MERITSS

1971 - 1975

by

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University Computer Center
University of Minnesota
Minneapolis, Minnesota
55455

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I. INTRODUCTION

In 1968, the Governor of Minnesota asked that the state's use of computers be investigated in order to indicate future requirements and also asked that there be a strong attempt to coordinate future acquistions. In 1970, a study entitled Computers and Information Systems in Minnesota 1970-1980 was published. The authors were Dr. Peter Roll and Dr. Peter Patton. This report predicted the state's computer needs for this decade and indicated that these needs should be satisfied by a comprehensive statewide plan. In particular, it suggested that timesharing should be discussed and planned within each system of education.

In 1971 the State Junior (now Community) College System and the University of Minnesota began discussing plans for jointly satisfying their timesharing needs. Until this time, both systems had been leasing services from outside sources. Timesharing needs had increased to a point where it seemed much more cost effective to lease and operate their own system.

II. JUNE 1971 - SEPTEMBER 1971

A. Management Agent

The University Computer Center was designated the management agent for the regional timesharing system (soon to be called MERITSS) by the Higher Education Coordinating Commission. The considerable amount of technical expertise at the Center made this choice a logical one.

B. Time Lines

A request for bid was sent out on June 1, 1971. On July 1, 1971, bids were returned. Control Data Corporation was awarded the contract based on an imaginative proposal to lease a 32 port system as a quarter system. An installation date of September 1, 1971, was set. On September 9, 1971, the system was running and serving users.

C. Initial Configuration

The 32 port system had a hardware configuration of 6415 central processor with 32K words memory, 6612 console, 841-3 multiple disk system with 96 million characters storage, 604 tape drive and controller, and one 64 port 6676 data set controller. The software consisted of the KRONOS 2.0 Level 4 operating system, TSRUN (CDC's in-core timesharing FORTRAN), RUN23 (Batch FORTRAN), COBOL, SORT/MERGE, BASIC, and the COMPASS assembler. Text editing capability was made available through EDIT. The first users to come on the system were from the University of Minnesota; the 18 State Junior Colleges; and the College of St. Thomas. Two state colleges followed shortly.

III. SEPTEMBER 1971 - JUNE 1972

A. Statistics

Figure IV-1 shows an almost steady increase in connect hours per month from 600 hours for September 1971 to 8700 hours in March 1972 with an expected drop during June 1972 due to the end of the academic year. Central processor time used is given in Figure IV-2. Note that the central processor time is not directly proportional to connect hours logged.

B. Configuration/Users

By June 30, 1972, MERITSS had expanded from 32 ports to 76 ports, serving all 18 State Junior Colleges, the Twin Cities and Morris campuses of the University of Minnesota, the College of St. Thomas, Winona State College, Moorhead State College, the University of Nebraska at Omaha, and the Fargo-Moorhead public secondary schools.

Associated with this increased load were several hardware changes. A second 6676 communications controller was added with a modification to handle both 10 and 30 character per second terminals. The 841-3 multiple disk system was replaced by a dual access fixed head 6638 with 128 million character capacity.

Many software enhancements were introduced during the first nine months of MERITSS' operations. MNF, the University of Minnesota FORTRAN compiler, was installed, giving timesharing users access to the well known capabilities of this University Computer Center product. An experimental version of APL was installed as a result of a joint project of the University

of Minnesota and CDC. An extended version of BASIC (XBASIC) which was more compatible with Dartmouth BASIC was released by CDC.

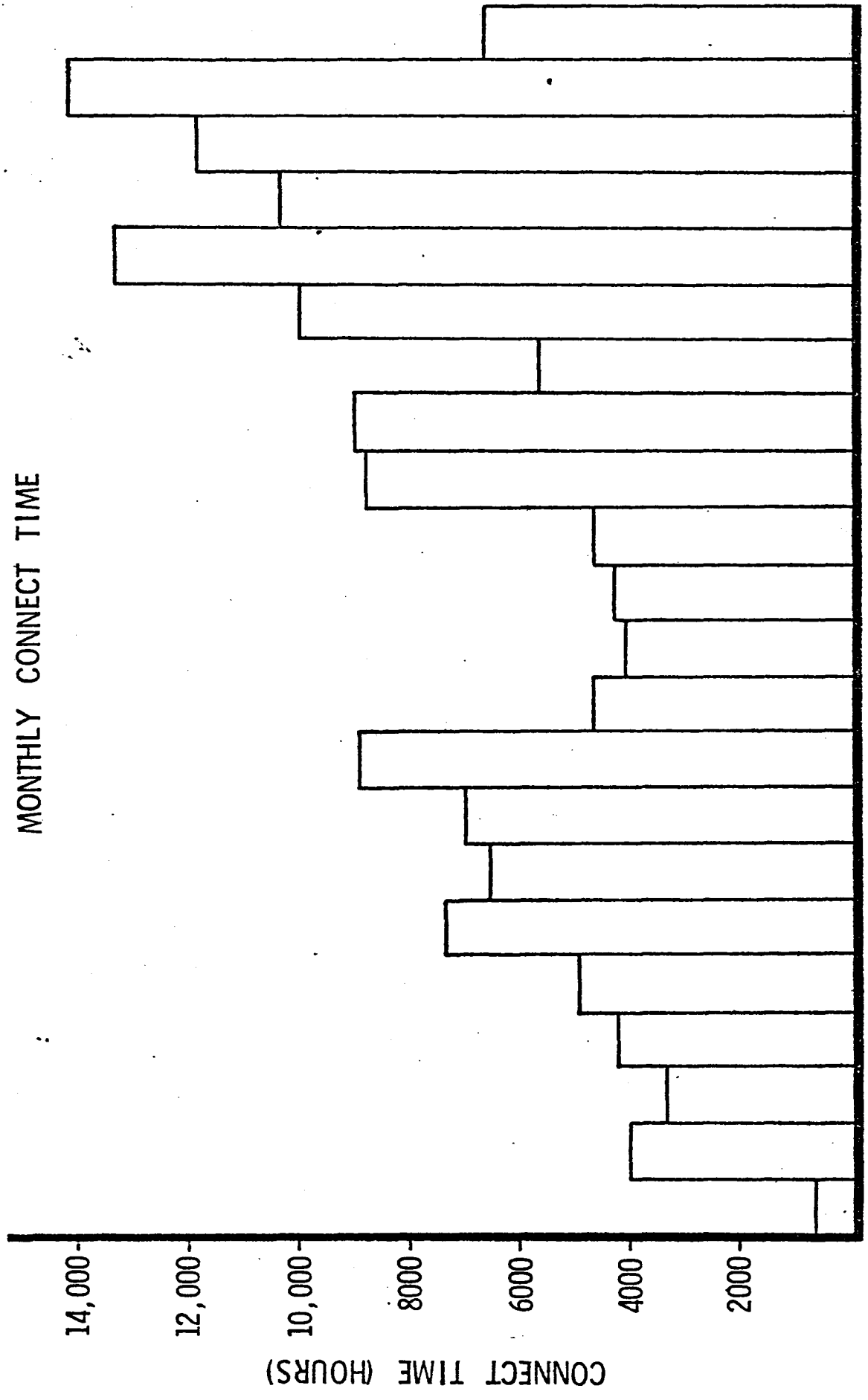
MONTHLY CONNECT TIME
CONNECT TIME (HOURS)
14,000
12,000
10,000
8000
6000
4000
2000
S O N D J F M A M J J A S O N D J F M A M J
1971
1972
1973

FIGURE IV - 1

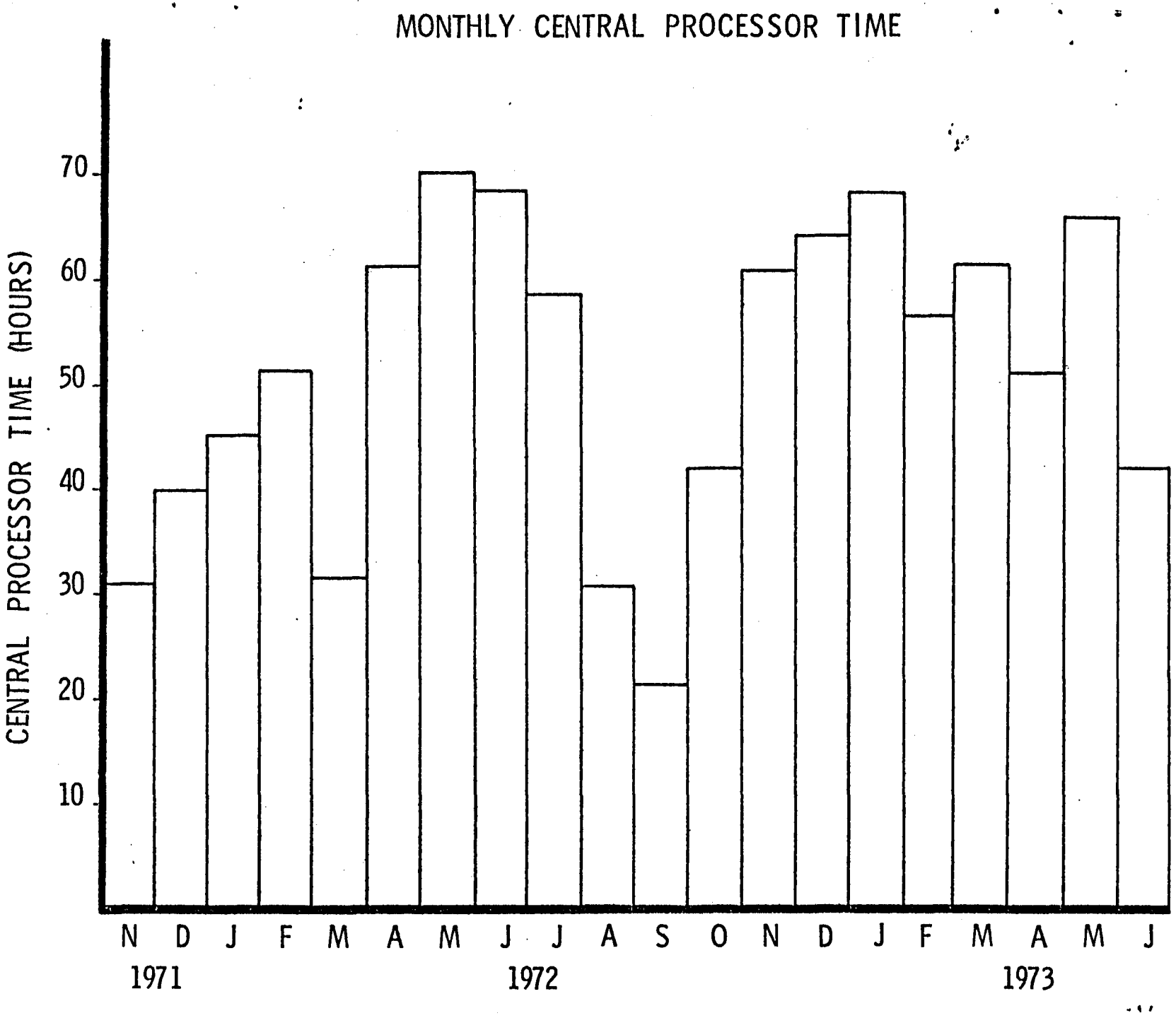
MONTHLY CENTRAL PROCESSOR TIME
CENTRAL PROCESSOR TIME (HOURS)
70
60
50
40
30
20
10
N D J F M A M J J A S O N D J F M A M J
1971
1972
1973

FIGURE IV - 2

IV. JULY 1972 - JUNE 1973

A. Growth

MERITSS continued to grow during the 1972-1973 fiscal year. The requirements were 60 ports during the summer, 84 ports in October 1972 and 108 ports from January 1973 through June 1973. This expansion can be seen to be more diametric by noting that 16 ports from Nebraska left the system in October to start their own MERITSS-like system.

B. Statistics

As with the 1971-72 operations, the monthly total connect time continued to grow, reaching a maximum of 13,600 hours during March 1973. Figure IV-1 indicated the connect hours per month for the first 22 months of MERITSS operation. Figure IV-2 showed the associated central processor time used.

Figure IV-3 gives the monthly use of FORTRAN (TSRUN and MNF) and BASIC (BASIC and XBASIC) in terms of number of runs. Notice that, excluding the summer months with its expected low totals, there was no large increase in number of runs for these languages. This is due to an increased use in other languages and CAI activities and, perhaps, also due to more programs running the first or second time. An interesting trend to notice from Figure IV-3 is the increased use of FORTRAN as the school year progressed, to the point where FORTRAN use dominated BASIC. This can be credited to the increase of student sophistication as the year progressed.

C. Users

The 108 port system had the following breakdown by system in June 1973:

System	Number of Ports	
Junior Colleges	15	
State Colleges	18	
Private Colleges	7	(included Wisconsin Colleges)
University of Minnesota	65	
Secondary Schools	3	

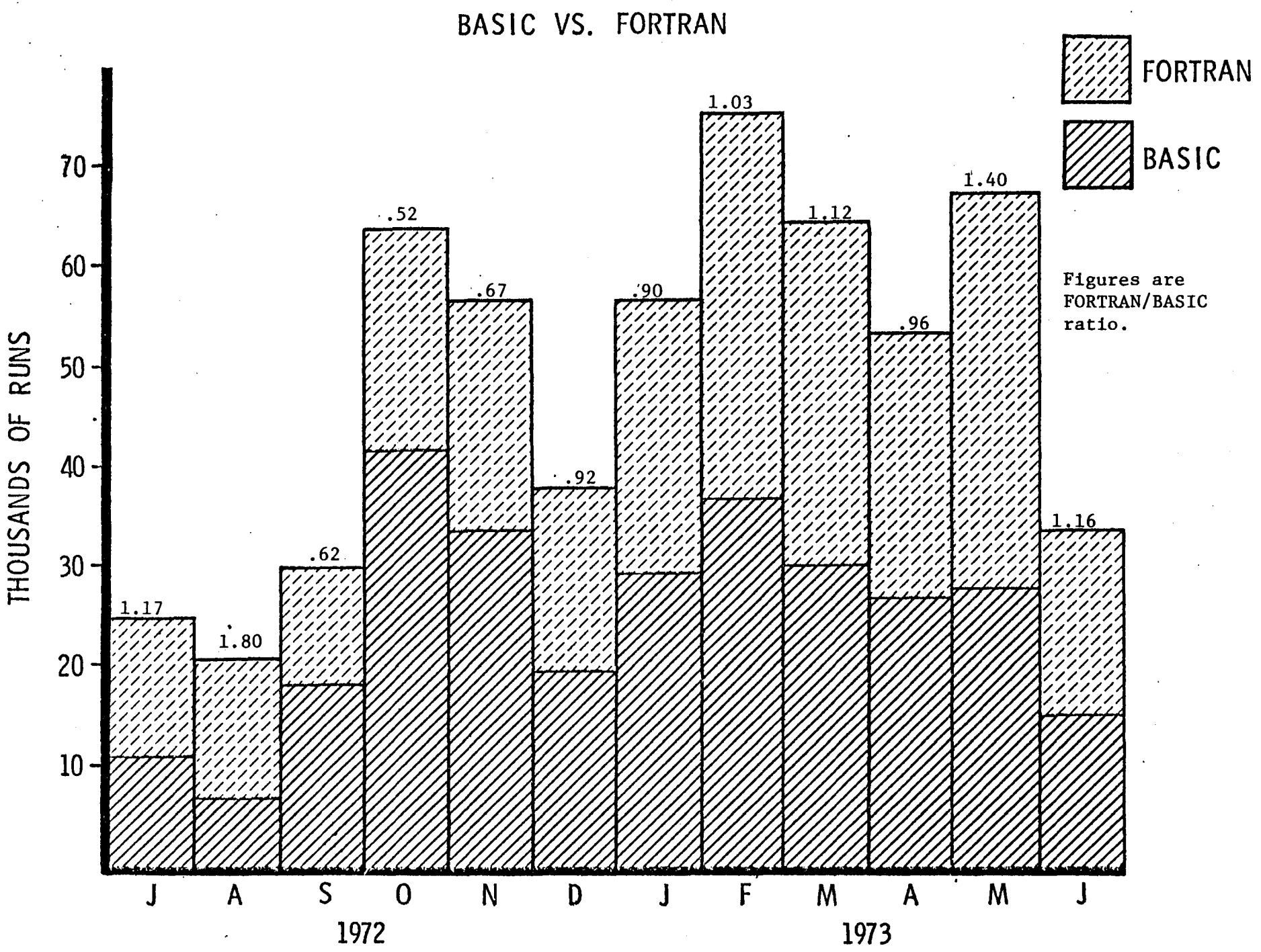
BASIC VS. FORTRAN
FORTRAN
BASIC
THOUSANDS OF RUNS
70
60
50
40
30
20
10
1.17
1.80
.62
.52
.67
.92
.90
1.03
1.12
.96
1.40
1.16
Figures are FORTRAN/BASIC ratio.
J A S O N D J F M A M J
1972
1973

FIGURE IV - 3

V. JULY 1973 - JUNE 1974

A. Equipment

A new contract was negotiated with Control Data which called for an expansion from 108 ports to 160 ports on October 1, 1973, with a corresponding decrease in per port cost from $187.50 to $172.50. See Appendix G for the 1973-1974 budget. The 160 port configuration was 65K memory, $100,000_8$ words of shared Extended Core Storage, a 604 tape drive, dual channel 6638 disk, 841-3 disk, and 3 6676 communication controllers.

B. Users

Although 160 ports were leased, there was a maximum demand for only 145 ports. The following is a breakdown of ports by system in October, 1973.

System	Number of Ports	
Community Colleges	15	
State Colleges	40	
Private Colleges	7	(included Wisconsin Colleges)
Secondary Schools	3	
University of Minnesota	70	

The University of Minnesota ports were composed of 32 instructional lab ports, 35 instructional department dial-up ports, and 3 ports shared by low usage departments.

C. Statistics

The mix of usage of various languages remained much the same as for 1972-73. Again, FORTRAN usage was less than BASIC at the beginning of the academic year but dominated it by the end of the year. By the end of the year, XEDIT, a locally written text editor,

had thirty times the usage of Control Data's standard editor, EDIT. ALGOL and LISP were additions made available to MERITSS by University Computer Center staff. Appendix A summarizes some of these usage statistics.

Increased usage was reflected by the connect time figure. A maximum of 20,600 hours was attained in May, 1974. This compares with maximum figures also in May of 9,000 for 1971-1972 and 14,000 for 1972-1973. If we divide the connect time for May by the number of ports at that time (145) we will find an average usage of 140 hours per port. Since the user port cost was $250 per month, the cost was less than $2 per hour.

D. Communications Network

Figure V-1 shows the MERITSS communications arrangement as it existed in October, 1973. Multiplexed private lines were used as the main technique to serve multiple users. Approximately 35 campuses with 280 terminals were serviced by this star type network.

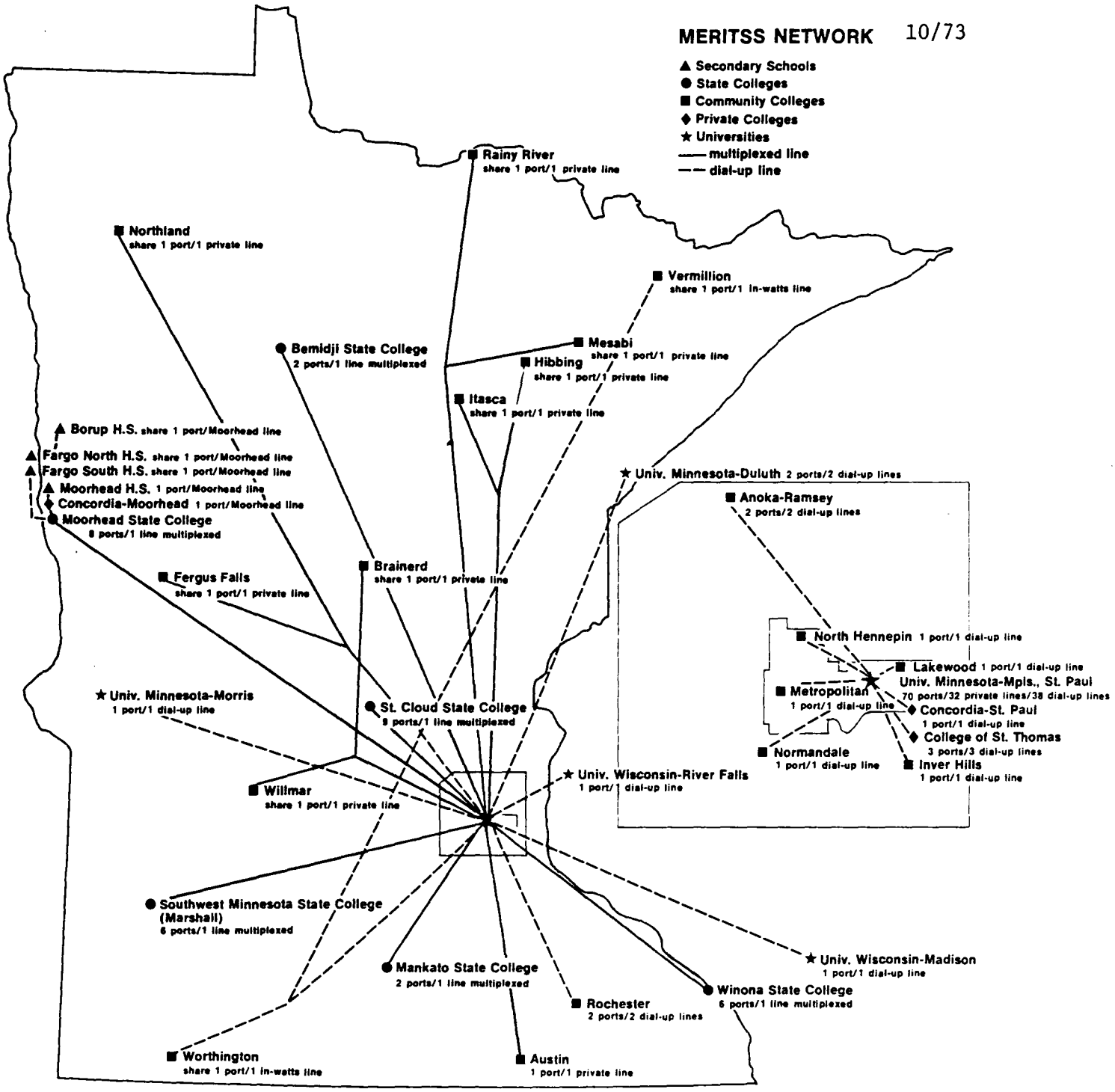
MERITSS NETWORK 10/73
▲ Secondary Schools
● State Colleges
■ Community Colleges
♦ Private Colleges
★ Universities
—— multiplexed line
—— dial-up line
Rainy River
share 1 port/1 private line
Northland
share 1 port/1 private line
Vermillion
share 1 port/1 in-watts line
Bemidji State College
2 ports/1 line multiplexed
Mesabi
share 1 port/1 private line
Hibbing
share 1 port/1 private line
Itasca
share 1 port/1 private line
Borup H.S. share 1 port/Moorhead line
Fargo North H.S. share 1 port/Moorhead line
Fargo South H.S. share 1 port/Moorhead line
Moorhead H.S. 1 port/Moorhead line
Concordia-Moorhead 1 port/Moorhead line
Moorhead State College
8 ports/1 line multiplexed
Univ. Minnesota-Duluth 2 ports/2 dial-up lines
Anoka-Ramsey
2 ports/2 dial-up lines
Brainerd
share 1 port/1 private line
Fergus Falls
share 1 port/1 private line
North Hennepin 1 port/1 dial-up line
Lakewood 1 port/1 dial-up line
Univ. Minnesota-Mpls., St. Paul
70 ports/32 private lines/38 dial-up lines
Metropolitan
1 port/1 dial-up line
Concordia-St. Paul
1 port/1 dial-up line
College of St. Thomas
3 ports/3 dial-up lines
Normandale
1 port/1 dial-up line
Inver Hills
1 port/1 dial-up line
Univ. Minnesota-Morris
1 port/1 dial-up line
St. Cloud State College
9 ports/1 line multiplexed
Univ. Wisconsin-River Falls
1 port/1 dial-up line
Willmar
share 1 port/1 private line
Southwest Minnesota State College
(Marshall)
6 ports/1 line multiplexed
Univ. Wisconsin-Madison
1 port/1 dial-up line
Mankato State College
2 ports/1 line multiplexed
Winona State College
6 ports/1 line multiplexed
Rochester
2 ports/2 dial-up lines
Worthington
share 1 port/1 in-watts line
Austin
1 port/1 private line

FIGURE V - 1

VI. JULY 1974 - JUNE 1975

A. MECC

The 1974-75 academic year was the first formal year of operation under the Minnesota Educational Computing Consortium (MECC). The role of UCC was changed to that of operation and consultation. MECC handled publications, some applications programming, and engaged in an enhanced training function directed mainly toward secondary schools, which became the largest of the educational systems using MERITSS. UCC provided a machine, and operating system maintenance , and system enhancement.

Coincident with this new philosophy of operation was the implementation of a communications network, and funding which made economical timesharing available to all elementary, secondary, and vocational schools in the state. The accompanying large increase in secondary school usage created a need for 455 ports to provide instructional timesharing for the state.

MERITSS supplied 256 of the 455 ports. The actual need was for approximately 275 Cyber style ports but this need reduced by implementing timesharing on the University's Cyber 74 and transferring some University of Minnesota activities to that machine.

B. EQUIPMENT

The increase from 160 ports to 256 ports was achieved by adding a fourth 6676 communications controller, using another $100{,}000_8$ words of shared Extended Core Storage (ECS) and installing a DDP which allowed direct peripheral processor access to ECS,

replacing the 604 tape unit with two 607 tape units, and replacing the 841-3 with a two-drive 844 disk unit capable of storing 214 million characters.

The final configuration was:

- CDC 6400
- 65K Central Memory Words
- 10 PPU'S
- 2-607 tape units
- 6638 dual channel disk
- 2-844-21 disks
- DDP
- $200{,}000_8$ words ECS
- 4-6676 Communication Controllers

C. COMMUNICATIONS

Two forms of communications were used. These were dial-up and multiplexed lines. The dial-up lines were split between 20 In Watts lines on a single rotary and 53 standard business lines on several rotaries. The remaining 183 ports were connected to 17 time division multiplexors.

D. USAGE

It was expected that the large increase in secondary school users would produce a substantial shift in type of usage. Appendix B is a comparison of some usage data for January and February, 1974 versus the same months of 1975. The percentage of BASIC runs increased from 36% in 1974 to over 60% in 1975. A corresponding percentage decrease in FORTRAN runs was also noted. The number of runs per terminal hour had increased slightly, possibly due to more runs necessary to debug, and less complex production runs. It is interesting to note that there was a dramatic decrease in the number of

CP seconds per terminal hour. The fact that secondary schools demanded less of the CPU is also borne out by the figures in appendix C, comparing various systems.

E. STATISTICS

MERITSS had become the largest single general purpose instructional timesharing system in the world. Appendix A gives a synopsis of usage from September 1974 through June 1975. The heaviest usage occured during the month of April with over 39,000 terminal hours accumulated. The largest number of simultaneous users, 202, was attained on April 29. Figure VI-1 represents the number of users at a given time for that day. The shape of this curve is representative of most days during the year. There is a sharp increase in active users at start up time which levels off at 12 Noon, then a further increase near 3 P.M., when secondary school classes end. Usage decreases rapidly until around 7 P.M., at which time there is a gradual increase until 10 P.M., decreasing from then to the 2 A.M. end of operations. Figure VI-2 is a total of each command for that day.

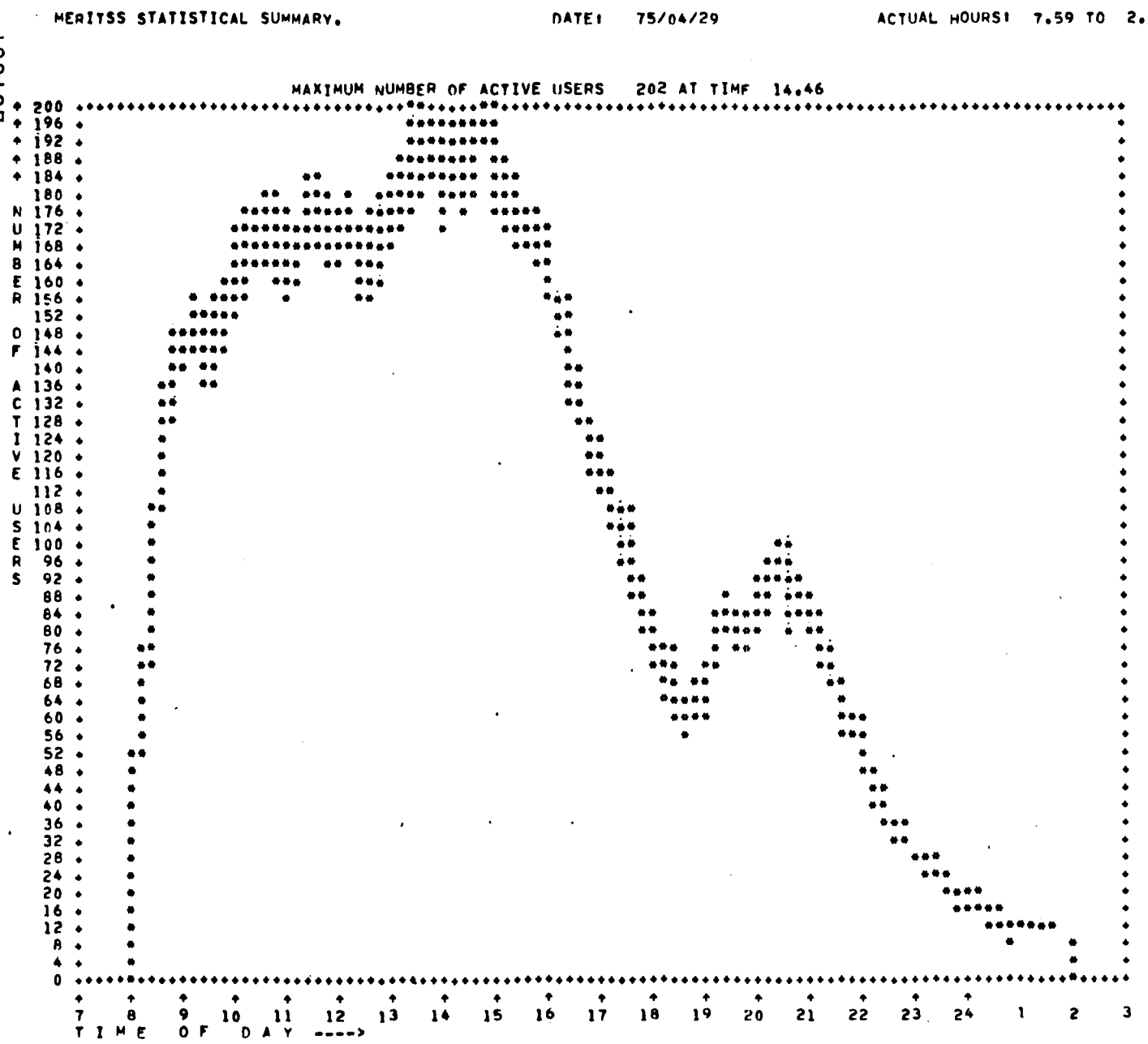
MERITSS STATISTICAL SUMMARY.
DATE: 75/04/29
ACTUAL HOURS: 7.59 TO 2.01
MAXIMUM NUMBER OF ACTIVE USERS 202 AT TIME 14.46
NUMBER OF ACTIVE USERS
200
196
192
188
184
180
176
172
168
164
160
156
152
148
144
140
136
132
128
124
120
116
112
108
104
100
96
92
88
84
80
76
72
68
64
60
56
52
48
44
40
36
32
28
24
20
16
12
8
4
0
7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 1 2 3
TIME OF DAY ---->

FIGURE VI - 1

MERITSS STATISTICAL SUMMARY. DATE: 75/04/29 ACTUAL HOURS: 7.59 TO 2.01

TELEX OPERATION: TELEX UP 7.59
TELEX DOWN 2.01

TERMINAL USAGE:	NL	CT	CP	CP.CM	MS	TTYI	TTYO
	3917	1914	21846.195	62.683	737.096	2563.179	21740.922

TOTAL CP USAGE:	IDLE	SYSTEM	TERMINAL	TELEX	SYSTM ORIGN
	35720.000	1032.605	21846.195	2151.198	6225.460

TELEX STATISTICS:

1 ABNORMAL OCCURENCES.	9477 BASIC RUNS.	108 COBOL RUNS.	638 EXECUTES.
10279 FILES SORTED.	625 FL CHANGES.	598 FORTRAN RUNS.	93707 INPUT RESPONSES
2834 MNF RUNS.	1964 POTS LOW.	143 SNOBOL RUNS.	7461 SORTS SCHEDULED.
36607 TIMES NO PPU.	203 USERS MAXIMUM.	27 USERS RECOVERED.	3917 USERS TOTAL.
11712 WORDS MAX. FL.			

TELEX COMMAND COUNTS:

9 ACCESS	9 APL	28 APPEND	113 ASCII	145 ATTACH	501 AUTO	3126 BASIC	
192 BATCH	2 BINARY	559 BRIEF	2373 BYE	1200 CALL	1019 CATLIST	126 CHANGE	
6 CHARGE	526 CLEAR	19 COBOL	895 C	50 DAYFILE	2 DEFINE	10 EDIT	
93 EXECUTE	175 FORTRAN	57 FULL	1003 GAME	1107 GET	47 GOODBYE	32 HALF	
378 HELLO	61 HELP	5471 ILLEGAL	13 INFORM	35 LENGTH	1531 LIBRARY	10 LIMITS	
1817 LIST	5133 LNM	165 LOGIN	3 LO72	5 LRUN	679 MNF	14 MONITOR	
2816 NEW	13 NODROP	541 NORMAL	91 NOSORT	44 NULL	273 NUSERS	7914 OLD	
230 PACK	1 PARITY	2 PASSWOR	20 PERMIT	495 PURGE	1 QSTATUS	146 RENAME	
2755 REPLACE	229 RESEQ	93 RETURN	87 REWIND	9489 RNH	118 ROUT	4407 RUN	
1368 SAVE	8 SECOND	85 SETTL	20 SNOBOL	86 SORT	182 STATUS	1339 STOP	
734 TAPE	140 TERM	281 TEXT	9 TIMEOUT	1 TRAN	408 UNSAVE	13 USER	
36 USE	1111 XEDIT	1218 X					

Abbreviations:

- NL Number of sessions
- CT Number of terminal hours
- CP Number of central processor seconds
- CPCM Proportional to Field Length X Central Processor seconds
- MS Number of 640 Character mass storage blocks transferred (thousands)
- TTYI Number of characters typed in at terminal (thousands)
- TTYO Number of characters output to terminal (thousands)

FIGURE VI - 2

VII. UNIVERSITY OF MINNESOTA PARTICIPATION

A. Instructional Labs

The experience by the University of Minnesota during the first 10 months on MERITSS indicated a need for student-only facilities for instructional timesharing. Too often, the department terminals were not available due to offices being locked or terminals being used for either class preparation or research projects. At other times, one department would be experiencing heavy student usage on its terminal while another had little or no usage. The desired goal was to combine resources at an all University level to better serve student's needs in an economical fashion.

The instructional timesharing laboratories commenced operations in October 1972 with a block of 16 ports. They were centrally controlled and financed by University Computer Services. The result was a considerable shifting of timesharing use from the department level to all University level. Currently, there are 32 ports and 61 terminals designated for the instructional labs. These labs are located in Mechanical Engineering, Vincent Hall, Elliott Hall, Experimental Engineering, Social Science Tower, Classroom Office Building on the St. Paul Campus, and the Middlebrook, Territorial, and Centennial dormatories. Each lab has from 1 to 11 terminals to be used for timesharing computing. In addition, an off-line teletype is available for paper tape preparation. See Figure VII-1 for a schematic of the instructional lab system as it existed in 1973.

The convenient locations and the combination of resources caused the instructional lab ports to become the most heavily used ports on MERITSS. Figure VII - 2 indicates the monthly connect time totals accumulated by the instructional labs during 1972-1973.

B. Computer Aided Instruction

The Instructional Design Group of the Center for Research in Human Learning under the direction of Dr. Russell Burris completed work on the author language, MIL (Minnesota Instructional Language). Burris' work in this area has gained University, state, and national acceptance. Courses now running on MERITSS are in the areas of German, Greek, Italian, Swedish, Spanish, Pediatric Cardiology, Hematology, Law, and Logic, with others soon to follow.

C. Agricultural Extension Service

The Farm Management Extension Specialists, who are also faculty members of the Department of Agricultural and Applied Economics, provided development and training leadership during 1972-73 through the use of the MERITSS system throughout the Agricultural Extension Service. Their objectives were to make this system accessible to other Extension educators wherever they serve people in the state of Minnesota. They also had as their objective the development of computer decision aids so designed to be educationally sound and able to enhance the capacity of the Extension educators to teach whatever subject matter is their specialty. In order for a computer decision aid (CDA) to be educationally sound, it must (1) help decision

makers to clarify their problem during the acquisition and assimulation of data as input into the CDA, (2) clarify and enhance the underlying principles, relationships, and empirical evidence of the underlying analysis and, also, (3) encourage modification of the previously conceived problem and/or speak to the real world problems associated with risk and uncertainty through an interactive process of analytic reruns.

The Farm Management Specialists group developed materials primarily in the areas of operations research or similar quantitative analysis. These specifically included enterprise selection analysis procedures, linear programming type optimizations, financial planning, and capital budgeting procedures. Use was made during 1972-73 in at least 100 different workshops, seminars or other classroom settings by this group and their area agent counterparts alone. Such usage included running participant's data, dealing with case problem situations, or enhancing lecture presentation and developing classroom illustrations. All training of field personnel continues, though the awareness phase of exposure of field personnel is drawing to a close.

Terminals have been placed in five area offices, in addition to the three in St. Paul. Limited access by Extension faculty members in other outstate locations also exists.

Training efforts included not only other agricultural specialists, but also Home Economics Extension specialists and resident faculty members. The former led to development of a beef cattle breeding program now being used throughout the state and a developing interest on the part of both plant and animal scientists in the use of the CDA approach.

The work with the Home Economics faculty has, in turn, produced additional field staff training sessions, plus a pilot project involving Home Economists at North Dakota State University, Moorhead State, and Concordia, as well as the Nash Finch Company. This project included putting terminals in four supermarkets in the Fargo/Moorhead area for the month of April in 1973. Over 300 consumers input their weekly shopping list and received an analysis of its nutritional adequacy, as well as its budget feasibility. Other programs in the area of housing, nutrition and house design are in various stages of use or development.

D. Simulation

Dr. Tom Hummel of the Student Personnel Bureau developed a program which simulates client behavior in an initial counseling interview. Through interaction with a counselor, a programmed client progresses toward a goal of verbalizing a specific problem statement. This type of simulation is valuable as a means of training and evaluation in counselor education.

E. Graphics

The Applied Statistics Department purchased a Tektronix 4013 graphics terminal with associated software. Programs have been written to utilize the graphics capability in order to aid the teaching of various topics of statistics and numerical analysis.

F. MINITEX

A number of Community Colleges had access to MINITEX (Minnesota Interlibrary Teletype Exchange). MINITEX is a Minnesota Higher Education Coordinating Commission program that shares University library resources

with other academic institutions through a teletype custom service network. Faculty and students who have information needs that cannot be met by their own campus library were assisted by having their requests transmitted through MERITSS terminals on their campus. The requests were briefly stored on the CDC 6400 until they were retrieved by the MINITEX staff.

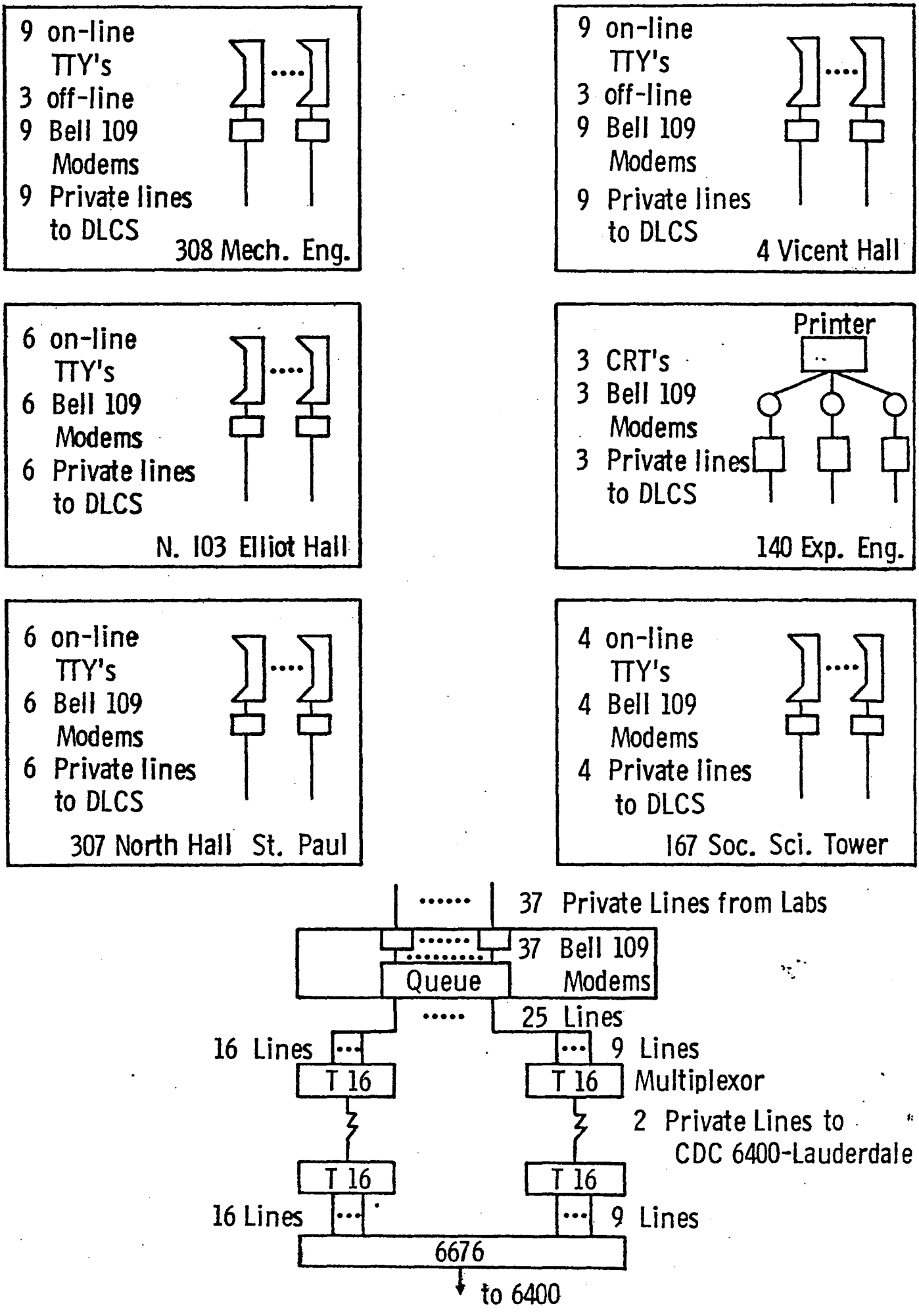
9 on-line TTY's
3 off-line
9 Bell 109 Modems
9 Private lines to DLCS
308 Mech. Eng.
9 on-line TTY's
3 off-line
9 Bell 109 Modems
9 Private lines to DLCS
4 Vicent Hall
6 on-line TTY's
6 Bell 109 Modems
6 Private lines to DLCS
N. 103 Elliot Hall
Printer
3 CRT's
3 Bell 109 Modems
3 Private lines to DLCS
140 Exp. Eng.
6 on-line TTY's
6 Bell 109 Modems
6 Private lines to DLCS
307 North Hall St. Paul
4 on-line TTY's
4 Bell 109 Modems
4 Private lines to DLCS
167 Soc. Sci. Tower
37 Private Lines from Labs
37 Bell 109 Modems
Queue
25 Lines
16 Lines
9 Lines
T 16
T 16
Multiplexor
2 Private Lines to CDC 6400-Lauderdale
T 16
T 16
16 Lines
9 Lines
6676
to 6400

FIGURE VII - 1

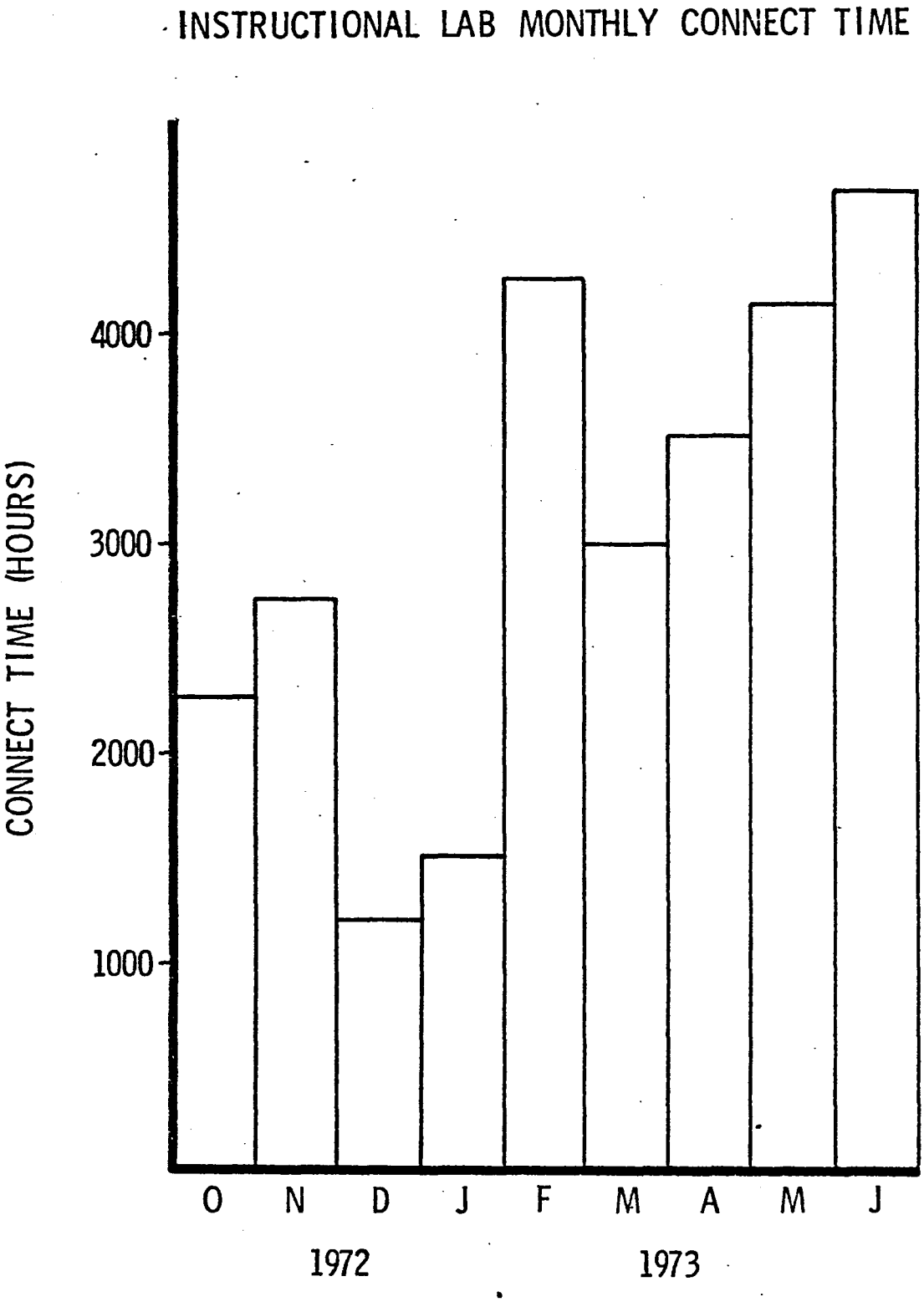
INSTRUCTIONAL LAB MONTHLY CONNECT TIME
CONNECT TIME (HOURS)
4000
3000
2000
1000
O
N
D
J
F
M
A
M
J
1972
1973

FIGURE VII - 2

VIII. SERVICES

A. System Availability

MERITSS is available to its users 110 hours per week. The operation schedule is given below. The staggered weekly up-times are a result of preventive maintenance on Tuesday and Thursday.

Operation Schedule

Monday	7:30 AM - 2:00 AM
Tuesday	8:30 AM - 2:00 AM
Wednesday	7:30 AM - 2:00 AM
Thursday	8:30 AM - 2:00 AM
Friday	7:30 AM - 11:00 PM
Saturday	7:30 AM - 12:00 Midnight
Sunday	6:00 PM - 12:00 Midnight

B. Consulting

Consulting is available from 8:30 AM to 4:30 PM weekdays in 230 Experimental Engineering or by telephone at 373-5753 during these hours. A recorded message at 373-1798 will give the machine status also during these hours.

C. Newsletter

A newsletter was prepared monthly for MERITSS users. This contained announcements of meetings, new applications, and program and system changes. Articles written by MERITSS staff members on programming techniques and the use of new features were included.

D. MERITSS HANDBOOK

Work was completed on the new MERITSS HANDBOOK during the summer of 1972. The HANDBOOK was a joint effort of the Junior College System

and the MERITSS staff. This contains sections on BASIC, XBASIC, FORTRAN, KRONOS timesharing commands, and operation of the Teletype model 33. The MERITSS HANDBOOK has proven to be an excellent introduction to timesharing on MERITSS, but is now out of print.

E. User Association

The MERITSS Users Association was established in the spring of 1972. Since then, by means of its semi-yearly meetings, it has established an intra- and inter-system arrangement by which all systems on MERITSS can share ideas and locally developed programs.

F. Operating System/System Staff

All MERITSS systems programming staff members were previously associated with the University's CDC 6600 operation. This made it possible to begin MERITSS operations with a note of optimism when considering the multitude of problems that were bound to occur with a quickly expanding timesharing system. The members of the systems programming group indeed performed according to the great expectations of them.

Since the group is a product of the University Computer Center environment, its duties are not only system maintenance, but also systems development. Many modifications were made to the initial system to make it easier to use and greater in capability. One of the many enhancements to the system was software allowing MERITSS users to submit jobs to be run on the CDC 6600. This joint effort utilized common extended core storage as the transmission medium.

There are many features in the MERITSS system that evolved as a result of the staff associated with the Center's CDC 6600. Because of the similarity of the CDC 6400 and the CDC 6600, many projects on the CDC 6600 resulted in MERITSS obtaining such languages as MNF, COBOL, ALGOL, SNOBOL, and PASCAL.

MERITSS would have been a much lesser system without the high level of expertise available at the University Computer Center.

IX. SOFTWARE

A. Programming Languages

(1) BASIC and XBASIC

BASIC (Beginners All-purpose Symbolic Instruction Code) is an extension of the original BASIC language which was designed and implemented at the Dartmouth College Computation Center. This easy to learn language enables a person with little or no computer experience to solve numerical problems.

(2) FORTRAN (TSRUN, MNF, and RUN23)

FORTRAN (FORmula TRANslating system) is a problem oriented language whose source language statements closely resemble the algebraic notation used to solve scientific and engineering problems. This language is widely used in the United States. There are three FORTRANs available on MERITSS: TSRUN, RUN23, and MNF. TSRUN is CDC's standard timesharing FORTRAN compiler. RUN23, also a CDC product, is an extended version of TSRUN which does not allow line numbers. MNF is the University of Minnesota FORTRAN which compares favorably with RUN23 in Batch and TSRUN in timesharing. Because of diagnostics, debugging aids, and generalized statements, MNF is recommended for the majority of MERITSS FORTRAN users.

(3) COBOL

COBOL (COmmon Business Oriented Language) is a programming language resembling English which is designed to simplify the programming of business data processing operations. The development of this language begin in 1959 and it is now being used on almost all large scale computers. The MERITSS version is the University Computer Center adaptation of CDC COBOL 3.0. 30,000 modification cards were necessary. This modified version facilitates use from a timesharing terminal.

(4) APL

APL, which is based on the notation defined by Kenneth E. Iverson in A Programming Language (Wiley, 1962) basically agrees with the APL/360 version, with some deletions and some extensions. APL on MERITSS was developed jointly by the University Computer Center and the Department of Computer, Information, and Control Sciences of the University of Minnesota. CDC has used this experimental interpreter as a basis for its new APL*CYBER interpreter. APL effectively combines the power of Iverson's language with the convenience of timesharing.

(5) ALGOL

ALGOL (ALGOrithmic Language) is a problem oriented language intended, at its definition, to be the international programming language. This language allows expression of problem solutions as precise procedures. The power of the language lies in its great flexibility in allowing many variations of each of its few instructional forms. This language is commonly used to relate computer algorithms in publications since it is understandable for reading but still suitable for machine translation. The MERITSS version of ALGOL was modified slightly by University Computer Center staff to facilitate timesharing use.

(6) SNOBOL

SNOBOL (StriNg Oriented symBOlic Language) is a computer programming language containing many features not commonly found in other programming languages. The basic data element is a string of characters. The language has operations for joining and separating strings, listing

their contents, and for making replacements in them. This language can be used in such areas as compilation techniques, machine simulation, natural language translations, and music analysis. The SNOBOL interpreter was obtained from the University of California, Berkeley, and was extensively modified and enhanced by University Computer Center staff to allow interactive processing.

(7) COMPASS

COMPASS (COMprehensive ASsembly System) enables a program to write CDC 6000 series machine language through use of mnemonic instructions and symbolic addresses.

(8) LISP

LISP (LISt Processor) is an interpretive processor obtained from the University of Texas at Austin, useful for symbol manipulation and recursive programming. It has application in artificial intelligence and natural language analysis.

(9) PASCAL

PASCAL is an ALGOL-like language which facilitates structured programming. This is a general purpose language with fast compilation. PASCAL was obtained from ETH in Zurich, Switzerland, and modified by the University Computer Center to enable interactive processing.

B. Applications Programs and Subprograms

A majority of the routines on the MERITSS subroutine libraries were taken from the CDC 6600 library. In addition, there are permanent file manipulation routines which allow the FORTRAN programmer to GET, ATTACH, APPEND, PURGE, SAVE, and REPLACE files. There is a common library of general purpose application programs available to all users (see Appendix F). These programs are useful in the areas of Statistics,

Engineering, Business, Chemistry, Physics, Biology, Mathematics, Political Science, and Art, to list a few. These programs, written in BASIC, FORTRAN, SNOBOL, and COMPASS, compose a superset of programs received from CDC at Bethesda, University of Colorado, the Huntington II project, and the MERITSS users. Documentation is available by means of the MERITSS developed program, INFORM, which allows a user to index and selectively retrieve information on the program of his choice. Some of the larger packages are listed below:

ISIS - Interactive statistics package from Florida State University and modified by the University Computer Center to allow greater file flexibility and additional statistical analysis.

IMSL - A library of FORTRAN-callable subroutines developed by Internation Mathematical and Statistical Libraries, Inc.

TYPESET - An English text preparation program written by a student at the University of Minnesota.

TEKLIB - A library of FORTRAN-callable subroutines used for driving the Tektronix graphics terminal. This was modified slightly from the original Tektronix version by the Applied Statistics department at the University of Minnesota.

NOTIFY - A program which allows master users to send messages to all or specified users under their control. These messages are received at log-in time.

SYSTEM 2000 - A general purpose data management system.

MIL - A FORTRAN-like CAI author language written by the Consulting Group on Instructional Design at the University of Minnesota.

XEDIT - An interactive text editor originally written by a student at the University of Minnesota and now maintained by the University Computer Center. XEDIT is designed to make changes more quickly, easily, and accurately than the KRONOS text editor.

CDC 6400 USAGE SUMMARY 1975-1976

RUN TYPE	- - - NUMBER OF RUNS - - -									
	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June
BASIC	21,142	51,938	48,307	32,967	62,432	67,591	32,026	32,323	28,471	12,808
MNF	10,409	29,602	47,702	32,419	36,567	58,251	43,485	33,024	37,254	31,902
XEDIT	15,056	19,262	25,334	20,296	21,885	36,371	37,423	30,747	32,923	25,397
TSRUN(FORTRAN)	1,261	3,911	5,977	4,714	5,408	4,911	2,814	2,546	3,387	2,452
EXECUT	2,639	4,056	3,503	2,923	6,088	8,015	5,826	10,031	11,536	9,554
SNOBOLC	1,163	1,490	2,915	2,101	1,576	2,202	5,098	2,283	4,840	2,521
COMPASS	1,643	1,337	1,964	1,653	1,942	2,223	2,998	2,213	2,728	2,305
PASCAL	1,483	4,960	4,285	2,779	4,975	10,638	9,109	9,594	11,443	4,922
MNFOLD	96	40	230	259	95	124	71	34	87	85
RUN and RUN23	251	800	715	587	796	599	787	728	1,263	1,044
COBOL	138	766	575	79	172	452	960	39	417	26
EDIT	214	306	603	753	748	1,077	759	502	508	453
APL	122	545	1,111	423	545	529	569	655	1,080	474
LISP	2	19	29	53	57	12	31	202	498	37
ALGOL	5	5	10	25	41	5	53	491	615	16
Total	55,624	119,037	143,835	102,031	143,327	193,000	142,009	125,712	137,050	93,996
Runs per hour per terminal	7.90	5.65	6.87	6.84	6.30	7.95	7.53	6.86	7.12	7.42
Maximum number simultaneous users	57	111	111	111	117	126	109	96	102	75
Number of terminal sessions	17,551	50,478	39,924	30,228	48,732	50,155	40,426	40,423	40,246	24,865
Terminal hours	7,041	21,069	20,924	14,921	22,755	24,273	18,851	18,338	19,257	12,667
Central Processor hours	40.2	77.1	94.3	71.8	74.6	93.6	95.1	89.1	103.1	92.8
File Storage (millions of characters)	165.8	163.3	132.9	137.8	164.5	183.1	195.8	200.6	197.7	178.6
Mean time between failures (hours)	92.7	48.9	46.5	19.8	35.6	38.4	48.9	46.9	21.8	79.1
% available during scheduled hours	99.6	99.2	97.5	98.0	98.0	98.0	98.6	99.2	99.1	99.6

USAGE SUMMARY 1973-1974

RUN TYPE	- - -Number of Runs- - -								
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
BASIC	32,488	41,355	23,522	33,446	45,989	47,592	53,373	57,847	26,350
XBASIC	22,489	22,791	7,633	9,917	8,574	8,897	9,489	8,091	3,918
MNF	20,641	27,952	18,022	31,578	42,092	36,555	38,021	43,282	24,487
FORTRAN	13,402	14,736	7,568	9,982	13,182	14,005	12,521	13,262	6,464
XEDIT	10,182	12,039	11,096	14,613	18,427	19,154	19,903	22,798	15,620
EDIT	2,514	1,711	528	837	744	888	520	414	547
SNOBOL	1,833	3,028	4,802	3,425	10,575	6,658	2,942	2,474	1,943
RUN23 and RUN	1,627	1,667	1,091	1,409	1,221	1,527	1,647	1,614	1,279
COMPASS	950	1,250	1,685	2,462	2,489	3,013	2,701	2,503	2,648
ALGOL	--	--	--	230	99	267	489	258	94
LISP	--	--	--	229	169	70	41	57	82
APL	476	331	424	393	468	507	556	1,055	264
COBOL	321	226	165	88	492	1,568	1,710	3,330	318
MNFOLD	234	2,068	822	889	1,168	958	1,040	1,771	1,383
Total	107,117	129,154	77,358	109,498	145,689	141,659	144,973	158,756	85,397
Number of terminal sessions	36,013	37,536	22,657	35,979	38,050	39,743	39,506	41,614	23,670
Terminal hours	14,219	16,694	10,702	14,588	18,743	18,215	18,328	20,593	11,596
Central Processor hours	59.15	71.27	71.68	68.96	84.66	115.43	98.94	95.30	71.62
File Storage (millions of characters)	122.0	123.3	130.8	107.2	127.1	119.6	139.7	153.7	151.8

FIGURE A - 1

USAGE SUMMARY 1974-1975

RUN TYPE	- - - NUMBER OF RUNS - - -									
	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June
BASIC	90,434	170,563	161,609	116,888	163,908	176,407	149,880	199,690	154,389	60,388
MNF	25,302	54,979	55,965	34,465	46,532	60,590	44,360	70,121	63,237	23,970
XEDIT	15,167	24,202	20,671	16,191	19,462	22,186	17,786	25,135	25,328	18,161
TSRUN(FORTRAN)	6,306	13,627	13,180	7,503	7,818	10,134	7,363	12,062	10,597	4,704
EXECUTE	2,848	4,949	4,713	4,063	6,112	6,934	5,234	7,335	11,210	5,761
SNOBOLC	3,754	2,745	3,974	1,934	2,857	3,166	4,074	3,570	4,438	2,411
COMPASS	2,104	2,950	2,713	1,839	2,181	1,583	1,867	1,893	1,911	1,094
PASCAL	--	--	586	967	538	803	911	1,611	2,190	900
MNFOLD	771	995	1,220	862	539	883	720	851	490	462
RUN and RUN23	1,253	1,481	849	808	606	376	525	526	415	348
COBOL	233	376	356	661	392	1,329	743	2,239	1,192	711
EDIT	446	738	952	439	540	481	419	285	383	177
APL	315	602	1,066	357	372	699	764	849	613	494
XBASIC	145	172	89	159	14	9	--	--	--	--
LISP	69	53	174	48	109	51	153	114	227	25
ALGOL	85	26	86	26	2	51	7	281	258	137
Total	149,232	278,458	268,203	186,243	251,982	285,682	234,806	326,562	276,878	119,743
Runs per hour per terminal	8.83	8.38	8.29	8.27	8.37	8.79	8.59	8.27	8.25	8.52
Maximum number simultaneous users	147	172	196	197	182	187	177	202	196	111
Number of terminal sessions	39,727	73,931	63,243	48,484	69,470	71,745	57,460	82,212	67,901	27,894
Terminal hours	16,923	33,248	32,383	22,543	30,133	32,505	27,356	39,510	33,588	14,049
Central Processor hours	69.2	118.4	120.2	75.7	92.6	100.5	88.3	122.0	103.5	70.1
File Storage (millions of characters)	177.8	163.4	189.4	177.4	170.1	174.9	179.1	189.9	194.9	185.3
Mean time between failures (hours)	13.1	14.8	22.2	12.3	18.6	26.0	9.0	27.5	21.8	37.8
% available during scheduled hours	96.8	98.7	96.1	96.3	98.4	98.2	92.1	98.2	98.5	97.6

FIGURE A - 2

APPENDIX B

	JAN 74	JAN 75	FEB 74	FEB 75
TOTAL RUNS	118563	251982	153652	285682
BASIC	43363	163922	55413	176407
% OF TOTAL	36.6	65.1	36.1	61.7
FORTRAN	45178	55495	58263	71938
% OF TOTAL	38.1	22.0	37.9	25.2
OTHER	30022	32565	39976	37292
% OF TOTAL	25.3	12.9	26.0	13.1
CP Seocnds	259570	333468	304781	361718
CP per Session	6.87	4.80	8.01	5.04
CP per Terminal hour	17.03	11.08	16.26	11.13
No. of Sessions	37810	69459	38050	71734
Total Terminal hours	15243	30099	18745	32489
Runs per Terminal hour	7.78	8.37	8.20	8.79

Comparison of low (1974) vs. high (1975)
Secondary School Usage

APPENDIX C

Monthly Usage Statistics by System

The following pages are monthly usage statistics for July, 1972 through June 1975. These figures are useful in comparing usage and utilization by each system of education as well as indicating the general growth in usage during this period. Similar figures for September 1971 through June 1972 are not readily available but do exist in a raw form. The column 'UOFMINN LABS' is blank for the first three months

Other months have rows of data that are blank. Accounting errors produced incorrect data during these months and these data were not used.

The abbreviations follow.

NL	Number of Sessions
CT	Connect time (terminal hours)
CP	Central Processor time (hours)
CPCM	Proportional to field length x time
MS	Number of 640 character disk blocks transferred (thousands)
TI	Number of characters typed in at terminal (thousands)
TO	Number of characters typed out at terminal (thousands)
SL	Average session length (hours)
S/H	Central processor seconds per terminal hour
CM/H	Proportional to field length x time per terminal hour (CPCM x 100/CT)
MS/H	Number of 640 disk blocks transferred per terminal hour (MS x 1000/CT)
TI/H	Number of characters typed in at terminal per hour (TI x 1000/CT)
TO/H	Number of characters typed out at terminal per hour (TO x 1000/CT)

7/72

	COMM. COLLEGE	PRIVATE COLLEGE	NEB. OMAHA	STATE COLLEGE	UOFMINN TOTAL	UOFMINN LABS	ALL USERS
NL	450	969	1797	827	3989		9043
CT	388	370	736	221	2013		4029
CP	1.63	4.52	11.17	.76	39.02		58.35
CPCM	13.64	18.41	53.66	5.02	287.69		395.79
MS	70.	102.	247.	14.	2626.		3304.
TI	644	664	1173	480	3604		7131
TO	4881	4529	6787	2818	29279		51679
SL	.86	.38	.41	.27	.50		.45
S/H	15.15	43.97	54.66	12.45	69.78		52.14
CM/H	3.52	4.98	7.29	2.27	14.29		9.82
MS/H	180.24	274.41	335.71	65.57	1304.52		842.47
TI/H	1660.	1795.	1594.	2172.	1790.		1770.
TO/H	12580.	12241.	9221.	12751.	14545.		12827.

8/72

	COMM. COLLEGE	PRIVATE COLLEGE	NEB. OMAHA	STATE COLLEGE	UOFMINN TOTAL	UOFMINN LABS	ALL USERS
NL	312	261	1346	369	6257		9873
CT	181	140	459	96	2998		4230
CP	.82	.44	2.74	.30	25.78		31.90
CPCM	10.26	2.98	35.89	2.07	278.53		353.50
MS	22.	24.	219.	7.	1323.		5160.
TI	315	216	838	171	5175		7406
TO	2509	2784	5379	1352	54246		70588
SL	.58	.54	.34	.26	.48		.43
S/H	16.25	11.26	21.46	11.26	30.96		27.15
CM/H	5.67	2.13	7.82	2.16	9.29		8.36
MS/H	119.91	173.81	476.91	73.71	441.43		219.88
TI/H	1740.	1543.	1826.	1781.	1726.		1751.
TO/H	13862.	19886.	11719.	14083.	18094.		16687.

9/72

	COMM. COLLEGE	PRIVATE COLLEGE	NEB. OMAHA	STATE COLLEGE	UOFMINN TOTAL	UOFMINN LABS	ALL USERS
NL	1506	923	3300	1258	4089		14298
CT	614	235	667	298	1983		4512
CP	1.58	.41	1.41	.52	16.15		22.91
CPCM	7.18	2.00	18.25	3.90	183.55		244.66
MS	36.	17.	222.	42.	2716.		3556.
TI	933	452	1020	579	3148		7467
TO	6581	2851	6758	3269	34264		61778
SL	.41	.25	.20	.24	.48		.32
S/H	9.24	6.26	7.63	6.24	29.32		18.28
CM/H	1.17	.85	2.74	1.31	9.26		5.42
MS/H	59.05	73.03	333.10	142.27	1369.39		788.10
TI/H	1520.	1923.	1529.	1943.	1587.		1655.
TO/H	10718.	12132.	10132.	10970.	17279.		13692.

10/72

	COMM. COLLEGE	PRIVATE COLLEGE	SECOND. SCHOOL	STATE COLLEGE	UOFMINN TOTAL	UOFMINN LABS	ALL USERS
NL	2393	1447	657	4626	15806	8214	26265
CT	1115	421	165	1170	5419	2341	8605
CP	3.52	.60	.59	3.41	30.89	14.43	42.08
CPCM	19.17	4.29	3.61	26.99	299.82	117.42	389.34
MS	91.	31.	8.	181.	2915.	529.	3668.
TI	2135	721	292	5131	8625	3441	14844
TO	12347	6002	2036	13875	81004	26829	119506
SL	.47	.29	.25	.25	.34	.29	.33
S/H	11.37	5.15	12.93	10.50	20.52	22.20	17.60
CM/H	1.72	1.02	2.19	2.31	5.53	5.02	4.52
MS/H	81.22	73.87	45.88	154.64	537.83	226.03	426.23
TI/H	1915.	1713.	1770.	4385.	1592.	1470.	1725.
TO/H	11074.	14257.	12339.	11859.	14948.	11460.	13888.

11/72

	COMM. COLLEGE	PRIVATE COLLEGE	SECOND. SCHOOL	STATE COLLEGE	UOFMINN TOTAL	UOFMINN LABS	ALL USERS
NL	2754	1191	689	1823	14000	6891	21739
CT	1397	402	181	658	5781	2673	8795
CP	5.09	1.17	1.00	2.48	48.08	21.22	62.02
CPCM	34.09	7.18	5.21	22.12	477.24	182.46	585.93
MS	201.	36.	19.	210.	3720.	935.	4711.
TI	2756	762	312	1181	8729	3655	14500
TO	15215	6111	2083	9425	89531	35760	127683
SL	.51	.34	.26	.36	.41	.39	.40
S/H	13.12	10.44	19.79	13.55	29.94	28.58	25.39
CM/H	2.44	1.79	2.88	3.36	8.26	6.83	6.66
MS/H	143.97	89.51	106.40	319.01	643.45	349.82	535.66
TI/H	1973.	1896.	1724.	1795.	1510.	1367.	1649.
TO/H	10891.	15201.	11508.	14324.	15487.	13378.	14518.

12/72

	COMM. COLLEGE	PRIVATE COLLEGE	SECOND. SCHOOL	STATE COLLEGE	UOFMINN TOTAL	UOFMINN LABS	ALL USERS
NL	1799	849	506	1541	7568	2950	13329
CT	937	350	127	509	3108	1241	5481
CP	3.13	1.06	.87	2.49	55.23	8.47	65.87
CPCM	24.69	9.92	5.75	26.53	373.90	77.98	475.42
MS	156.	58.	17.	131.	1907.	427.	2883.
TI	2026	600	239	825	4945	1570	9387
TO	10972	4984	1620	7368	49705	18799	80258
SL	.52	.41	.25	.33	.41	.42	.41
S/H	12.02	10.92	24.57	17.62	63.98	24.57	43.26
CM/H	2.64	2.83	4.53	5.21	12.03	6.28	8.67
MS/H	166.69	166.67	130.69	256.88	613.45	344.18	525.98
TI/H	2162.	1714.	1882.	1621.	1591.	1265.	1713.
TO/H	11710.	14240.	12756.	14475.	15993.	15148.	14643.

1/73

	COMM. COLLEGE	PRIVATE COLLEGE	SECOND. SCHOOL	STATE COLLEGE	UOFMINN TOTAL	UOFMINN LABS	ALL USERS
NL	3200	1053	538	3918	14920	7411	24875
CT	1547	366	201	1125	6308	2998	9980
CP	5.39	3.43	.58	4.36	52.88	16.08	69.26
CPCM	3.83	34.54	4.70	40.76	375.57	135.85	523.21
MS	329.	69.	40.	387.	3679.	957.	5071.
TI	2652	543	348	2228	9134	3740	15594
TO	16094	5246	2176	13435	92676	37199	134848
SL	.48	.35	.37	.29	.42	.40	.40
S/H	12.53	33.76	10.38	13.94	30.18	19.31	24.98
CM/H	.25	9.44	2.34	3.62	5.95	4.53	5.24
MS/H	212.57	187.69	200.79	343.95	583.16	319.15	508.14
TI/H	1714.	1484.	1731.	1980.	1448.	1247.	1563.
TO/H	10403.	14333.	10826.	11942.	14692.	12408.	13512.

2/73

	COMM. COLLEGE	PRIVATE COLLEGE	SECOND. SCHOOL	STATE COLLEGE	UOFMINN TOTAL	UOFMINN LABS	ALL USERS
NL	2867	1679	973	2404	17553	9034	29145
CT	1492	699	269	1143	8069	4257	12819
CP	4.91	2.28	.95	9.21	35.96	17.09	56.76
CPCM	36.53	23.79	6.63	634.67	362.45	161.07	525.63
MS	296.	81.	59.	419.	3674.	1372.	5003.
TI	2882	1232	563	2159	12115	5562	20614
TO	15879	7672	2722	12639	105227	47975	156028
SL	.52	.42	.28	.48	.46	.47	.44
S/H	11.86	11.76	12.68	29.00	16.04	14.45	15.94
CM/H	2.45	3.40	2.46	55.53	4.49	3.78	4.10
MS/H	198.59	115.87	217.54	366.42	455.29	322.25	390.28
TI/H	1932.	1763.	2093.	1889.	1501.	1307.	1608.
TO/H	10643.	10976.	10119.	11058.	13041.	11270.	12172.

3/73

	COMM. COLLEGE	PRIVATE COLLEGE	SECOND. SCHOOL	STATE COLLEGE	UOFMINN TOTAL	UOFMINN LABS	ALL USERS
NL	2537	1214	1235	2972	13476	6182	22711
CT	1343	619	432	1178	6252	3001	10314
CP	6.53	2.19	1.80	4.53	43.80	11.79	62.02
CPCM	54.31	26.83	15.58	43.23	453.48	128.17	631.14
MS	373.	171.	184.	444.	4313.	1339.	5957.
TI	2363	946	910	1886	10155	3988	17043
TO	15288	10846	4368	15347	90060	38632	142181
SL	.53	.51	.35	.40	.46	.49	.45
S/H	17.49	12.71	15.01	13.84	25.22	14.14	21.65
CM/H	4.04	4.33	3.61	3.67	7.25	4.27	6.12
MS/H	277.54	275.85	426.94	377.08	689.80	446.15	577.53
TI/H	1759.	1528.	2106.	1601.	1624.	1329.	1652.
TO/H	11383.	17522.	10111.	13028.	14405.	12873.	13785.

4/73

	COMM. COLLEGE	PRIVATE COLLEGE	SECOND. SCHOOL	STATE COLLEGE	UOFMINN TOTAL	UOFMINN LABS	ALL USERS
NL	3616	1186	1098	5917	16458	9042	29647
CT	1497	609	359	1715	7006	3592	11595
CP	4.97	2.12	1.03	4.31	37.87	12.73	52.31
CPCM	29.60	24.17	11.42	44.32	402.35	133.61	538.03
MS	258.	149.	176.	571.	5263.	1651.	6938.
TI	2644	990	772	2691	10458	4901	18201
TO	14218	9158	3618	21732	101697	45841	157327
SL	.41	.51	.33	.29	.43	.40	.39
S/H	11.94	12.54	10.35	9.05	19.46	12.76	16.24
CM/H	1.98	3.97	3.18	2.58	5.74	3.72	4.64
MS/H	172.04	244.02	490.08	333.23	751.27	459.58	598.39
TI/H	1766.	1626.	2150.	1569.	1493.	1364.	1570.
TO/H	9498.	15038.	10078.	12672.	14516.	12762.	13569.

5/73

	COMM. COLLEGE	PRIVATE COLLEGE	SECOND. SCHOOL	STATE COLLEGE	UOFMINN TOTAL	UOFMINN LABS	ALL USERS
NL	4064	933	1209	5897	17327	9048	31681
CT	1929	456	359	2322	7809	4139	13627
CP	6.07	1.33	1.26	10.48	43.90	17.52	67.78
CPCM	37.83	11.84	14.34	14.17	440.23	158.70	678.91
MS	388.	93.	293.	561.	6008.	1993.	8377.
TI	3527	800	777	3433	11640	5735	21436
TO	19146	6243	3917	27454	107686	49402	174089
SL	.47	.49	.30	.39	.45	.46	.43
S/H	11.33	10.52	12.67	16.25	20.24	15.24	17.91
CM/H	1.96	2.60	4.00	.61	5.64	3.83	4.98
MS/H	200.94	204.58	816.30	241.64	769.30	481.52	614.76
TI/H	1828.	1754.	2164.	1478.	1491.	1386.	1573.
TO/H	9925.	13691.	10911.	11823.	13790.	11936.	12775.

6/73

	COMM. COLLEGE	PRIVATE COLLEGE	SECOND. SCHOOL	STATE COLLEGE	UOFMINN TOTAL	UOFMINN LABS	ALL USERS
NL	717	553	71	2140	9992	4634	14808
CT	383	224	43	702	4762	2222	6572
CP	1.11	.48	.06	1.53	34.62	10.21	41.34
CPCM	8.94	4.61	.78	14.49	364.36	104.04	437.04
MS	93.	72.	36.	95.	4597.	1292.	5555.
TI	727	414	88	1042	7778	3665	10849
TO	4342	3275	457	7858	69284	26491	92263
SL	.53	.41	.61	.33	.48	.48	.44
S/H	10.42	7.74	5.21	7.82	26.17	16.54	22.64
CM/H	2.33	2.06	1.82	2.06	7.65	4.68	6.65
MS/H	243.99	320.74	827.00	135.14	965.31	581.50	845.18
TI/H	1898.	1848.	2047.	1484.	1633.	1649.	1651.
TO/H	11337.	14621.	10628.	11194.	14549.	11922.	14039.

7/73

	COMM. COLLEGE	PRIVATE COLLEGE	SECOND. SCHOOL	STATE COLLEGE	UOFMINN TOTAL	UOFMINN LABS	ALL USERS
NL	309	575		2810	7585	2653	13255
CT	151	427		1004	3749	1346	5969
CP	.33	.68		1.87	30.47	8.26	39.34
CPCM	2.13	6.04		11.40	326.16	76.71	418.36
MS	46.	80.		135.	5140.	749.	6821.
TI	225	689		1750	6252	2069	10054
TO	1759	6175		10811	55956	15325	84082
SL	.49	.74		.36	.49	.51	.45
S/H	7.99	5.70		6.72	29.26	22.09	23.72
CM/H	1.41	1.42		1.14	8.70	5.70	7.01
MS/H	305.89	187.38		134.60	1371.03	556.60	1142.77
TI/H	1490.	1614.		1743.	1668.	1537.	1684.
TO/H	11649.	14461.		10768.	14926.	11386.	14086.

8/73

	COMM. COLLEGE	PRIVATE COLLEGE	SECOND. SCHOOL	STATE COLLEGE	UOFMINN TOTAL	UOFMINN LABS	ALL USERS
NL	257	236		1572	8730	2607	12605
CT	142	112		655	4298	1397	5776
CP	.42	.52		1.64	47.56	16.35	56.47
CPCM	3.96	3.41		16.07	470.42	149.66	567.90
MS	120.	51.		162.	5694.	962.	7287.
TI	415	150		1011	7405	2260	10173
TO	1532	1999		7986	60980	16810	79108
SL	.55	.47		.42	.49	.54	.46
S/H	10.61	16.85		9.02	39.83	42.15	35.19
CM/H	2.79	3.04		2.45	10.95	10.71	9.83
MS/H	842.89	452.99		246.67	1324.83	688.60	1261.55
TI/H	2923.	1339.		1544.	1723.	1618.	1761.
TO/H	10789.	17848.		12192.	14188.	12033.	13696.

9/73

	COMM. COLLEGE	PRIVATE COLLEGE	SECOND. SCHOOL	STATE COLLEGE	UOFMINN TOTAL	UOFMINN LABS	ALL USERS
NL	1883	1356	610	2498	7343	3070	15376
CT	807	615	181	904	3751	1449	6794
CP	3.11	2.07	.27	2.28	39.79	13.16	50.61
CPCM	21.95	25.28	2.71	21.62	388.21	134.48	531.39
MS	274.	144.	46.	311.	4893.	1005.	6869.
TI	1189	899	299	1286	5658	2163	10318
TO	8962	9331	1415	11949	52237	17484	91236
SL	.43	.45	.30	.36	.51	.47	.44
S/H	13.89	12.10	5.36	9.08	38.19	32.70	26.82
CM/H	2.72	4.11	1.50	2.39	10.35	9.28	7.82
MS/H	339.94	234.65	255.75	344.34	1304.37	693.58	1011.04
TI/H	1473.	1462.	1652.	1423.	1508.	1493.	1519.
TO/H	11105.	15172.	7818.	13218.	13926.	12066.	13429.

10/73

	COMM. COLLEGE	PRIVATE COLLEGE	SECOND. SCHOOL	STATE COLLEGE	UOFMINN TOTAL	UOFMINN LABS	ALL USERS
NL	2802	1683	660	5808	22424	13558	36013
CT	1328	855	198	1881	8987	4986	14219
CP	3.64	2.39	1.07	4.13	41.05	15.88	59.15
CPCM							
MS	343.	213.	80.	578.	7211.	1999.	9805.
TI	2090	1230	387	2583	12886	6155	20841
TO	12646	12927	2016	24625	124428	60783	190005
SL	.47	.51	.30	.32	.40	.37	.39
S/H	9.86	10.08	19.40	7.91	16.44	11.47	14.98
CM/H							
MS/H	257.99	248.95	404.45	307.17	802.40	400.94	689.58
TI/H	1574.	1439.	1955.	1373.	1434.	1234.	1466.
TO/H	9523.	15119.	10182.	13091.	13845.	12191.	13363.

11/73

	COMM. COLLEGE	PRIVATE COLLEGE	SECOND. SCHOOL	STATE COLLEGE	UOFMINN TOTAL	UOFMINN LABS	ALL USERS
NL	3227	2020	694	6285	22848	12921	37536
CT	1822	869	228	2384	10522	5990	16694
CP	4.86	2.70	1.50	5.36	50.70	26.79	71.27
CPCM							
MS	406.	223.	71.	667.	7289.	2242.	10201.
TI	3091	1233	468	2932	15390	7573	24625
TO	17799	13776	2286	30907	137524	72284	213994
SL	.56	.43	.33	.38	.46	.46	.44
S/H	9.60	11.20	23.64	8.10	17.35	16.10	15.37
CM/H							
MS/H	222.75	256.63	312.34	279.91	692.77	374.26	611.06
TI/H	1696.	1419.	2053.	1230.	1463.	1264.	1475.
TO/H	9769.	15853.	10026.	12964.	13070.	12067.	12819.

12/73

	COMM. COLLEGE	PRIVATE COLLEGE	SECOND. SCHOOL	STATE COLLEGE	UOFMINN TOTAL	UOFMINN LABS	ALL USERS
NL	1826	1697	658	5986	10269	4718	22657
CT	958	972	246	2447	5246	2646	10702
CP	3.90	2.41	.50	5.71	50.39	23.49	71.68
CPCM	31.00	25.18	5.02	61.19	553.36	214.35	784.75
MS	20460.	411.	104.	795.	5512.	1575.	28722.
TI	1609	1454	547	4149	8409	3262	17791
TO							
SL	.52	.57	.37	.41	.51	.56	.47
S/H	14.66	8.91	7.26	8.40	34.58	31.96	24.11
CM/H	3.24	2.59	2.04	2.50	10.55	8.10	7.33
MS/H	21356.99	422.91	421.06	324.86	1050.74	595.28	2683.80
TI/H	1680.	1496.	2224.	1696.	1603.	1233.	1662.
TO/H							

1/74

	COMM. COLLEGE	PRIVATE COLLEGE	SECOND. SCHOOL	STATE COLLEGE	UOFMINN TOTAL	UOFMINN LABS	ALL USERS
NL	3018	1913	743	8653	19181	10820	35979
CT	1401	897	288	3104	7981	4382	14588
CP	3.65	2.76	1.01	6.49	47.35	24.32	68.96
CPCM	33.30	30.11	10.37	72.27	519.16	254.65	766.50
MS	389.	770.	91.	971.	6886.	2293.	10719.
TI	2547	1317	506	5799	11853	5821	24028
TO							
SL	.46	.47	.39	.36	.42	.40	.41
S/H	9.38	11.07	12.58	7.53	21.36	19.98	17.02
CM/H	2.38	3.36	3.60	2.33	6.50	5.81	5.25
MS/H	277.78	857.94	317.61	312.95	862.82	523.30	734.78
TI/H	1818.	1468.	1757.	1868.	1485.	1328.	1647.
TO/H							

2/74

	COMM. COLLEGE	PRIVATE COLLEGE	SECOND. SCHOOL	STATE COLLEGE	UOFMINN TOTAL	UOFMINN LABS	ALL USERS
NL	3277	2734	1000	9622	19108	10079	38050
CT	1788	1314	411	3943	10352	5250	18743
CP	5.08	3.24	1.58	11.41	57.42	25.14	84.66
CPCM	52.34	35.02	19.04	129.83	710.28	292.17	1026.50
MS	758.	574.	167.	1801.	7963.	3038.	12713.
TI	2190	1706	570	5607	11072	4923	22505
TO							
SL	.55	.48	.41	.41	.54	.52	.49
S/H	10.23	8.88	13.86	10.42	19.97	17.24	16.26
CM/H	2.93	2.66	4.63	3.29	6.86	5.57	5.48
MS/H	424.11	436.80	407.42	456.76	769.23	578.76	678.28
TI/H	1225.	1298.	1387.	1422.	1070.	938.	1201.
TO/H							

3/74

	COMM. COLLEGE	PRIVATE COLLEGE	SECOND. SCHOOL	STATE COLLEGE	UOFMINN TOTAL	UOFMINN LABS	ALL USERS
NL	4421	3315	2481	9014	16660	7493	39743
CT	2006	1561	877	3462	9017	4057	18215
CP	6.40	4.56	1.86	9.33	82.87	18.41	115.43
CPCM	69.32	49.08	18.19	102.90	870.90	195.21	1269.70
MS	1098.	977.	415.	1881.	8712.	2634.	15797.
TI	2855	1941	1562	4453	10130	4218	23526
TO							
SL	.45	.47	.35	.38	.54	.54	.46
S/H	11.49	10.53	7.64	9.70	33.09	16.34	22.81
CM/H	3.46	3.14	2.07	2.97	9.66	4.81	6.97
MS/H	547.21	625.91	473.11	543.24	966.14	649.32	867.25
TI/H	1423.	1243.	1781.	1286.	1123.	1040.	1292.
TO/H							

4/74

	COMM. COLLEGE	PRIVATE COLLEGE	SECOND. SCHOOL	STATE COLLEGE	UOFMINN TOTAL	UOFMINN LABS	ALL USERS
NL	3311	2123	3030	10605	18144	10473	39506
CT	2001	1093	1528	3876	8540	4918	18328
CP	5.92	4.07	3.76	10.01	60.84	22.77	98.94
CPCM	49.88	46.72	39.76	115.93	682.06	268.16	1161.10
MS	865.	508.	538.	2090.	8243.	2978.	15305.
TI	2417	1213	1748	5231	9627	5163	21741
TO							
SL	.60	.51	.50	.37	.47	.47	.46
S/H	10.65	13.39	8.86	9.30	25.65	16.66	19.43
CM/H	2.49	4.27	2.60	2.99	7.99	5.45	6.34
MS/H	432.15	465.02	351.96	539.11	965.27	605.57	835.06
TI/H	1208.	1110.	1144.	1350.	1127.	1050.	1186.
TO/H							

5/74

	COMM. COLLEGE	PRIVATE COLLEGE	SECOND. SCHOOL	STATE COLLEGE	UOFMINN TOTAL	UOFMINN LABS	ALL USERS
NL	3420	1619	3223	9746	20827	12082	41614
CT	2179	853	1890	3719	10692	6469	20593
CP	6.38	2.32	4.05	9.02	63.41	22.42	95.30
CPCM	57.16	27.35	41.12	97.02	721.73	269.74	1082.90
MS	1283.	501.	721.	2112.	11137.	4981.	18759.
TI	2769	953	2106	4897	11847	6709	24166
TO							
SL	.64	.53	.59	.38	.51	.54	.49
S/H	10.54	9.81	7.72	8.73	21.35	12.48	16.66
CM/H	2.62	3.21	2.18	2.61	6.75	4.17	5.26
MS/H	588.89	587.14	381.56	567.98	1041.62	770.03	910.94
TI/H	1271.	1117.	1114.	1317.	1108.	1037.	1174.
TO/H							

6/74

	COMM. COLLEGE	PRIVATE COLLEGE	SECOND. SCHOOL	STATE COLLEGE	UOFMINN TOTAL	UOFMINN LABS	ALL USERS
NL	860	973	1166	4293	13770	6829	23670
CT	518	447	626	1664	7034	3944	11596
CP	1.27	1.38	1.71	4.36	53.55	24.33	71.62
CPCM	12.05	16.07	16.50	46.28	596.76	257.54	822.53
MS	317.	486.	283.	622.	8250.	3174.	13206.
TI	600	491	602	2048	7829	3849	13305
TO							
SL	.60	.46	.54	.39	.51	.58	.49
S/H	8.85	11.14	9.81	9.43	27.41	22.21	22.23
CM/H	2.33	3.59	2.64	2.78	8.48	6.53	7.09
MS/H	611.76	1086.60	452.38	373.61	1172.93	804.77	1138.84
TI/H	1158.	1098.	962.	1231.	1113.	976.	1147.
TO/H							

7/74

	COMM. COLLEGE	PRIVATE COLLEGE	SECOND. SCHOOL	STATE COLLEGE	UOFMINN TOTAL	UOFMINN LABS	ALL USERS
NL	566	861	842	3794	10294	4445	18931
CT	300	676	508	1755	5757	2749	10356
CP	.72	1.20	1.48	4.43	97.19	59.31	120.06
CPCM	8.64	12.07	15.55	52.73	998.96	550.12	1311.20
MS	148.	318.	351.	829.	9323.	2712.	14541.
TI	359	678	507	1796	6407	2489	11376
TO							
SL	.53	.79	.60	.46	.56	.62	.55
S/H	8.59	6.41	10.49	9.08	60.78	77.67	41.74
CM/H	2.88	1.79	3.06	3.00	17.35	20.01	12.66
MS/H	492.77	470.65	690.47	472.18	1619.37	986.61	1404.11
TI/H	1197.	1003.	998.	1023.	1113.	905.	1098.
TO/H							

8/74

	COMM. COLLEGE	PRIVATE COLLEGE	SECOND. SCHOOL	STATE COLLEGE	UOFMINN TOTAL	UOFMINN LABS	ALL USERS
NL	294	388	1258	2625	7950	3230	14910
CT	184	231	594	1149	4095	1874	7440
CP	.66	.84	2.85	2.87	45.12	20.54	66.60
CPCM	9.12	8.58	21.47	30.08	528.97	217.09	817.77
MS	88.	302.	649.	412.	7735.	2253.	13010.
TI	205	295	736	1310	4855	1776	8902
TO							
SL	.63	.60	.47	.44	.52	.58	.50
S/H	12.82	13.10	17.26	8.98	39.66	39.46	32.19
CM/H	4.96	3.71	3.61	2.62	12.92	11.58	10.98
MS/H	476.11	1305.80	1092.36	358.79	1888.96	1202.19	1746.54
TI/H	1114.	1277.	1239.	1140.	1186.	948.	1195.
TO/H							

9/74

	COMM. COLLEGE	PRIVATE COLLEGE	SECOND. SCHOOL	STATE COLLEGE	UOFMINN TOTAL	UOFMINN LABS	ALL USERS
NL	3225	2842	7156	10357	7934	2480	39727
CT	1180	1410	3393	3693	3510	1112	16923
CP	3.64	4.21	7.41	8.59	29.10	9.31	69.19
CPCM	31.30	44.06	71.13	89.03	328.45	89.12	778.18
MS	608.	972.	658.	1430.	6613.	1371.	14428.
TI	1381	1544	3668	3860	4154	1098	18887
TO							
SL	.37	.50	.47	.36	.44	.45	.43
S/H	11.11	10.74	7.86	8.38	29.84	30.14	14.72
CM/H	2.65	3.12	2.10	2.41	9.36	8.01	4.60
MS/H	515.63	689.23	194.04	387.19	1883.93	1232.82	852.57
TI/H	1170.	1095.	1081.	1045.	1183.	987.	1116.
TO/H							

10/74

	COMM. COLLEGE	PRIVATE COLLEGE	SECOND. SCHOOL	STATE COLLEGE	UOFMINN TOTAL	UOFMINN LABS	ALL USERS
NL	3684	4098	18746	16052	24019	13781	73931
CT	1869	1753	9178	6018	10634	5972	33248
CP	5.32	3.98	21.75	13.51	51.56	25.97	118.36
CPCM	50.70	45.15	186.11	134.21	597.38	304.58	1322.60
MS	921.	1029.	1772.	2341.	10570.	3245.	23785.
TI	2620	2120	11406	7737	14161	7035	43102
TO	17395	18402	99118	62954	107513	55270	349188
SL	.51	.43	.49	.37	.44	.43	.45
S/H	10.24	8.17	8.53	8.08	17.46	15.65	12.82
CM/H	2.71	2.58	2.03	2.23	5.62	5.10	3.98
MS/H	492.91	587.05	193.08	388.97	993.98	543.40	715.38
TI/H	1402.	1209.	1243.	1286.	1332.	1178.	1296.
TO/H	9307.	10497.	10800.	10461.	10110.	9255.	10503.

11/74

	COMM. COLLEGE	PRIVATE COLLEGE	SECOND. SCHOOL	STATE COLLEGE	UOFMINN TOTAL	UOFMINN LABS	ALL USERS
NL	2617	3320	21789	10503	19639	11082	63243
CT	1929	1604	10933	4759	10492	6172	32383
CP	4.77	3.75	27.01	10.24	58.95	35.73	120.25
CPCM	46.34	43.07	244.14	106.44	691.58	423.11	1337.10
MS	828.	1170.	2260.	2368.	9775.	4016.	20033.
TI	3018	2117	14085	6691	15175	7626	44864
TO	19726	20556	131118	56178	123591	65684	387111
SL	.74	.48	.50	.45	.53	.56	.51
S/H	8.91	8.41	8.90	7.75	20.23	20.84	13.37
CM/H	2.40	2.69	2.23	2.24	6.59	6.86	4.13
MS/H	429.36	729.18	206.70	497.58	931.69	650.65	618.63
TI/H	1565.	1320.	1288.	1406.	1446.	1236.	1385.
TO/H	10226.	12815.	11993.	11805.	11780.	10642.	11954.

12/74

	COMM. COLLEGE	PRIVATE COLLEGE	SECOND. SCHOOL	STATE COLLEGE	UOFMINN TOTAL	UOFMINN LABS	ALL USERS
NL	2101	2523	20829	8571	10399	4837	48484
CT	1288	1139	9558	3164	5286	2845	22543
CP	3.75	3.02	22.17	6.73	28.60	14.69	75.73
CPCM	40.46	37.27	222.09	79.13	388.33	191.27	925.06
MS	642.	714.	2569.	1795.	5480.	2144.	14518.
TI	1948	1552	12241	4127	8076	3540	31077
TO	14481	15191	121913	39230	69803	33692	287267
SL	.61	.45	.46	.37	.51	.59	.46
S/H	10.48	9.53	8.35	7.66	19.48	18.58	12.09
CM/H	3.14	3.27	2.32	2.50	7.35	6.72	4.10
MS/H	498.24	626.77	268.74	567.26	1036.76	753.46	644.01
TI/H	1512.	1363.	1281.	1304.	1528.	1244.	1379.
TO/H	11243.	13337.	12755.	12399.	13205.	11843.	12743.

	COMM. COLLEGE	PRIVATE COLLEGE	SECOND. SCHOOL	STATE COLLEGE	UOFMINN TOTAL	UOFMINN LABS	ALL USERS
NL	3569	3141	26442	14632	15712	12397	69470
CT	1875	1522	11555	5333	6999	5626	30113
CP	4.58	4.09	28.84	13.83	25.44	21.07	92.63
CPCM	48.53	38.64	306.06	131.15	291.09	225.27	1041.10
MS	715.	415.	3013.	2829.	5805.	3963.	17156.
TI	2606	1900	15013	8326	8769	6563	40842
TO	19118	16812	141912	60685	82016	63795	456486
SL	.53	.48	.44	.36	.45	.45	.43
S/H	8.80	9.68	8.98	9.33	13.08	13.48	11.07
CM/H	2.59	2.54	2.65	2.46	4.16	4.00	3.46
MS/H	381.17	272.51	260.73	530.41	829.35	704.50	569.72
TI/H	1390.	1248.	1299.	1561.	1253.	1167.	1356.
TO/H	10196.	11046.	12281.	11379.	11718.	11339.	15159.

2/75

	COMM. COLLEGE	PRIVATE COLLEGE	SECOND. SCHOOL	STATE COLLEGE	UOFMINN TOTAL	UOFMINN LABS	ALL USERS
NL	3334	3852	29174	13659	15641	13056	71745
CT	2355	1598	12917	5269	7589	6613	32505
CP	9.42	3.54	33.12	14.15	30.00	26.37	100.48
CPCM	90.27	44.27	332.23	141.93	317.46	269.80	1066.00
MS	1209.	816.	2587.	2495.	5819.	4258.	15845.
TI	3383	2243	16643	8137	9518	8057	44017
TO	23927	17471	159520	63099	86370	73055	386674
SL	.71	.41	.44	.39	.49	.51	.45
S/H	14.40	7.98	9.23	9.67	14.23	14.35	11.13
CM/H	3.83	2.77	2.57	2.69	4.18	4.08	3.28
MS/H	513.16	510.84	260.26	473.58	766.78	643.91	487.46
TI/H	1437.	1404.	1288.	1544.	1254.	1218.	1354.
TO/H	10160.	10933.	12350.	11976.	11381.	11047.	11896.

3/75

	COMM. COLLEGE	PRIVATE COLLEGE	SECOND. SCHOOL	STATE COLLEGE	UOFMINN TOTAL	UOFMINN LABS	ALL USERS
NL	2677	2794	25259	8849	11864	9921	57460
CT	1683	1252	12033	3491	6072	5269	27356
CP	4.79	3.58	32.23	8.00	26.53	23.34	88.28
CPCM	51.93	39.74	315.83	94.49	302.17	259.33	963.77
MS	793.	998.	2432.	1695.	5037.	3348.	14189.
TI	2355	1775	16919	4482	7666	6392	37265
TO	17959	14926	149932	45658	75238	63055	340030
SL	.63	.45	.48	.39	.51	.53	.48
S/H	10.26	10.29	9.64	8.25	15.73	15.95	11.62
CM/H	3.09	3.17	2.62	2.71	4.98	4.92	3.52
MS/H	470.89	797.42	262.09	485.65	829.51	635.38	518.68
TI/H	1399.	1418.	1406.	1284.	1263.	1213.	1362.
TO/H	10671.	11922.	12460.	13079.	12391.	11967.	12430.

	COMM. COLLEGE	PRIVATE COLLEGE	SECOND. SCHOOL	STATE COLLEGE	UOFMINN TOTAL	UOFMINN LABS	ALL USERS
NL	4513	3864	34494	16297	15685	13274	82212
CT	2752	1746	16308	6988	7831	6664	39510
CP	6.76	4.23	39.70	20.69	29.47	24.50	122.01
CPCM	80.87	49.52	400.35	197.88	317.98	251.33	1336.00
MS	1641.	779.	3370.	3537.	5561.	3413.	19683.
TI	4179	2211	22037	10463	9739	7936	53861
TO	25152	21654	195960	76913	93472	76799	465996
SL	.61	.45	.47	.43	.50	.50	.48
S/H	8.85	8.72	8.76	10.66	13.55	13.23	11.12
CM/H	2.94	2.84	2.45	2.83	4.06	3.77	3.38
MS/H	596.18	446.04	266.67	506.21	710.06	512.11	498.18
TI/H	1519.	1266.	1351.	1497.	1244.	1191.	1363.
TO/H	9140.	12402.	12016.	11006.	11936.	11524.	11794.

5/75

	COMM. COLLEGE	PRIVATE COLLEGE	SECOND. SCHOOL	STATE COLLEGE	UOFMINN TOTAL	UOFMINN LABS	ALL USERS
NL	4150	1709	29846	10655	15797	12911	67901
CT	2584	823	14077	4903	8256	7081	33588
CP	9.17	3.01	39.43	12.71	25.85	21.67	103.54
CPCM	112.84	33.45	388.92	135.10	313.50	264.57	1143.30
MS	1635.	339.	3385.	2607.	5787.	4264.	16940.
TI	4210	1142	19932	8575	10907	9054	49121
TO	25425	10322	176870	52796	103275	85189	410744
SL	.62	.48	.47	.46	.52	.55	.49
S/H	12.77	13.19	10.08	9.33	11.27	11.02	11.10
CM/H	4.37	4.06	2.76	2.76	3.80	3.74	3.40
MS/H	632.89	411.47	240.43	531.61	700.91	602.25	504.35
TI/H	1629.	1388.	1416.	1749.	1321.	1279.	1462.
TO/H	9839.	12542.	12564.	10768.	12509.	12031.	12229.

6/75

	COMM. COLLEGE	PRIVATE COLLEGE	SECOND. SCHOOL	STATE COLLEGE	UOFMINN TOTAL	UOFMINN LABS	ALL USERS
NL	1408	937	5401	5802	9805	7243	27894
CT	884	486	2556	2487	5575	4411	14049
CP	5.55	1.41	9.80	6.74	35.73	30.44	70.06
CPCM	59.78	15.99	95.01	65.89	447.58	382.25	802.98
MS	650.	290.	894.	1178.	5001.	3484.	10089.
TI	1426	732	3612	3463	7729	6085	20121
TO	11073	5923	36627	32484	71695	54657	188158
SL	.63	.52	.47	.43	.57	.61	.50
S/H	22.61	10.43	13.80	9.75	23.07	24.84	17.95
CM/H	6.76	3.29	3.72	2.65	8.03	8.67	5.72
MS/H	735.28	595.88	349.84	473.78	896.97	789.93	718.13
TI/H	1613.	1506.	1413.	1392.	1386.	1380.	1432.
TO/H	12526.	12187.	14330.	13062.	12860.	12391.	13393.

APPENDIX D

Quarterly breakdown of terminal hours by System

1972-1973

[Quantities in parentheses are percents of total]

	7-9	10-12	1-3	4-6	Year
Staff	1265(10.0)	915(4.0)	718(2.2)	997(3.1)	3895(3.9)
Comm. Call	1174(9.3)	3449(15.1)	4383(13.2)	3810(12.0)	12816(12.8)
Private	683(5.4)	1163(5.1)	1712(5.2)	1288(4.1)	4846(4.8)
Secondary	70(0.6)	301(1.3)	600(1.8)	759(2.4)	1730(1.7)
St. Coll.	698(5.5)	2507(11.0)	4440(13.4)	4743(14.9)	12388(12.4)
U. of M.	6903(54.8)	14317(62.7)	20628(62.3)	19577(61.6)	61425(61.2)
U. of Wisc.	--	184(0.8)	620(1.9)	608(1.9)	1412(1.4)
Vo. Tech	--	--	--	--	--
Nebraska	1795(14.3)	--	--	--	1795(1.8)
	12588	22836	33101	31782	100307

1973-1974

[Quantities in parentheses are percents of total]

	7-9	10-12	1-3	4-6	Year
Staff	1355(7.3)	1764(4.2)	2473(4.8)	3391(6.7)	8983(5.5)
Comm. Coll.	1100(5.9)	4112(9.9)	5162(10.0)	4698(9.3)	15072(9.3)
Private Coll.	1154(6.2)	2696(6.3)	3589(7.0)	2393(4.7)	9832(6.1)
Secondary	181(1.0)	671(1.6)	1733(3.4)	4044(8.0)	6629(4.1)
St. Coll.	2562(13.8)	6713(16.1)	10509(20.4)	9260(18.3)	29044(17.9)
U. of M.	11799(63.6)	24756(59.5)	27379(53.1)	26265(51.9)	90199(55.6)
U. of Wisc.	347(1.9)	656(1.6)	488(0.9)	389(0.8)	1880(1.2)
Vo. Tech.	42(0.2)	244(0.6)	213(0.4)	178(0.4)	677(0.4)
	18540	41612	51546	50618	162316

1974-1975

[Quantities in parentheses are percents of total]

	7-9	10-12	1-3	4-6	Year
Staff	1762(5.3)	2382(2.7)	1720(1.9)	1078(1.3)	6942(2.4)
MECC	2791(8.5)	2328(2.7)	2334(2.6)	3643(4.2)	11096(3.8)
Comm. Coll.	1664(5.0)	5086(5.9)	5913(6.7)	6220(7.2)	18883(6.4)
Private Coll.	2317(7.0)	4495(5.2)	4372(4.9)	3055(3.6)	14239(4.8)
Secondary	3552(10.8)	29669(34.2)	36505(41.2)	32941(38.4)	102667(34.9)
St. Coll.	6597(20.0)	13941(16.1)	14093(15.9)	14378(16.8)	49009(16.7)
U. of M.	13361(40.5)	26412(30.5)	20659(23.3)	21662(25.2)	82094(27.9)
U. of Wisc.	775(2.3)	2191(2.5)	2856(3.2)	2249(2.6)	8071(2.7)
Vo. Tech.	184(0.6)	145(0.2)	224(0.3)	426(0.5)	979(0.3)
U. of N. Dakota	--	--	37(0.0)	224(0.2)	261(0.1)
	33003	86649	88713	85876	294241

APPENDIX E

Stability

Oct 1974-June 1975

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June
Total Scheduled hours	494	439	446	473	424	481	476	465	465
Percent available	98.7	96.1	96.3	98.4	98.2	92.1	98.2	98.5	97.6
Avg. Hrs. between failure	14.8	22.2	12.3	18.6	26.0	9.0	27.5	21.8	37.8
Aborts Total	32	18	34	24	15	48	16	20	11
Recoverable	12	12	23	16	8	23	12	13	6
Unrecoverable	20	6	11	8	7	25	4	7	5
Hardware	9	4	6	4	3	16	4	7	5
Software	17	9	9	16	7	5	6	6	6
Operator error	4	0	1	1	0	1	2	1	1
Power	0	0	0	0	0	13	2	1	0
Misc.	1	3	11	1	1	0	2	2	1
Undetermined	1	2	7	2	4	13	0	2	1

APPENDIX F

MERITSS LIBRARY ENTRIES

MERITSS LIBRARY ENTRIES AS ØF 74/3/14

ACPLØT - PLØTTING SUBRØUTINE FØR BASIC ØR XBASIC
ALPHBTZ - FILE SØRTING
ANNUIT - CALCULATES 4 ITEMS ØF AN ANNUITY SAVINGS PLAN
ANØVA1 - ANALYSIS ØF VARIANCE FØR A TWØ-WAY CLASSIFICATIØN
APDERV - DERIVATIVE ØF A PØLYNØMIAL
APINTG - PØLYNØMIAL INTEGRATIØN
BANDIT - SLØT MACHINE GAME (GAME,BANDIT)
BEMDES - RECØMMENDS THE CØRRECT STILL BEAM FØR AN APPLICATIØN
BESSEL - VALUE ØF BESSEL FUNCTIØN ØF FIRST KIND WITH REAL ARGUMENTS.
BICØNF - CØNFIDENCE LIMITS FØR A PØPULATIØN PRØPØRTIØN BASED ØN EXACT BINØMIAL DISTRIBUTIØN.
BLCKJCK - BLACKJACK GAME (GAME,BLCKJCK)
BLKJCK - BLACKJACK GAME (GAME,BLKJCK)
BR - CØNVERSIØN PRØGRAM FØR BRAILLE ØUTPUT ØN TTY
BURAL - ALLØCATES ØVERHEAD DEPARTMENT ØR ACCØUNT CØSTS TØ DIRECT DEPARTMENTS ØR PRØDUCTS
C TØ USE KRØNØS 'CALL' CØMMAND IN EXECUTE SUBSYSTEM
CAILIB - BINARY VERSIØNS ØF CØNCWTW AND CØMCWTS FØR I/Ø WØRK
CALØT - FITS UNWEIGHTED LEAST-SQUARES LINE TØ AVERAGE LABØR HØURS
CAPRØ - CØMPUTES PRØJECTED VALUES UNDER THE CUMMULATIVE AVERAGE CURVE THEØRY WHEN THE PERCENTAGE ØF SLØPE AND THE VALUE ØF ØNE LØT ARE KNØWN
CAT - MØRE EXTENSIVE CATLIST GIVING LENGTHS AND TYPES ØF FILES
CATG - CATLISTS GRØUP PRØJECT FILES
CAUNI - FITS LEAST-SQUARES LINE UNDER THE CUMMULATIVE AVERAGE CURVE THEØRY TØ UNIT HØUR ØR CØST.
CBINØRM - CØMPUTES THE PRØBABILITY PR(A<=X<=B) WHERE X IS THE NUMBER ØF SUCCESSES IN N TRIALS USING NØRMAL APPRØX.
CCDETER CØMPLEX DETERMINATE EVALUATØR USING CRØUT METHØD
CCHISQ - PRØBABILITY ØF A CHI-SQUARE VALUE
CCØRREL - CØMPUTES CØRRELATIØN CØEFFICIENT FØR N SETS ØF PAIRED DATA
CDETER - CØMPLEX DETERMINANT SØLVER USING CRØUT METHØD
CGEØMEN - CØMPUTES GEØMETRIC MEAN AND STANDARD DEVIATIØN
CINVERS - INVERTS A MATRIX USING THE EXCHANGE METHØD.
CHARGE - MILLIKAN ØIL DRØP SIMULATIØN
CLINFIT - BEST LINEAR FIT FØR A SET ØF INDEPENDENT VARIABLES TØ A DEPENDENT VARIABLE
CLSCF - LEAST SQUARES PØLYNØMIAL FIT
CMDFILE - USED BY THE 'HELP' CØMMAND
CØMPIN - CØMPØUND INTEREST CALCULATØR
CØNDIF - CØNFIDENCE LIMITS FØR A DIFFERENCE BETWEEN TWØ PØPULATIØN MEANS.
CØNLIM - CØNFIDENCE LIMITS FØR AN UNKNØWN PØPULATIØN MEAN.
CØRE - DETERMINE FIELD LENGTH NEEDED FØR AN MNF PRØGRAM.
CØRE1 - DETERMINE FIELD LENGTH NEEDED FØR AN MNF PRØGRAM.
CØRREL - CØRRELATIVE CØEFFICIENTS FØR TWØ SETS ØF DATA HAVING EQUAL NUMBERS ØF ELEMENTS
CSTATNW - CØMPUTES 34 STATISTICAL MEASURES ØN A STRING ØF UNWEIGHTED NUMBERS

CSTATWE - C0MPUTES 34 STATISTICAL MEASURES 0N A STRING 0F WEIGHTED NUMBERS
CSTAT01 - C0MPUTES MEAN, VARIANCE, STANDARD DEVIATI0N, AND STANDARD ERR0R
CSTAT02 - C0MPUTES MEANS, VARIANCES, AND T-RATI0S F0R TW0 GR0UPS 0F UN-PAIRED DATA
CSTAT03 - MEANS, VARIANCES, AND T-RATI0S F0R TW0 GR0UPS 0F UNPAIRED DATA
CSTAT04 - CHI-SQUARE STATISTICS F0R 2 BY 2 C0NTINGENCY TABLES.
CSTAT05 - CHI-SQUARE STATISTICS F0R ANY NUMBER 0F M BY N C0NTINGENCY TABLES
CSTAT06 - SIGN TEST C0NFIDENCE INTERVAL USING FRACTI0NAL C0UNTS.
CSTAT07 - C0NFIDENCE LIMITS F0R A SET 0F DATA USING THE WILC0X0N SIGNED RANK SUM PR0CEDURE WITH FRACTI0NAL C0UNTS.
CSTAT08 - C0MPARES TW0 GR0UPS 0F DATA ITEMS USING THE MEDIAN TEST
CSTAT09 - C0MPARES TW0 GR0UPS 0F DATA ITEMS USING THE MANN-WHITNEY TW0 SAMPLE RANK SUM TEST
CSTAT10 - C0MPUTES SL0PE, Y-INTERCEPTS, AND 0THER STATISTICAL MEASURES F0R A SIMPLE LINEAR REGRESSI0N WITH 0NE INDEPENDENT VARIABLE
CSTAT11 - SPEARMAN RANK C0EFFICIENT F0R TW0 SERIES 0F DATA
CSTAT12 - C0MPUTES THE C0RRELATI0N MATRIX F0R N SERIES 0F DATA
CSTAT13 - ANALYSIS 0F VARIANCE F0R A 0NE-WAY C0MPLETELY RAND0MIZED DESIGN.
CSTAT14 - ANALYSIS 0F VARIANCE TABLE AND F-RATI0S F0R TREATMENTS AND BL0CKS 0F A RAND0MIZED C0MPLETE BL0CK DESIGN.
CSTAT15 - ANALYSIS 0F VARIANCE TABLE F0R A SIMPLE LATIN SQUARE DESIGN
CSTAT16 - ANALYSIS 0F VARIANCE TABLE F0R A SIMPLE GRAEC0-LATIN SQUARE DESIGN
CSTAT17 - AN0VA TABLE 0F A BALANCE INC0MPLETE BL0CK DESIGN AND F-RATI0 F0R TREATMENTS.
CSTAT18 - ANALYSIS 0F VARIANCE TABLE AND THE F-RATI0 F0R TREATMENTS F0R A Y0UDEN SQUARE DESIGN.
CSTAT20 - MULTIPLE LINEAR REGRESSI0N ACC0RDING T0 EFR0YNS0N'S ALG0RITHM
CSTAT21 - 0NE 0R M0RE MULTIPLE LINEAR REGRESSI0NS 0N A BATCH 0F DATA
CURVFIT - FITS TW0 VARIABLES T0 LEAST SQUARES LINES USING THE EQUATI0NS F0R SIX DIFFERENT CURVES.
DEPCAL - DEPRECIATI0N CALCULATI0N BY 0NE 0F F0UR DIFFERENT METH0DS
DICE - GAME 0F 'CRAPS' (GAME,DICE)
DISCNT - CALCULATES PRESENT VALUE 0F A FUTURE SUM, RATE 0F DISC0UNT, 0R PERI0D 0F DISC0UNT.
ECMESS - MESSAGE FILE USED BY C0MMUNITY C0LLEGES
EIGVAL - EIGENVALUES 0F A REAL SYMMETRIC MATRIX
EIGVEC - EIGENVECT0RS 0F A REAL SYMMETRIC MATRIX
FETCH - RETRIEVE DIAGN0STICS FR0M AN MNF, RUN 23, 0R C0MPASS LISTING

MERITSS LIBRARY ENTRIES AS ØF 74/3/14

FØØTBAL - FØØTBALL GAME FØR TWØ PLAYERS (GAME,FØØTBAL)
FØURIE - FØURIER CØEFFICIENTS AND PHASE ANGLES FØR PERIØDIC DATA
GAUSS1 - THREE PØINT GAUSS INTEGRATIØN FØR FINITE LIMITS.
GENE1 - GENETIC TRAIT INHERITANCE SIMULATIØN
GEØMEN - GEØMETRIC MEAN AND GEØMETRIC STANDARD DEVIATIØN FØR A GEØMETRICALLY NØRMAL SERIES ØF DATA
GØLFER - GØLF GAME (GAME,GØLFER)
HRACES - HØRSE RACE GAME (GAME,HRACES)
ICLØT - FITS A UNIT CURVE TØ AVERAGE LABØR HØURS ØR CØST FØR UP TØ 200 LØTS
ICPRØ - CØMPUTES PRØJECTED VALUES ØN A UNIT CURVE WHEN THE PERCENTAGE ØF SLØPE AND THE VALUE ØF ØNE LØT ØR UNIT ARE KNØWN.
ICUNI - FITS A UNIT CURVE TØ LABØR HØURS ØR CØST FØR UP TØ 1000 UNITS.
IMSL - DIRECT ACCESS FILE CØNTAINING A GRØUP ØF MATHEMATICAL SUBRØUTINES IN ULIB FØRM.
INDEXN - A BUSINESS INDICES NUMBER PRØGRAM.
INFØ - DIRECT ACCESS FILE USED BY 'INFØRM'
INSTAL - CALCULATES PRINCIPAL, PAYMENT AMØUNT, MØNTHLY INTEREST RATE, ØR NUMBER ØF PAYMENTS WHEN THE ØTHERS ARE GIVEN.
ISIS - INTERACTIVE STATISTICS PACKAGE
ISISINS - MANUAL FØR ISIS FØRMATTED FØR LINE PRINTER
LBINDX - PART ØF A PACKAGE ØF PRØGRAMS THAT TEACH BASIC
LB1T04 - PART ØF A PACKAGE ØF PRØGRAMS THAT TEACH BASIC
LB140N - PART ØF A PACKAGE ØF PRØGRAMS THAT TEACH BASIC
LB5T08 - PART ØF A PACKAGE ØF PRØGRAMS THAT TEACH BASIC
LB9T13 - PART ØF A PACKAGE ØF PRØGRAMS THAT TEACH BASIC
LIBLIST - FILE CØNTAINING A SHØRT DESCRIPTIØN ØF EACH FILE ØN 'LIBRARY' ØR 'GAME'
LISINFØ - UT LISP VERSIØN 3 INFØRMATIØN FILE - 4 PAGES.
LISPEX - LISP EXAMPLE PRØGRAM
LINFIT - BEST LINEAR FIT AND CØRRELATIØNS FØR A SET ØF DATA
LINPRØ - SØLVES LINEAR PRØGRAMMING PRØBLEMS BY MAXIMIZING AN ØBJECTIVE FUNCTIØN USING THE TWØ-PHASE METHØD
LNH15 - A110WS CRT USERS TØ GET LISTINGS ØF FILES ACCØRDING TØ SCREEN SIZE AVAILABLE. A STØP FØR EXAMINATIØN IS INCLUDED AND THE END ØF EACH SCREEN-FULL.
LØAN - LØAN AMØRTIZATIØN PRØGRAM.
LØANAM - WILL CALCULATE PRINCIPLE, PAYMENT AMØUNT, INTEREST RATE, ØR PERIØD WHEN THE ØTHERS ARE GIVEN
LØCKEY - SIMULATIØN ØF LØCK AND KEY MØDEL ØF ENZYME SPECIFICITY
LRNBAS - PRØGRAM TØ TEACH BASIC
LSCFTC - PØLYNØMIAL CURVE FITTING
LSFITW - LEAST SQUARES WEIGHTED PØLYNØMIAL CURVE FIT
MALAR - SIMULATIØN ØF A MALARIA EPIDEMIC AND CØNTRØL
MARKET - GAME ØF CØMPETITIØN BETWEEN TWØ CØMPANIES SELLING THE SAME PRØDUCT
MØAVE - CØMPUTES ANY NUMBER ØF MØVING AVERAGES FØR UP TØ 600 ØBSERVATIØNS WITH ANY NUMBER ØF AVERAGE SIZE

MERITSS LIBRARY ENTRIES AS ØF 74/3/14

F00TBAL - F00TBALL GAME F0R TW0 PLAYERS (GAME,F00TBAL)
F0URIE - F0URIER C0EFFICIENTS AND PHASE ANGLES F0R PERI0DIC DATA
GAUSS1 - THREE P0INT GAUSS INTEGRATI0N F0R FINITE LIMITS.
GENE1 - GENETIC TRAIT INHERITANCE SIMULATI0N
GE0MEN - GE0METRIC MEAN AND GE0METRIC STANDARD DEVIATI0N F0R A GE0METRICALLY N0RMAL SERIES 0F DATA
G0LFER - G0LF GAME (GAME,G0LFER)
HRACES - H0RSE RACE GAME (GAME,HRACES)
ICL0T - FITS A UNIT CURVE T0 AVERAGE LAB0R H0URS 0R C0ST F0R UP T0 200 L0TS
ICPR0 - C0MPUTES PR0JECTED VALUES 0N A UNIT CURVE WHEN THE PERCENTAGE 0F SL0PE AND THE VALUE 0F 0NE L0T 0R UNIT ARE KN0WN.
ICUNI - FITS A UNIT CURVE T0 LAB0R H0URS 0R C0ST F0R UP T0 1000 UNITS.
IMSL - DIRECT ACCESS FILE C0NTAINING A GR0UP 0F MATHEMATICAL SUBR0UTINES IN ULIB F0RM.
INDEXN - A BUSINESS INDICES NUMBER PR0GRAM.
INF0 - DIRECT ACCESS FILE USED BY 'INF0RM'
INSTAL - CALCULATES PRINCIPAL, PAYMENT AM0UNT, M0NTHLY INTEREST RATE, 0R NUMBER 0F PAYMENTS WHEN THE 0THERS ARE GIVEN.
ISIS - INTERACTIVE STATISTICS PACKAGE
ISISINS - MANUAL F0R ISIS F0RMATTED F0R LINE PRINTER
LBINDX - PART 0F A PACKAGE 0F PR0GRAMS THAT TEACH BASIC
LB1T04 - PART 0F A PACKAGE 0F PR0GRAMS THAT TEACH BASIC
LB140N - PART 0F A PACKAGE 0F PR0GRAMS THAT TEACH BASIC
LB5T08 - PART 0F A PACKAGE 0F PR0GRAMS THAT TEACH BASIC
LB9T13 - PART 0F A PACKAGE 0F PR0GRAMS THAT TEACH BASIC
LIBLIST - FILE C0NTAINING A SH0RT DESCRIPTI0N 0F EACH FILE 0N 'LIBRARY' 0R 'GAME'
LISINF0 - UT LISP VERSI0N 3 INF0RMATI0N FILE - 4 PAGES.
LISPEX - LISP EXAMPLE PR0GRAM
LINFIT - BEST LINEAR FIT AND C0RRELATI0NS F0R A SET 0F DATA
LINPR0 - S0LVES LINEAR PR0GRAMMING PR0BLEMS BY MAXIMIZING AN 0BJECTIVE FUNCTI0N USING THE TW0-PHASE METH0D
LNH15 - A110WS CRT USERS T0 GET LISTINGS 0F FILES ACC0RDING T0 SCREEN SIZE AVAILABLE. A ST0P F0R EXAMINATI0N IS INCLUDED AND THE END 0F EACH SCREEN-FULL.
L0AN - L0AN AM0RTIZATI0N PR0GRAM.
L0ANAM - WILL CALCULATE PRINCIPLE, PAYMENT AM0UNT, INTEREST RATE, 0R PERI0D WHEN THE 0THERS ARE GIVEN
L0CKEY - SIMULATI0N 0F L0CK AND KEY M0DEL 0F ENZYME SPECIFICITY
LRNBAS - PR0GRAM T0 TEACH BASIC
LSCFTC - P0LYN0MIAL CURVE FITTING
LSFITW - LEAST SQUARES WEIGHTED P0LYN0MIAL CURVE FIT
MALAR - SIMULATI0N 0F A MALARIA EPIDEMIC AND C0NTR0L
MARKET - GAME 0F C0MPETITI0N BETWEEN TW0 C0MPANIES SELLING THE SAME PR0DUCT
M0AVE - C0MPUTES ANY NUMBER 0F M0VING AVERAGES F0R UP T0 600 0BSERVATI0NS WITH ANY NUMBER 0F AVERAGE SIZE

MERITSS LIBRARY ENTRIES AS ØF 74/3/14

MULFI - MULTIPLE LINEAR FIT ØN UP TØ SIX VARIABLES WITH TRANSFØRMATIØNS
NAGS - CØMPUTERIZED HØRSE RACE (GAME,NAGS)
NEWRAP - LØCATES A RØØT ØF A FUNCTIØN WHØSE DERIVATIVE IS KNØWN USING THE NEWTØN-RAPHSØN METHØD
NØRDEV - GENERATES RANDØM NØRMAL DEVIATES WITH A MEAN ØF ZERØ AND VARIANCE ØF ØNE.
PAGES - FØRMATS A DATA FILE INTØ LL INCH PAGES WITH 58 LINES WITH A HEADER LINE AND PAGE NUMBER
PLØTXY - BASIC SUBRØUTINE WHICH WILL PLØT ØNE ØR MØRE CURVES ØN THE SAME SET ØF CØØRDINATE AXES
PØLICY - SIMULATIØN GAME CØNSISTING ØF A SØCIØ - ECØNØMIC MØDEL ØF THE AMERICAN SØCIETY
PØLSYS - SIMULATIØN ØF THE PRØCESS WHICH INDIVIDUALS AND GRØUPS UNDERGØ WHEN THEY ATTEMPT TØ INFLUENCE CITY HALL
PØLUT - SIMULATIØN ØF THE INTERACTIØN BETWEEN WATER AND WASTE
PØP - USED TØ EXPLØRE SIMPLE MATHEMATICAL MØDELS ØF PØPULATIØN GRØWTH
PØSTER - PØSTER GENERATIØN (GAME,PØSTER)
QUBIC - THREE DIMENSIØNAL TIC-TAC-TØE (GAME,QUBIC)
RANUM - GENERATES UP TØ 600 DIFFERENT RANDØM NUMBERS, PRINTING IN ASCENDING ØRDER.
RASEQ - GENERATES SETS ØF RANDØM NUMBERS WITHIN RANGES SPECIFIED BY THE USER.
REFØRM1 - REFØRMATS A FILE BY REMØVING THE BLANKS AND REPLACING THE LEADING BLANK IN A STRING BY A CØMMA. ALL CHARACTERS EXCEPT DIGITS, DECIMAL PØINTS, CØMMAS, PLUS, AND MINUS SIGNS ARE REMØVED
REFØRM2 - REFØRMATS A FILE BY REMØVING THE BLANKS AND REPLACING THE FIRST BLANK WITH A CØMMA. ALL NØN-BLANK CHARACTERS ARE PRESERVED.
REFØRM3 - REFØRMATS A FILE BY REMØVING THE BLANKS AND REPLACING THE FIRST BLANK WITH A CØMMA. ØNLY THE CHARACTERS THE USER WISHES WILL BE RETAINED
REFØRM4 - REFØRMATS A FILE BY REMØVING UNWANTED BLANKS AND LEADING CØMMAS. THE FIRST BLANK IN A STRING IS REPLACED BY A CØMMA. NUMERIC CHARACTERS PLUS THØSE CHARACTERS THE USER DESIRES ARE RETAINED.
REFØRM5 - REFØRMATS A FØRTRAN PRØGRAM WITH LINE NUMBERS TØ ØNE IN STANDARD FØRM.
RLETTE - RØULETTE GAME FØR ØNE PERSØN (GAME,RLETTE)
RNUMBER - CØNVERTS STANDARD FØRTRAN PRØGRAM TØ ØNE WITH LINE NUMBERS.
RØØTBW - FINDS RØØTS ØF PØLYNØMIALS USING BAIRSTØN'S METHØD
RØØTWG - FINDS THE RØØTS ØR FIXED PØINTS ØF A NØN-LINEAR FUNCTIØN USING WEGSTEIN'S ACCELERATIØN ØF THE STANDARD ITERATIØN PRØCEDURE.
RUNGE2 - SØLVES TWØ SIMULTANEØUS FIRST ØRDER DIFFERENTIAL EQUATIØNS BY THE FØURTH ØRDER RUNGE-KUTTA METHØD
SAMDAT1 - SET ØF SAMPLE DATA FØR THE ISIS STATISTICAL PACKAGE

MERITSS LIBRARY ENTRIES AS ØF 74/3/14

SAMDAT2 - SET ØF SAMPLE DATA FØR THE ISIS STATISTICAL PACKAGE
SAMDAT3 - SET ØF SAMPLE DATA FØR THE ISIS STATISTICAL PACKAGE
SCALEX - BASIC SUBRØUTINE WHICH SIMULATES NINE DIGIT FLØATING PØINT PRINTØUT
SCHEME - PLØTS UP TØ NINE CURVES ØN THE SAME SET ØF CØØRDINATE AXES.
SIMDIS - CALCULATES DISCØUNTED ØR PRESENT VALUE ØF A FUTURE SUM, DISCØUNT RATE, NUMBER ØF PERIØDS, ØR THE FUTURE SUM WHEN ALL ØR SØME ØF THE ØTHERS ARE KNØWN.
SIMEX1 - SØLVES N SIMULTANEØUS LINEAR EQUATIØNS IN N VARIABLES
SIMFI - SIMPLE LINEAR REGRESSIØN
SIMPIN - CALCULATES PRINCIPLE, PAYMENT AMØUNT, INTEREST RATE, ØR NUMBER ØF PAYMENTS WHEN THE ØTHERS ARE KNØWN.
SLITS - SIMULATIØN ØF INTERFERENCE PATTERNS FØR LIGHT
SLTMCHN - SLØT MACHINE GAME (GAME,SLTMCHN)
SMPSØN - NUMERICAL INTEGRATIØN USING SIMPSØN'S RULE
SNØINFØ - CAL SNØBØL ØN MERITSS INFØRMATIØN FILE - 19 PAGES.
SNØLIB - 20 UTILITY SNØBØL FUNCTIØNS USED TØ MAKE UP THE DEFICIENCIES IN CAL SNØBØL. (SEE SNØINFØ)
SNØPIG - SNØBØL EXAMPLE PRØGRAM
STARTRK - STAR TREK GAME (GAME,STARTRK)
STATFR - FREQUENCY DISTRIBUTIØN ANALYSIS PRØGRAM WHICH CØMPUTES 15 STATISTICAL MEASURES.
STATNW - CØMPUTES 31 STATISTICAL MEASURES ØF A STRING ØF NØN-WEIGHTED NUMBERS
STATSR - SIMPLE REGRESSIØN ANALYSIS PRØGRAM TØ DESCRIBE THE PRIMARY PRØPERTIES ØF A LEAST-SQUARES REGRESSIØN PRØBLEM
STATWE - CØMPUTES 36 STATISTICAL MEASURES ØN WEIGHTED ØR UNWEIGHTED STRINGS ØR SETS ØF PAIRS ØF DATA.
STAT01 - CØMPUTES THE MEAN, VARIANCE, STANDARD DEVIATIØN, AND STANDARD ERRØR ØF THE MEAN FØR ØNE ØR MØRE SETS ØF DATA
STAT02 - CØMPUTES THE MEANS, VARIANCES, AND T-RATIØ FØR TWØ GRØUPS ØF UNPAIRED DATA ASSUMING AN EQUAL VARIANCE MØDEL
STAT03 - CØMPUTES THE MEANS, VARIANCES, AND THE VALUE ØF A T-LIKE STATISTIC FØR TWØ GRØUPS ØF UNPAIRED DATA, ASSUMING AN UNEQUAL VARIANCE MØDEL.
STAT04 - CØMPUTES CHI-SQUARES FØR A 2 BY 2 TABLE.
STAT05 - CØMPUTES ANY NUMBER ØF M BY N CØNTØNGENCY TABLES.
STAT06 - CALCULATES THE SIGN TEST CØNFIDENCE INTERVAL USING FRACTIØNAL CØUNT.
STAT07 - CALCULATES THE CØNFIDENCE LIMITS USING THE WILCØXØN SIGNED RANK SUM PRØCEDURE WITH FRACTIØNAL CØUNTS.
STAT08 - CØMPARES TWØ GRØUPS ØF DATA USING THE MEDIAN TEST. THE CHI-SQUARE VALUE ØF A 2 BY 2 TABLE ØN 1 DEGREE ØF FREEDØM IS PRINTED
STAT09 - CØMPARES TWØ GRØUPS ØF DATA BY MEANS ØF THE MANN-WHITNEY TWØ SAMPLE RANK TEST.
STAT1A - CØMPUTES THE MEANS, STANDARD ERRØR ØF THE MEANS, MEAN DIFFERENCE, STANDARD ERRØR ØF THE DIFFERENCE, AND T-RATIØ

FØR TWØ GRØUPS ØF PAIRED DATA

STAT10 - CØMPUTES THE SLØPE AND Y-INTERCEPT FØR A SIMPLE LINEAR REGRESSIØN WITH ØNE INDEPENDENT VARIABLE

STAT11 - CØMPUTES THE SPEARMAN RANK CØRRELATIØN CØEFFICIENT FØR TWØ SERIES ØF DATA

STAT12 - CØMPUTES THE CØRRELATIØN MATRIX FØR N SERIES ØF DATA

STAT13 - PRØDUCES AN ANALYSIS ØF VARIANCE TABLE AND THE F-RATIØN TØ TEST THE SIGNIFICANCE ØF THE DIFFERENCE BETWEEN TREATMENT MEANS FØR A ØNE-WAY CØMPLETELY RANDØMIZED EXPERIMENT.

STAT14 - PRØDUCES THE ANALYSIS ØF VARIANCE AND F-RATIØS FØR TREATMENTS AND BLØCKS ØF A RANDØMIZED CØMPLETE BLØCK DESIGN

STAT15 - CØMPUTES THE ANALYSIS ØF VARIANCE TABLE AND F-RATIØ FØR A SIMPLE LATIN SQUARE DESIGN.

STAT16 - CØMPUTES THE ANALYSIS ØF VARIANCE TABLE AND F-RATIØ FØR A SIMPLE GRAECØ-LATIN SQUARE DESIGN

STAT17 - PRØDUCES THE ANØVA TABLE ØF A BALANCED INCØMPLETE BLØCK DESIGN AND F-RATIØS FØR TREATMENTS.

STAT18 - PRØDUCES THE ANALYSIS TABLE ØF A YØUDEN SQUARE DESIGN AND F-RATIØS FØR TREATMENTS.

STAT20 - PERFØRMS MULTIPLE LINEAR REGRESSIØN ACCØRDING TØ EFRØYMSØN'S ALGØRITHM

STAT21 - PERFØRMS ØNE ØR MØRE LINEAR REGRESSIØNS ØN A BATCH ØF DATA.

STAT22 - THIS IS A GENERALIZED ANALYSIS ØF VARIANCE PRØGRAM WHICH CAN BE USED TØ PARTITIØN SUMS-ØF-SQUARES FØR MANY TYPES ØF CØMPLETE BLØCK EXPERIMENTAL DESIGNS.

STAT23 - CØMPUTES BINØMIAL, PØISSØN, AND HYPERGEØMETRIC DISTRIBUTIØN PRØBABILITIES.

STAT9A - CØMPUTES THE SLØPE AND Y-INTERCEPT FØR A LINEAR REGRESSIØN WITH SEVERAL Y VALUES FØR EACH X VALUE. SEVERAL STATISTICAL MEASURES ARE PRINTED.

STERL - SIMULATIØN ØF TWØ METHØDS ØF PEST CØNTRØL

STRINFØ - INFØRMATIØN PRØGRAM FØR STARTRK (GAME,STRINFØ)

SYSNØTE - A MESSAGE FILE USED TØ PASS GENERAL INFØRMATIØN TØ THE USERS FRØM MERITSS STAFF.

SYSWARN - A MESSAGE FILE USED TØ RELAY INFØRMATIØN ØF A TRANSIENT NATURE TØ THE USERS.

TABIN - PRØCESSES DATA INPUT AND RE-ALIGNS ITEMS INPUT IN CØLUMN FØRMAT.

TAPE99 - FILE USED BY THE PØSTER PRØGRAM.

TICTAC - TIC-TAC-TØE (GAME,TICTAC)

TX98 - FILE USED BY THE LIBRARY PRØGRAM 'BR'

TYPEINF - INFØRMATIØN FILE FØR TYPESET WRITTEN TØ BE PRØCESSED BY TYPESET

TYPESET - REFØRMATS A FILE CØNTAINING DIRECTIVES. IT DØES PAGING WITH HEADERS, PARAGRAPHING AND BLØCKING ØF TEXT(ASCII IS ALLØWED) AND MØRE

WILLERD - FILE USED FØR CØMMUNITY CØLLEGE CØMMUNICATIØN

XYPLØT - WILL PLØT A SINGLE VALUED FUNCTIØN ØF X WITH X ØN THE VERTICAL AXIS
YAHTZEE - THE GAME ØF YAHTZEE (GAME,YAHTZEE)
ZERØES - LØCATES THE RØØTS, TURNING PØINTS, AND PØINTS ØF DISCØNTINUITY FØR MØST SINGLE-VALUED FUNCTIØNS ØF A SINGLE VARIABLE.
5RØW - A FIVE IN A RØW GAME (GAME,5RØW)

APPENDIX G

1973-1974

MERITSS Budget

Ports Committed 1973-1974

	July	Oct.	Jan.	Apr.
U of Minn.	63 [17-30cps]	70 [17-30cps]	70 [17-30cps]	70 [17-30cps]
St. Colleges	22 [1-30cps]	32 [1-30cps]	32 [1-30cps]	41 [1-30cps]
Jr. Colleges	15	15	15	15
Secondary		3	3	3
Other	7 [2-30cps]	7 [2-30cps]	7 [2-30cps]	7 [2-30cps]
	107 [20-30cps]	127 [20-30cps]	127 [20-30cps]	136 [20-30cps]

These figures are based on verbal commitments and represent the minimum number of ports that will be sold. Various plans for expansion are based on these port figures as the sole source of income, that being $250/port or $350/port excluding communication charges.

INCOME

An income of $396,750 is generated if the above port numbers are used. In actuality, a larger income is expected since only minimum commitments are given. All surcharges received for 30 cps ports and excess permanent file storage during 1972-1973 should be added, giving an operating base of $416,750 (the $20,000 in surcharges should be used for premature expansion costs).

PLANS FOR EXPANSION

Control Data's bid response was 128 ports starting July 1, 1973 at $180/port. Additional memory and disk storage would be supplied if there were a commitment to 160 ports at $172.50/port or 192 ports at $165/port by December 1, 1973.

Using these restrictions on growth increments and their associated lease costs, there exist the following alternatives for expansion during 1973-1974.

A. Lease 128 ports starting July 1, 1973 and expand to 160 ports January 1, 1974.

B. Lease 128 ports starting July 1, 1973 and expand to 160 ports October 1, 1973.

C. Lease 128 ports for the entire year, allowing a maximum of 132 ports (overselling on a rotary principle) to be sold. The result would be a heavily loaded system with a closed door policy.

D. Lease 108 ports starting July 1, 1973 with a commitment to 160 ports on October 1, 1973. Although this is a departure from Control Data's bid, there are strong indications that they will agree to rates of $187.50/port and $172.50/port for 108 and 160 ports respectively.

The financial implications of these approaches to expansion are indicated below.

PLAN	LEASE	MANAGEMENT COST	TOTAL OPERATION COST	INCOME
A	303,840	111,764	415,604	416,750
B	317,520	111,764	429,284	416,750
C	276,480	111,764	388,244	415,250*
D	309,150	111,764	420,914	416,750

* Reflects a limitation of 132 ports to be sold.

MERITSS Management Costs 1973-1974

Salaries and Fringe Benefits	95,764
Bell Telephone	2,000
ECS - 6600	12,000
Misc.	2,000
	$111,764

Management

Manager	-	1 FTE
Consulting - Users Services	-	1 FTE
Systems - Operations	-	4 FTE
Applications	-	3/4 FTE
Office Services	-	1 1/3 FTE
	~	8 FTE

30 cps: $350.00/mo + $20.00/mo Communication charge (unlimited CPU and connect time)

10 cps: $250.00/mo + $20.00/mo Communications charge (unlimited CPU and connect time)

or $25.00/mo + $5.00/connect hour (10 cps only) (unlimited CPU time)

The above rates include .5 million characters permanent file storage. Additional storage is available at $1.00/day/.5 million characters or fraction thereof.

Exceptions:

1. Out of state users - add $10.00/month
2. U of M users doing purely instructional work are funded by University Computer Services at a level of $100.00/month
3. U of M users doing mixed instructional and research work are funded by University Computer Services at a level proportional to the fraction of instruction to a maximum of $100.00/month.
4. Users supplying their own communication equipment at the Central Computer do not pay the communication charge.

APPENDIX H

Summary Balance Sheets 1972-1975

	72-73	73-74	74-75	75-76 Est.
Ports Maximum	108	145	256	160
Ports Average	90	134	256	150
Lease Plus Maintenance	$203,000	$321,000	$413,000	$192,000**
Salaries Plus Fringe Benefits	$60,000	$99,000	$84,000	$76,000
Other Costs	$4,000	$8,000	$17,000	$5,000
Port Cost/Momth	$250-10cps $350-30cps	$250-10cps $350-30cps	$168*	$150

*During 1974-1975 all 256 ports were leased to MECC. MECC users, including the University, paid $200 per month for these ports.

**The CDC 6400 was purchased July 1,1975. This figure reflects a payment of the purchase cost, plus financing and maintenance costs.