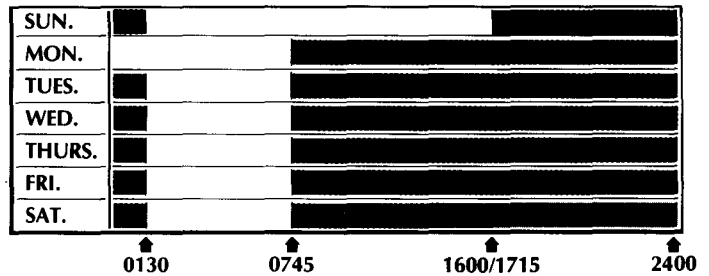
CYBER 74 + 172 OPERATING HOURS



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

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

CYBER 720 OPERATING HOURS



Up, not attended
 Up, attended

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

TWIN CITIES CAMPUS PUBLIC REMOTE JOB ENTRY SITES

SITE	ID	SUPERVISOR	PHONE
East Bank			
ElectE 38	4V	V. Zahhos	373-5346
Elth N640	4W	D. Anderson	373-5827
ExpEng 130	3L	I/O Coordinator	373-4596
ExpEng 130	4B	I/O Coordinator	373-4596
ExpEng 130	4N	I/O Coordinator	373-4596
FrontH	4E	D. Schumacher	373-2740
HSUnitA	4C	L. Croatt	373-7714
KoltH S191	4Z		
MinMet 321	41	R. Larson	376-2668
Physics 69	44	L. Whitney	376-7627
TerrH W106	41	B. Hackett	373-6621
D388 Mayo	24	L. Croatt	373-7714
Zoology 314	4J	E. Cushing	373-2232
West Bank			
SocSci 167	4X	D. Lund	373-3608
SocSci 1009	4K	M. Mongiat	373-0168
St. Paul			
BioSci 257A	47	M. Simmons	373-1961
ClaOff 125G	48	C. Bingham	373-0988
McN H	42	G. Wahlert	373-0939
NorH 24	4G	J. Colten	373-0990
NorH 24	40	J. Colten	373-0990
Lauderdale			
User's Room	49	Secretary	373-4912
User's Room	3F	Secretary	373-4912

Keypunches provided at each site.

TWIN CITIES INSTRUCTIONAL COMPUTER LABORATORIES

SITE	SUPERVISOR	PHONE	EQUIPMENT
East Bank			
CentH	R. Rickgarn	3-2289	TTY33(2)
ComH	C. Youngdale	3-2453	TTY43(1)
DiehH 535	N. Sauro	6-7005	CRT(2)
Elth 121, 125	D. Anderson	3-5827	TTY33(6) CDC713(1) Hazeltime(3) Telera(1)
FrontH	D. Schumacher	3-2740	TTY33(1)
HS-A 1-752	L. Ellis	3-0331	TTY33(3) TTY43(2) Telera(1) Decwriter(1) CDC713(6) Decwriter(5) Tektronix4013(1) Telera(1)
LindH 25	T. Chan	3-7580	TTY43(11) TTY33(4) Telera(3) Decwriter(5)
MechE 308	D. Riley	3-0340	TTY33(4) Telera(3) Decwriter(5)
SanfH	M. Kilbury	3-3434	TTY33(1)
TerrH	B. Hackett	3-3567	TTY33(1)
VincentH 4	W. Stenberg	3-2586	TTY33(2) CDC713(2) Decwriter(7) Telera(2)
WaLib 204	R. Estelle	3-2538	TTY43(10) CRT(2)
West Bank			
BlegH 140	D. Lund	3-3608	TTY43(13) Telera(1)
MdbH	R. Baker	3-9818	TTY33(1)
SocSci 167	D. Lund	3-3608	TTY33(5) Telera(3) Decwriter(2)
St. Paul			
ClaOff 125	C. Bingham	3-0988	TTY33(6) Hazeltime(2) Decwriter(4)

phone numbers

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

University Computer Center Newsletter

User Services

227 Experimental Engineering
University of Minnesota
208 Union Street SE
Minneapolis, Minnesota 55455

UNIVERSITY ARCHIVES
11 WALTER LIBRARY
UNIVERSITY OF MINNESOTA
EAST BANK
117 PLEASANT STREET SE
MINNEAPOLIS MN 55455