STX

Computi.

Services

Office

Off-Line

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Administrative

Director	George Badger	150 DCL	333-4103
Business Manager	Stanley Rankin	150 DCL	333-6530
Secretary	Joyce McCabe	150 DCL	333-1637

User Services and Hardware/Software Support

User Accounting		1208 W Springfield	333-7752
Distribution Office		1208 W Springfield	333-6760
Systems Consulting		1208 W Springfield	333-6133
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Dial-up Numbers	CYBER 175 (NOSA)	300 baud	333-4000
	CYBER 174 (NOSB)	300 baud	333-4004
	IBM 4341 L10 (VME)	300 baud	333-4005
	IBM 4341 M2 (VMD)	300 baud	333-4006
	Switch	1200 baud	333-4008
	TELENET (local no.)		384-6428

Asst Dir User Services	Robert Penka	173 DCL	333-4709
Asst Dir Systems and Operations	Sandra Moy	177 DCL	333-4703
Asst Dir Development	J. M. Randal	1207 W.Springfield	333-9772
Asst Dir Networking	Sue Greenberg	187 DCL	333-3723
Manager Accounting Services	Gary Bouck	1208 W Springfield	333-7752
Manager Statistical Services	Beth Richardson	189 DCL	333-6276
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CYBER-IBM Operations	Myra Williams	194a DCL	333-7685
	Ann Ryczer		
	Rex Duzan		
VAX Operations	Debbie Hudson	1207 W Springfield	333-8150
Laboratory Support Project	Mike Gardner	1207 W Springfield	333-7904
Site Operations	Sylvia Hansen	65 ME	333-6285
	Chuck Harnsberger		

CSO Sites (see Reference Guide RF-0.3 for operating hours)

Agriculture		N-120 Turner Hall	333-8170
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CSO operates a CDC Cyber 175 with 262K words of central memory and a CDC Cyber 174 with 196K words of central memory. The 175 and 174 run under the NOS Operating System and share 512K words of ECS. The 175 serves over 200 simultaneously active text and graphics terminals and the 174 serves over 100 simultaneously active terminals. CSO also operates an IBM 4341 Model M2 with 8 million bytes of memory running HASP-OS/MVT under VM and an IBM 4341 Model L10 with 4 million bytes of memory running VM. In addition, CSO operates a DEC VAX 11/780 with 4 million bytes of memory, running under the UNIX Operating System and driving a GSI CAT-8 phototypesetter.

Operating Hours (see HEARYE,SCHEDUL for exceptions):

	CYBERS 174/175	IBM
M-F	8 am - 6 am	8 am - 6 am
SAT	8 am - Midnight	8 am - 6 am
SUN	Noon - 6 am	Noon - 6 am

POLICY

FREE CYBER STUDENT ACCOUNTS

Students may apply for a **Free Cyber Student Account** number at the following locations:

CSO South Operations   or   CSO Accounting Office
70 Commerce West   1208 W. Springfield, Urbana

The Free Cyber Student Account is available to students currently enrolled at the University of Illinois. Each student is required to present a valid University ID to obtain this student account.

Current restrictions on obtaining a Free Cyber Student Account are as follows:

- Persons having an active SARA account are not eligible.

- Students currently enrolled in 100 level CS courses are not eligible.

COMMUNICATIONS PROBLEM REPORTING

There has always been some confusion in knowing who to call when a terminal, whether it be privately owned or CSO's, malfunctions. A terminal user was placed in the situation of being required to diagnose the problem prior to calling either terminal repair or data communications. Frequently the wrong group was called or the phone was not answered because the technicians were in the field fixing previously reported problems. Either of these occurrences delayed the response to the problem.

To correct these problems, CSO has set up a communications problem hotline, which should be called to report any terminal or communication problem or to inquire about any service or previously reported problem. The telephone number of this service is **333-0969**. It will be staffed from 7am to 3pm by personnel trained in communication problem isolation (and some correction). Problems which cannot be corrected in the process of isolation will be passed on to the most appropriate group within CSO to look into the problem in more depth. Between 3pm and 5pm the telephone will be answered and the problem recorded but initial problem determination will be done by a technician as he becomes free.

Should this service be well received and utilized the hours may be expanded.

USER TRAINING PROGRAM

Short Courses, Manuals and Training Tapes
for the CSO Computer Systems
Spring Semester 1985

SHORT COURSES

CSO is offering the following noncredit short courses during the Spring semester 1985 to acquaint potential users with our computing systems, facilities and services.

Short Course Policy

Please note that:

1. CSO makes a small charge for most short courses. This is due to two factors: (1) There is a need for equipment to support improvement in teaching methods; (2) The volume of short courses has risen to the point where it is a serious drain on consulting staff time, and some compensation in staffing must be made. The income is dedicated to support of the short course program.

2. REGISTRATION IS REQUIRED for all courses except where noted. Registration is accomplished by filling out a copy of the registration form for each course and sending these forms, together with payment for the total of indicated fees, to CSO in either campus or U.S. mail.

    The form is available on-line via:

        TYPE,REGFORM/AS/UN=COURSES

    or you may call 333-6630 and request that one be sent.

3. Each registrant will be sent a confirmation of registration on which the place of meeting is noted. This slip must be taken to all meetings of the class and shown when requested.

4. Refunds of fees will be made only for canceled classes, or upon receipt of an application for refund on or before the day BEFORE the second meeting of the class. There will be no such refunds for classes that meet only once. Application for a refund must be made in room 150 DCL during normal office hours.

5. A copy of the current (updated) short course listing may be examined on-line via:

        TYPE,COURSES/AS/UN=COURSES.

6. Updates (changes) since the printed short course listing was issued may be examined on-line via:

        TYPE,UPDATES/AS/UN=COURSES.

    This file contains current information on courses and sections that have been newly opened, canceled, filled and closed, etc.

7. A brief list of course titles, fees and meeting times is available via:

        TYPE,TITLES/AS/UN=COURSES.

8. CSO reserves the right to cancel courses or sections with insufficient enrollment. All fees paid for these classes will automatically be refunded.

Questions, comments and suggestions should be addressed to the CSO user training coordinator: Ron Szoke, 333-8630 or TELL,SZOKE from a Cyber terminal or NOTE SZOKE from a CMS/VMD terminal.

Short Course Summary: Titles

NOTE: For ease of reference, short courses are now classified into five groups, depending on the computing system addressed:

G series: General and Introductory
    G10.   Orientation to CSO Facilities and Services
    G17.   Overview of the Local Area Network
    G23.   Computing for Poets

M series: Microcomputers (Especially the IBM PC)
    M15.   Basic Concepts in Computer Information Processing
    M21.   Quick PC
    M41.   Using a Word Processing Package
    M43.   Using a Spreadsheet Package
    M45.   Using a Database Package
    M51.   Intermediate PC

Statistical Computing

    M73.   Using a Statistical Package

C series: The CDC Cyber NOS System
    C11.   Introduction to the Cyber Systems
    C15.   Use of MANAGE
    C21.   Producing a Thesis with RNF
    C35.   Using Magnetic Tapes
    C43.   Cyber Fortran-77 (FTN5) for the FTN User
    C51.   Using the UWRIM Database Management System
    C53.   Cyber Control Language (CCL)

Computer Graphics

    C61.   Easy Graphing
    C62.   Using Blaze Graphics
    C63.   Introduction to the DI-3000 Graphics Package
    C65.   The PVI Contouring System

I series: The IBM VM/CMS and OS/MVT Systems
    I21.   Introduction to IBM Timesharing: CMS
    I22.   Introduction to IBM Timesharing: XEDIT
    I31.   Using BITNET

Statistical Computing

    I71.   Introduction to Statistical Package Computing (CMS)
    I73.   Using IDA (Interactive Data Analysis) on CMS
    I74.   Introduction to SCSS (SPSS Conversational System)
    I75.   Introduction to SPSS
    I76.   Introduction to SPSSX
    I77.   SPSS and SPSSX Processing Using CMS
    I81.   Orientation to CSO SAS Services
    I83.   Introduction to SAS (Statistical Analysis System)

Statistical Package Graphics

I97. Introduction to SPSS Graphics
I98. Introduction to CMS SAS/GRAPH

X series: Mixed and Other Systems

Statistical Computing

X72. Introduction to BMDP
X79. Repeated Measures Analysis Using SPSS or SPSSX MANOVA
X81. Using the SHAZAM Econometric Package

Short Course Listing

G series: General and Introductory

G10. Orientation to CSO Facilities and Services

A brief, nontechnical presentation for prospective users on the following topics: the mission and organization of CSO; computing equipment; locations of facilities and hours of operation; available software; where to obtain documentation; user training (short courses and training tapes); consulting and other services; how to set up a computer account. Recommended manual: *An Index to Software on the Cyber* (see MANUALS, below). No prerequisites. No fee. NO REGISTRATION IS REQUIRED. Six sections will be offered.

1. January 16   12N-1pm   115 DCL [Dingler]

2. January 18   12N-1pm   115 DCL [Dingler]

3. January 24   3pm-4pm   168 Elect. Engr. [Mills]

4. January 28   3pm-4pm   505 E. Green, Room 226 [Szoke]

5. January 30   8am-9am   115 DCL [Szoke]

6. February 5   8am-9am   115 DCL [Alster]

G17. Overview of the Local Area Network

Discussion of campus's Sytek LocalNet network for data communications: its capabilities, technical requirements, costs of installation and usage, etc. Fee: none. NO REGISTRATION REQUIRED.

February 19   12N-1pm   170 Elect. Engr. [Wilmot]

G23.   Computing for Poets*

A brief general orientation to computers and computing for those in the humanities and fine arts. Intended especially for those with "computer anxiety" and those who are "anti-computer" or "anti-technology." The course assumes no background in computing, mathematics, or any other technical field. Prerequisites: none. Fee: $15.

*"Poets" is meant poetically, not literally.

February 18,19,20,21   12N-1pm   [Szoke]

M series: Microcomputers (especially the IBM PC)

M15.   Basic Concepts in Computer Information Processing

An introductory survey of computer information processing concepts and terminology, intended especially for those thinking of acquiring a small computer or word processing equipment. The needs of UI administrative, clerical and nonacademic personnel have been central to the planning of the course. Some guidelines for buying a personal or microcomputer are suggested, but attendees will NOT be told which one to buy, nor which one is "best." NOTE that there is no laboratory component to this course. No prerequisite. Fee: $15.

February 4,6   3pm-5pm   [Szoke]

M21.   Quick PC

A concise review of essentials of using the IBM Personal Computer: basic hardware configuration (keyboard, system unit, disk drives, printer); proper care and handling of diskettes; hands-on experience using the PC-DOS operating system to format a diskette and to copy, back up, type, rename and delete files; software packages available from CSO and how to check them out; how to load and run BASIC programs and other software packages. Prerequisite: Course G10 and familiarity with basic computer terminology equivalent to one of the following: courses G23, G25 or M15. Enrollment limited to 20 per section. Fee: $5 (includes one diskette).

1.   January 29   12N-1pm   [Knott]

2.   January 31   12N-1pm   [Knott]

3.   February 5   12N-1pm   [Knott]

4.   February 7   12N-1pm   [Knott]

5.   February 12   3pm-4pm   [Knott]

6.   February 14   12N-1pm   [Scheid]

7.   February 19   12N-1pm   [Albin]

M41.   Using a Word Processing Package

How to use a microcomputer (the IBM PC) and word processing package (probably Volkswriter or MultiMate) to produce (create, revise and print) publication-ready manuscripts. Prerequisite: Quick PC (course M21) or consent of instructor. Enrollment limited to 10 per section. Fee: $25 (includes one diskette).

    1.   February 25,26,27,28, Mar. 1   12N-1pm [Szoke]

    2.   March 11,12,13,14,15   12N-1pm [Dewan]

    3.   March 25,26,27,28,29   12N-1pm [Dewan]

M43.   Using a Spreadsheet Package

"Electronic spreadsheet" packages (such as VisiCalc, its successors and spinoffs) are widely considered the most impressive and useful software available for microcomputers. This course introduces participants to the analytical and "what if --" capabilities of a new generation spreadsheet package, Lotus 1-2-3 on the IBM PC. Also, glimpses of this package's database and graphics features if time permits. Prerequisite: course M21. Enrollment limited to 18. Fee: $20 (includes one diskette).

    March 11,12,13,14   12N-1pm [Szoke]

M45.   Using a Database Package

An introduction to microcomputer database management emphasizing the fundamentals of using database software. Using dBASE II or III we will design and create an information file, enter data, and use the package to write a report. If time permits, we may also discuss briefly some of the other database packages currently available for microcomputers. Prerequisite: course M21 or equivalent. Enrollment limited to 15. Fee: $25 (includes one diskette).

    March 18,19,20,21,22   12N-1pm [Staff]

M51.   Intermediate PC

A second course in using the IBM PC and PC-DOS. This course will cover aspects of DOS 2.x not covered in the introductory course (M21: Quick PC). The topics covered include: the EDLIN line editor, device names, global filename characters, tree-structured directories, pipes and filters, batch files, and configuring your system. Other topics that may be covered if time permits: hard disk usage, batch file commands, the LINK and DEBUG utilities, and using compilers (Fortran, Pascal, etc.). Prerequisite: course M21 or equivalent. Enrollment limited to 15. Fee: $15 (includes one diskette).

    March 11,13,15   12N-1pm [Pommert]

Statistical Computing

M73.   Using a Statistical Package

This course demonstrates how to download a data set from the Cyber system to an IBM PC diskette file. A microcomputer statistical package (probably Microstat) is then used to obtain basic descriptive statistics and do an illustrative regression and analysis of variance.

Prerequisite: course M21 oe equivalent knowledge. Enrollment limited to 15. Fee: $20 (includes one diskette).

April 8,9,12,11   12N-1pm   [Szoke]

C series: The CDC Cyber NOS System

C11.   Introduction to the Cyber System

This course is intended for the first time Cyber system user. Covers signing on, obtaining system information, and basic file concepts and maneuvers. The emphasis is on timesharing usage and the ICE text editor. Batch usage may also be discussed. Prerequisite: course G10. Fee: $15. Enrollment limited to 15 per section. Five sections will be offered.

1. January 21,22,23,24,25   12N-1pm   [Scheid]
   (plus one hour to be scheduled)

2. February 4,5,6,7,8   3pm-4pm   [Albin]

3. February 18,19,20,21,22   8am-9am   [Primer]

4. March 4,5,6,7   7pm-8:30pm   [Kerr]

5. March 18,19,20,21,22   12N-1pm   [Scheid]
   (plus one hour to be scheduled)

C15.   Use of MANAGE

How an instructor or project manager allocates computer resources to individual users. Assumes familiarity with simple use of the Cyber (equivalent to course C11). Fee: none.

February 5   8am-10am   [Primer]

C21.   Producing a Thesis with RNF

A concise explanation of how to use the RNF text formatter, in conjunction with the ICE file editor and the Diablo or Xerox laser printer, to produce a thesis or other substantial document. The emphasis is on basic principles of RNF and Thesis Office requirements. Topics include margins, tabbing, paragraphing, etc., as time allows. Prerequisites: course C11 or equivalent knowledge of the Cyber system and ICE. Fee: $15.

February 25,26,28, Mar 1   12N-1pm   [Dewan]

C35.   Using Magnetic Tapes

Covers the use of magnetic tapes on the Cyber. Assumes familiarity with use of the Cyber (equivalent to course C11.) Registrants should obtain the free Technical Notes (TN-150, TN-152, TN-153) at any CSO site before attending. Fee: $15

February 11,12,13,14   12N-1pm   [Wetzel]

C43.   Cyber Fortran-77 (FTN5) for the FTN User

A systematic presentation of the principal differences between Cyber Fortran (FTN4) and the more recent Cyber FTN5 compiler, an implementation of the Fortran-77 standard. How to convert FTN4 programs to FTN5 with the aid of F45. Assumes a good working knowledge of FTN. Fee: $20.

March 11,12,13,14,15   3pm-4pm   [Hirchert]

C51.   Using the UWRIM Database Management System

UWRIM (University of Washington Relational Information Management) is an easy-to-learn and easy-to-use database management package based on the relational algebra model of data organization. It can be used to solve a wide range of information handling problems, from everyday office management to scientific and engineering applications. This course shows how to store data in simple tables that can be sorted and accessed in various was, as well as some applications of UWRIM such as the TAGS mailing list management system. Prerequisite: course C11 or equivalent. Fee: $15.

March 4,6,8   3pm-4pm   [Edwards-Iwe]

C53.   Cyber Control Language (CCL)

CCL can be used in batch jobs or procedures to control the flow of execution, alter the control statements to be executed, issue messages to the terminal, and generate text files which can be used as input to programs within a batch job or CCL procedure. This course covers most CCL statements, CCL procedures, and, as time permits, related commands and examples which illustrate the various aspects of CCL. Prerequisite: course C11 or equivalent. Fee: $5.

March 5,7   3pm-4pm   [Pommert]

Computer Graphics

C61.   Easy Graphing

Elementary presentation of a high-level interactive plotting program for X-Y plots, bar and pie charts. Its English-like commands require no programming experience to generate plots. Assumes course C11 or equivalent knowledge. Fee: $10.

April 8,10,12   3pm-4pm   [Albin]

C62.   Using Blaze Graphics

Blaze is a versatile library of Fortran-callable subroutines for producing X-Y graphs. It is built upon DI-3000, though no knowledge of DI-3000 is necessary for using Blaze. The full range of DI-3000's device-independent functionality is available to the user. Assumes a working knowledge of Cyber Fortran. Fee: $5.

February 5,7   3pm-4pm   [Tuchman]

C63.   Introduction to the DI-3000 Graphics Package

DI-3000 is a library of Fortran-callable subroutines for device-independent computer graphics. It is an implementation of the 1979 ACM/SIGGRAPH CORE graphics system proposed

standard. This course is for those with little or no experience using DI-3000. It covers capabilities, structure, and basic use of the package. No high level or X-Y plotting capabilities will be presented (see C62). Assumes a working knowledge of Cyber Fortran. Fee: $10.

> February 18,20,22   12N-1pm   [Kerr]

C65.   The PVI Contouring System

The Contouring System is a Fortran-based subroutine library for producing contour plots and 3-D mesh surface drawings. It is primarily an application library which uses the DI-3000 graphics software for its graphic output. This course presents an overview of the capabilities and use of the Contouring System. Prerequisites: none, though familiarity with DI-3000 (equivalent to C63) would be helpful. Fee: none

> February 26   12N-1pm   [Tuchman]

I series: The IBM VM/CMS and OS/MVT Systems

I21.   Introduction to IBM Timesharing: CMS

An introduction to CMS (Conversational Monitor System), the IBM timesharing system. Topics include: general CMS and virtual machine concepts, useful standard and locally written CMS commands and utilities, sending files between the Cybers and CMS, guidelines for utilizing the available documentation, how to use the full-screen simulator (SIM). Required reference and recommended prior reading: *CMS Primer*, available at the CSO Distribution Office, 1208 W. Springfield. Prerequisite: course G10 or equivalent knowledge. Two two-hour lectures and a 1.5-hour lab. Fee: $20.

> January 29,31   7pm-9pm   [Dingler]
> Lab: February 9   8am-9:30am

I22.   Introduction to IBM Timesharing: XEDIT

This course introduces the IBM XEDIT text editor, which is used under CMS. The lectures cover useful commands for both "ASCII typewriter" and "full-screen" or "simulated full-screen" terminals. Useful locally written XEDIT commands are also discussed. Two two-hour lectures and a one-hour lab. Prerequisite: course I21 or equivalent knowledge of CMS. Required reference and recommended prior reading: *CMS Primer*, available at the CSO Distribution Office, 1208 W. Springfield. Fee: $20.

> February 5,7   7pm-9pm   [Dingler]
> Lab: February 9   9:30am-10:30am

I31.   Using BITNET

A brief presentation on how to use the BITNET communications facility, which links some 165 IBM/CMS and RSCS-compatible universities (including UIUC) in the USA, Canada, and several foreign countries, and which allows the transmission of files as well as messages. Prerequisite: I21 or equivalent knowledge of CMS and a CMS signon. Fee: none.

> February 21   3pm-4pm   [Wetzel]

Statistical Computing

171. Introduction to Statistical Package Computing (CMS)

The purpose of this course is to equip the novice computer user or the newcomer to this campus with the basic knowledge necessary to utilize CSO's IBM system to perform statistical analyses. Topics covered: the virtual machine concept; essentials of the CMS timesharing system; data formats; program and data entry using the XEDIT text editor; and glimpses of the major statistical packages available: SAS, SCSS, SPSSX, IDA, and BMDP. (Note: this course is NOT intended to replace the regular introductory courses for each package.) Two 2-hour lectures followed by a 3-hour lab session covering the basic file concepts and timesharing terminal usage. Prerequisite: course G10. Fee: $25. Two sessions will be offered.

    1. January 28,30 7pm-9pm [Mills]
         Lab: February 2 8am-11am

    2. February 11,13 7pm-9pm [Alster]
         Lab: February 16 8am-11am

173. Using IDA (Interactive Data Analysis) on CMS

An introduction to the use of the IDA Interactive Data Analysis and Forecasting System on IBM timesharing, a "conversational" statistical and time series analysis package emphasizing regression-related techniques. IDA is especially suited for instruction and the exploratory analysis of small data sets. Some knowledge of regression is desirable; the minimal CMS control language needed will be covered. Fee: $10.

    February 26,28 7pm-9pm [Mills]
    Lab: March 2 8am-9am

174. Introduction to SCSS (SPSS Conversational System)

SCSS is a comprehensive set of data management and statistical analysis facilities available only on the IBM computer. Using SCSS requires very little computer expertise because very little time is spent learning to program. SCSS is so named because communication between the user and the system resembles an actual conversation: it asks a series of questions to which the user responds with his/her choice of appropriate answers. When asked to display or analyze data, SCSS does so on the spot. The command language is simple, consisting of English words, and if a command is forgotten or misspelled, the system prompts the user for the information it needs. The facilities in SCSS will be described, and in the lab session easy sample exercises will enable participants to quickly become familiar with using the SCSS system. Fee: $5.

    February 18 7pm-8pm [Richardson]
    Lab: February 23 8am-9am

175. Introduction to SPSS (Statistical Package for the Social Sciences)

This is an introductory course on the SPSS package on the IBM timesharing system. Topics covered: data preparation, basic components of the SPSS language, data modification, running SPSS programs at terminals, and using SPSS to obtain basic statistics and contingency tables.

Participants are expected to have prior experience with program and data entry using the XEDIT text editor. Prerequisite: course I71 or equivalent knowledge. Fee: $25.

March 11,13,18   7pm-9pm   [Richardson]
Lab: March 23   8am-9am

I76.   Introduction to SPSSX (Statistical Package for the Social Sciences)

This course is designed for experienced SPSS users who wish to make the transition to SPSSX. SPSSX offers a wide range of enhancements, especially in the areas of file definition, data manipulation and file management. These new features of SPSSX will be illustrated in a series of applications. Topics covered: basic file definition, moving files from SPSS to SPSSX, merging files, and working with complex files. The course will not concentrate on syntax or statistical procedures; rather, it is designed to ease the transition from SPSS to SPSSX by pointing out differences and enhancements. Prerequisite: advanced knowledge of SPSS. Fee: $15.

March 25,27   7pm-9pm   [Richardson]

I77.   SPSS and SPSSX Processing Using CMS

This course provides an introduction to the system control language for running SPSS and SPSSX programs using the IBM CMS timesharing system. This is a conversion course for users who are currently running SPSS programs on the Cyber or OS/MVT, and who wish to make the transition to CMS. Topics covered: the system command for invoking SPSS or SPSSX and its options; the CMS commands needed to define raw data input/output files and system file input/output. Prerequisite: prior experience with running SPSS programs on the Cyber or OS/MVT. Fee: none.

February 25   7pm-8pm   [Richardson]

I81.   Orientation to CSO SAS (Statistical Analysis System) Services

A brief overview of the SAS computing facilities and services offered by CSO, including: the SAS Institute Program Products offered on CSO's CMS and OS/MVT systems, available documentation, user training offerings, how to get started using SAS, and a brief demonstration of SAS products (e.g., the BASE, GRAPH, FSP, ETS and OR software). This class is offered ONLY ONCE this semester. Fee: none. NO REGISTRATION IS REQUIRED.

January 24   7pm-8pm   161 Elect. Engr.   [Dingler]

I83.   Introduction to SAS (Statistical Analysis System)

An introduction to SAS processing using the IBM CMS timesharing system. Topics include using SAS interactively and non-interactively, using the DATA and PROC steps, creating temporary and permanent SAS data sets under CMS, reading and writing external data files, using basic SAS procedures, programming in the DATA step, using SAS/FSP (the SAS Full-Screen Product) to interactively edit SAS data sets, highlights of other SAS/FSP features, and an overview of CSO SAS features and services. NOTE: All SAS users are urged to make the transition from Cyber timesharing to CMS to perform their SAS processing because of the significant advantages CMS offers for such work. Prerequisite: courses I21 and I22 or equivalent

knowledge of CMS and XEDIT. Recommended references: *SAS Introductory Guide* and the *SAS Companion for the VM/CMS Operating System.* The course consists of three 2-hour sessions. Fee: $25.

February 26,28, Mar 5   7pm-9pm   [Dingler]

Statistical Package Graphics

197.   Introduction to SPSS Graphics

SPSS Graphics is available as part of the SPSS package under both the IBM VM/CMS and OS/MVT systems. It consists of three procedures: PIECHART, BARCHART and LINECHART, which are fully integrated into the SPSS system and use the familiar SPSS syntax. Commands for generating pies, bars and curves will be described and techniques for producing plots under both the IBM batch and timesharing systems will be illustrated. Recommended reference: *SPSS Update 7-9* (1981), Chapter 4. Prerequisite: prior experience with SPSS. Fee: $5.

March 4   7pm-9pm   [Richardson]

198.   Introduction to CMS/SAS/GRAPH

An introduction to using SAS/GRAPH on the IBM CMS timesharing system and CMS/SAS. Topics include: how to use SAS/GRAPH with various graphics devices, how to produce hardcopy Zeta plots from SAS/GRAPH output, global features of SAS/GRAPH, using map data sets, calculating dimensions and proportions for Zeta plots, and highlights of new features in SAS/GRAPH. Prerequisites: 121, 122, and 183 or equivalent knowledge of CMS, XEDIT, and SAS. Fee: $15.

March 26,28   7pm-9pm   [Dingler]

X series: Mixed and Other Systems

Statistical Computing

X72.   Introduction to BMDP

BMDP, a widely-used package of statistical programs developed by UCLA's Department of Biomathematics, is oriented toward the biological, medical, nutritional, agricultural and veterinary sciences. This is an introductory course on the use of BMDP on the Cyber and IBM systems. Topics covered: data preparation, elements of the BMDP language, running BMDP programs at terminals, data editing, creation and use of system files, and examples of using BMDP for descriptive statistics, regression and analysis of variance. Prerequisite: C71 or 171 or consent of instructor. Fee: $20.

April 8,10   7pm-9pm   [Mills]
Lab: April 13   8am-10am

X79.   Repeated Measures Analysis Using SPSS or SPSSX MANOVA

After a brief review of concepts and terminology useful for understanding SPSS documentation for MANOVA repeated measures analysis, examples are presented in a step-by-step fashion with emphasis on interpretation of MANOVA output. Guidance is provided on the choice of

contrasts for answering specific research questions and on the presentation and summarization of results. Prerequisite: I75 or I76 or equivalent knowledge of SPSS or SPSSX. Fee: $5. Two sections will be offered.

1. February 6   7pm-9pm   [Alster]

2. April 9   7pm-9pm   [Alster]

X81.   Using the SHAZAM Econometric Package

SHAZAM is an integrated package useful to econometricians, statisticians, engineers and others who use techniques common to econometrics. SHAZAM is relatively easy and inexpensive to use, and provides a great deal of flexibility in data formats. It has primary capabilities in regression analysis, simultaneous equation estimation, and principal components. Secondary capabilities are in factor analysis, analysis of variance, sorting and plotting variables. It also provides extensive data manipulation features and can generate various random probability distributions and a Divisia price index. This course covers how to run SHAZAM on the Cyber, CMS and OS/MVT systems, as well as interpretation of the output. Prerequisite: C11 or I21, or the equivalent. Fee: $20.

March 26,28   3pm-5pm   [Edwards-Iwe]

MANUALS

Access to the following manuals is strongly recommended for certain short courses. These documents may be purchased individually at the Illini Union Bookstore (Reference Section), 715 South Wright Street, or may be purchased as a set at the CSO Distribution Office, 1208 W. Springfield.

1. Introduction to the Cyber Systems, $2.00

2. A Tutorial Guide to the ICE Text Editor, $1.25

3. ICE Reference Manual, $3.25

4. RNF Documentation: Tutorial, Macros and Reference, $4.00 (NOTE: This manual is not included in the package; it must be purchased separately.)

5. An Index to Software on the Cyber, $3.25

6. Cyber Fortran Debugging, $1.25

TRAINING TAPES

CSO makes available to the user community nineteen training videotapes: three introducing the Cyber system, six on the fundamentals of using SAS (Statistical Analysis System), and ten on SAS color graphics (SAS/GRAPH). The tapes may be obtained at the Media Desk in the Undergraduate Library (upper level, in back). Show your University ID to the clerk on duty there and state the title of the videotape you wish to use. If a machine is available, you will be taken to a room containing the videotape equipment and shown how to operate it. If all machines are in use you can make a reservation for a later time.

complete the exercises, to take notes, and to use as a reference after the course is completed. The workbook may be purchased for $8.00 at the CSO Distribution Center, 1208 West Springfield, Urbana.

NOTE: The SAS videotapes are not available for loan.

The title of each of the videotapes is given below. Running time is about 45 to 60 minutes for each tape.

B101.   Introduction to SAS.

B102.   Getting Your Data Into a SAS Data Set.

B103.   Program Processing.

B104.   Working with SAS Data Sets.

B105.   Report Writing.

B106.   SAS procedures.

A Cyber terminal user may obtain more information about each via:

    TYPE,SASVID/AS/UN=COURSES.

The Media Desk also has the ten tapes in the SAS color graphics (SAS/GRAPH) series and a reference copy of the student workbook. For more details:

    TYPE,SASGRAF/AS/UN=COURSES.

Audio Cassettes

CSO makes available to the user community three sets of audio cassette tapes for the training of micro-computer users:

1.   How to Operate the IBM Personal Computer (on 3 cassettes)

2.   How to use MultiMate (3 cassettes)

3.   How to use Lotus 1-2-3 (4 cassettes)

These cassettes, with accompanying printed materials, may be borrowed for up to one week by contacting Ron Szoke, 333-8630.

MATHEMATICAL SERVICES

NEW VERSION OF SPICE WITH GAAS MESFET SUPPORT

As per a previous announcement in *OFF-LINE*, a new version of the SPICE circuit analysis package with support for modeling gallium arsenide MESFET's has been installed in GRAB on the Cyber systems. It can be accessed by the command

> *GRAB, SPICE.*

The on-line writeup for SP1CE has been updated (with the help of Eric Creviston) and can be obtained and printed by the Cyber commands

> *WRITEUP, SPICE.*
> *PRINT, SPCDOC/AS/CC/EJ/DEST = site.*

where *site* is some print site on campus.

The modifications for GaAs MESFET modeling were announced in the April 1984 issue of IEEE Transactions on Microwave Theory and Techniques by Stephen E. Sussman-Fort, Subramanian Narasimhan and Kartikeya Mayaram.

The Fortran codes were acquired through one of our users, Fred Fliegel, from Dr. Sussman-Fort, and incorporated into the current version of SPICE. Dr. Fliegel's assistant Eric Creviston helped in testing the modifications. Because the modifications are proprietary, however, they cannot be made available for examination without the permission of Dr. Sussman-Fort. The IEEE paper and associated references should be consulted for details on the GaAs MESFET model employed.

TRANSACTIONS ON MATHEMATICAL SOFTWARE

We now have on tape all algorithms published in Transactions on Mathematical Software up to September 1984 (from algorithm 493 published in the first issue of March 1975, up to algorithm 619). Algorithms from the December 1984 issue will be ordered when that issue arrives.

All TOMS algorithms are kept on a public tape; a document describing how to access this tape and summarizing the algorithms it contains can be obtained by entering the following Cyber commands:

> *WRITEUP, TOMS.*
> *PRINT, TOMSDOC/AS/CC/EJ.*

The algorithms published in the June 1984 and September 1984 issues are as follows :

In the June 1984 issue:

614: *A Fortran Subroutine for Numerical Integration in H-sub-p*, by K.Sikorski, F. Stenger, and J. Schwing.

615: *The Best Subset of Parameters in Least Absolute Value Regression*, by R. D. Armstrong, P. O. Beck, and M. T. Kung.

In the September 1984 issue:

616: *Fast Computation of the Hodges-Lehman Location Estimator*, by John F. Monahan.

617: *DAFNE - A DIfferential-Equations Algorithm for Nonlinear Equations*, by Filippo Aluffi-Pentini, Valerio Parisi, and Francesco Zirilli.

618: *Fortran Subroutines for Estimating Sparse Jacobian Matrices*, by Thomas J. Coleman, Burton S. Garbow, and Jorge J. More.

619: *Automatic Numerical Inversion of the Laplace Transform*, by Robert Piessens and Rudi Huysmans.

The following articles which appeared in the June and September issues may be of interest to some of our users:

In the June 1984 issue

Increasing Robustness in Global Adaptive Quadrature Through Interval Selection Heuristics, by Henry D. Shapiro.

Differentiation in Pascal-SC: Type GRADIENT, by L. B. Rall.

The Computation and Communication Complexity of a Parallel Banded System Solver, by D. H. Lawrie and A. H. Sameh.

In the September 1984 issue:

Squeezing the Most Out of an Algorithm in CRAY Fortran, by Jack J. Dongarra and Stanley C. Eisenstat.

An Acceptance-Complement Analogue of the Matrix-plus-Acceptance-Rejection Method for Generating Random Variables, by Richard A. Kronmal and Arthur V. Peterson.

Procedures for Optimization Problems with a Mixture of Bounds and General Linear Constraints, by Philip E. Gill, Walter Murray, Michael Saunders, Margaret Wright.

Multiprecision Integer Division Examples Using Arbitrary Radix, by Eric Regener.

If you are looking for software, Transactions on Mathematical Software is one of the journals to check, along with "Numerische Mathematik", "BIT", the "Computer Journal", and various publications of ACM (the Association for Computing Machinery) and SIAM (the Society for Industrial and Applied Mathematics).

We have in the systems consulting office at 1208 W. Springfield bound volumes containing all the algorithms published in Communications of the ACM from 1960 to 1975 (when the algorithms department of CACM became Transactions on Mathematical Software).

A great deal of the software supported on the Cyber systems is in the public domain and may be freely taken elsewhere. Some of the public domain software is listed in Math Note 1, which can be printed as follows:

GET, MNOTES/UN=MATHLIB.
MNOTES, 1.
PRINT, OUT/AS/CC/EJ.

PLOTTING SERVICES

HAVE YOU TRIED GLOSSY PLOTTER PAPER?

One of the paper options offered for the Zeta 1453 plotters is called glossy bond, or glossy. This paper has a smooth shiny surface, almost like a magazine cover. Nylon tip pens are used to draw on the glossy surface. Glossy paper comes in continuous rolls 11 inches wide, similar to standard plotter forms, but without perforations.

The quality of the plot output on glossy paper is excellent, comparable to liquid ink on regular paper. While regular paper is a bit off-white in color, glossy bond is very white, providing high contrast graphs which will photograph very well. All four standard ink colors may be used (black, blue, green, and red).

When using the nylon tip pens, you do not have the wide range of pen tip sizes that you would with liquid ink, and the width of the nylon tip may wear and thus, vary slightly from one plot to the next. The nylon tip pens will usually produce a line similar to a liquid ink pen size of 1 to 2 (0.5 mm to 0.6 mm).

Glossy paper is a special option available only on the SPECIAL plotter (located in 123 DCL). Like all special plots, the plot must be paid for with a personal check, university account number, or hard money PS number. To use glossy paper from either Cyber, use the command:

PLOT, TAPE99/FORMS=GLOSSY/P1=NYLON/PAY=option.

You may need to specify other options if you require additional time, length, or more than one pen. From the IBM, using CMS, you may use

NPLOT fn ft fm (FORMS GLOSSY P1 NYLON PAY option

plus any other desired options.

You may stop by and see samples of glossy paper output in the Systems Consulting Office (1208 W. Springfield), the Statistical Consulting Office (65 Commerce West), or the user help desk in 123 DCL.

PLOT ON ACETATE FOR OVERHEAD
PROJECTOR TRANSPARENCIES

Rolls of clear acetate film are available as a plotter forms option. A plot drawn on acetate film can be used as a transparency for use with overhead projectors. Nylon tip pens are used to draw on the acetate surface, for a non-beading, non-smearing image. The acetate comes in continuous rolls 11 inches wide, with no perforations.

The use of special forms options and nylon pens is described in the preceding article on Glossy plotter paper. The Cyber plot option /FORMS=ACETATE (or IBM option FORMS ACETATE) should be specified. Sample acetate output is available along with glossy samples at either of the consulting offices, or the user help desk in 123 DCL.

MISCELLANEOUS

MSCC STATISTICAL HELP

The Mathematical and Statistical Consulting Committee (MSCC) provides assistance to members of the University Community, government, and private industry on statistical problems in their research work. Aide is available in designing experiments, constructing surveys, analyzing data, extending theoretical research, and utilizing computers in statistics. The 1984-85 director of the MSCC is Professor Robert Bohrer who is assisted by graduate statistics students Matt Butcher, Laurie Hansen, Leonardo Auslander, Tom Bicek, Robert Nagel, and Bruce Richardson.

Up to two hours of consulting is provided free of charge to members of the University community. Problems that require a considerable amount of consulting time and effort are welcome, but faculty members anticipating the need of substantial statistical help (for themselves or their students) are urged to try to obtain funding for this purpose. Free assistance in the preparation of statistical sections of research proposals is available from the MSCC.

To use the service or to set up an appointment to see a consultant, call 333-2167, or stop by the MSCC office in 221 Altgeld Hall. The MSCC hours for the 1984-85 academic year are 9:00 to 12:00, and 1:00 to 5:00, Monday through Friday.

Services Offered by the MSCC

*** Seminars or workshops concerning various statistical topics are now being offered to interested departments, survey teams and research groups; if you are interested in arranging a seminar or workshop, please call the MSCC office.

*** Spring semester's consulting class (STAT 368), taught by Professor John Marden, will offer consulting assistance at reduced rates. If you are interested in participating in this program contact the office.

*** Statistical package programming, and Fortran programming relevant to statistical work can be arranged through the MSCC.

***   Non-statistical problems in pure and applied mathematics can be referred to expert consultants by the MSCC.

***   Note that there is a nominal fee for some of these services.

SALES - HELP WANTED

TERMINAL PAPER FOR SALE

Nine 8½" x 300' rolls of Texas Instrument's thermo-sensitive terminal paper for sale (either cash or interdepartmental transfer accepted) at 25% off from the original price of $74.62 per 12 rolls. Sale price: $4.65 per roll. Call Maurice Tatsuoka at 333-8250 or Mary Parker at 333-2245.

COMPUTER SYSTEMS SPECIALIST

JOB DESCRIPTION

TITLE: Computer Systems Specialist (one-half time)

EDUCATIONAL BACKGROUND: B.S. degree in Computer Science, and taking courses for M. S. or Ph. D. in Computer Science at the University of Illinois.

EXPERIENCE NEEDED: Working knowledge of PDP-11 Computer hardware, DEC operating systems (preferably RSX or RT-11), and PDP-11 Assembler language. Proficiency in programming in FORTRAN and BASIC. Experience in use of CYBER 174 or 175 computers and ICE editor. Knowledge of RS-232 communication standard. Good communication skills (written and oral). Helpful to have hardware experience with A-D and D-A convertors.

DUTIES AND RESPONSIBILITIES:
1.   Perform system administrator's duties on a PDP-11/23 computer system. Manage and operate the computer system.
2.   Manage and operate RS-232 local area network through a MICOM port selector. Develop and document software for communications between microprocessors, minicomputers, and campus mainframe computers via Sytek LocalNet.
3.   Assist with projects requiring data acquisition and transfer to departmental or campus computers.
4.   Diagnose and perform preliminary maintenance on malfunctioning computer equipment.
5.   Organize and present short classes to departmental students, faculty and staff on use of new equipment and software.
6.   Communicate with and assist students and faculty with development of software for specific research projects.
7.   Provide information for planning and future hardware and software purchases.

General supervision would be provided by a designated Agricultural Engineering Staff member. The specialist would also serve as a member of the departmental Computational Equipment and Procedure Committee.

SALARY: One-half time assistantship and waiver of tuition and fees.

CONTACT:
Dr. J. Kent Mitchell
332-P Agricultural Engineering Sciences Building
333-4913

or

Dr. Roger R. Yoerger, Head
338 Agricultural Engineering Sciences Building
333-3570

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Off-Line

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IBM SYSTEMS

MAHEMATICAL SERVICES

HELP WANTED

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Social Science		202 Lincoln Hall	333-0309

CSO operates a CDC Cyber 175 with 262K words of central memory and a CDC Cyber 174 with 196K words of central memory. The 175 and 174 run under the NOS Operating System and share 512K words of ECS. The 175 serves over 200 simultaneously active text and graphics terminals and the 174 serves over 100 simultaneously active terminals. CSO also operates an IBM 4341 Model M2 with 8 million bytes of memory running HASP-OS/MVT under VM and an IBM 4341 Model L10 with 4 million bytes of memory running VM. In addition, CSO operates a DEC VAX 11/780 with 4 million bytes of memory, running under the UNIX Operating System and driving a GSI CAT-8 phototypesetter.

Operating Hours (see HEARYE,SCHEDUL for exceptions):

	CYBERS 174/175	IBM
M-F	8 am - 6 am	8 am - 6 am
SAT	8 am - Midnight	8 am - 6 am
SUN	Noon - 6 am	Noon - 6 am

IBM SYSTEMS

IBM CSMP TARGETTED FOR REMOVAL

Stan Kerr

As per an announcement in the October issue of *OFF-LINE*, the IBM CSMP package has been "hidden" on the IBM system, pending its final removal at the end of the Spring semester. Users trying to access it using the EXEC CSMP or EXEC CSMP3 procedures will now get the error message

    PROCEDURE NOT FOUND

(Also, any Fetch designation in the job is ignored; the job is printed at DCL.) If you still need to use CSMP while converting to ACSL or some other package, please call Stan Kerr (179 DCL, phone 333-4715).

ADDLIB EXEC FOR CMS

Stan Kerr

An exec called ADDLIB has been created on CMS to ease management of library search lists. Currently, if you have a subroutine library which you wish searched during a load process, you must issue a GLOBAL TXTLIB command stating the complete list of libraries to be searched (not just the one you want); this means typing in (for Fortran programs) the list of Fortran system libraries as well. With the ADDLIB exec -- which is on disk USEFUL containing many other public utilities -- you can add to or subtract from the GLOBAL TXTLIB (or the GLOBAL LOADLIB, DOSLIB, and MACLIB) by a command such as

    ADDLIB IMSL MYLIB

or

    ADDLIB -IMSL

The first ADDLIB above adds IMSL and MYLIB to the current GLOBAL TXTLIB; the second subtracts IMSL from the GLOBAL TXTLIB.

Entering simply

    ADDLIB

causes the current GLOBAL TXTLIB to be displayed on your terminal. (The global list can be stacked for program access by entering ADDLIB (STACK LIFO or ADDLIB (STACK FIFO.)

There are several special options available with ADDLIB; these must follow a left parenthesis when the command is given. For instance,

    ADDLIB (CLEAR

causes the GLOBAL TXTLIB to be cleared, and

ADDLIB MYLIB (MACLIB

causes MYLIB to be added to the GLOBAL MACLIB rather than the GLOBAL TXTLIB. The options MACLIB, DOSLIB and LOADLIB can be used to direct the action of ADDLIB to the GLOBAL MACLIB, GLOBAL DOSLIB or GLOBAL LOADLIB list.)

If ADDLIB is called from another exec, the option NOTERM can be used to suppress display of terminal messages, e.g.

ADDLIB IMSL (NOTERM

A help file is available describing ADDLIB in more detail, via the command

HELP CSO ADDLIB

NEW CMS COMMAND -- LINKTO

Stan Kerr

CSO is introducing a new CMS command, LINKTO, to make access to certain programs and systems on CMS simpler and more easily maintainable. Called LINKTO, this command is usually used as in the following simple examples:

1. LINKTO IMSL

    This command links the minidisk containing the IMSL library and adds the library to the GLOBAL TXTLIB so it will be searched when you run a program.

2. LINKTO IMSL OFF
    LINKTO IMSL (OFF

    Either of the above commands delinks the minidisk containing IMSL and removes IMSL from the list of libraries to search when you run programs.

3. LINKTO SAS

    This command does what the LINKSAS command does now. LINKSAS will eventually (but not immediately) be phased out.

In general, LINKTO is called like this:

LINKTO product_name product_options (LINKTO_options

OFF (as above) is an example of both a ***product_option*** and a ***LINKTO_option***. Product options are options pertaining to the particular product being accessed, and LINKTO options are options which can be used with all products.

A help file is available on CMS via the command

    HELP CSO LINKTO

Three important LINKTO options are CURRENT, PAST, and FUTURE. These tell LINKTO which version of a product is to be linked. If none of them is present, LINKTO assumes you are referring to the CURRENT version of the product.

Some of the other LINKTO options currently available are:

1. LINKTO (LIST CURRENT
    LINKTO

    Either of the above commands causes LINKTO to display a list of the products available under CURRENT. CURRENT above may be replaced by PAST or FUTURE. Each product name is listed with a short description and a list of the nodes of our IBM system on which it is available (UIUCVMD, UIUCVME, UIUCVMC, or UIUCVMB).

2. LINKTO (LISTALL

    This causes LINKTO to display a list of all the available products, whether PAST, CURRENT or FUTURE.

3. LINKTO IMSL (NOTERM

    The NOTERM option tells LINKTO not to display any messages on the terminal when the link is done. This is useful if LINKTO must be called within an exec.

Many products which hitherto have been accessed by entering particular LINK and ACCESS commands can now be accessed by LINKTO. With the advent of LINKTO, we now have more control over the virtual addresses where products reside; the particular LINK commands used up to now will not be guaranteed to work indefinitely, so execs of your own which have hard-coded LINKs to various product disks should be converted to use LINKTO.

MAHEMATICAL SERVICES

VERSION 2.3 OF SLAM II

Stan Kerr

Version 2.3 of the SLAM II simulation package has been received and installed in FUTURE on the Cyber systems. It is scheduled to become the default version of SLAM in April. Until that time, the new version can be accessed by the command

    GRAB, SLAM/F.

Following is a description of the new features of SLAM II 2.3.

Output Reports

There is a change in the Echo Report in the section reporting general options. The option to be warned of destroyed entities is reported as "NO" unless the IXQT field of the GEN statement has been entered as "Y/Y". An entity may be destroyed in a SLAM II model if there is no branch available from a node or if it arrives to a full queue where blocking or balking has not been specified. It is a good idea to select this warning option until a model is debugged.

A warning message has also been included in the event that a resource capacity is altered below zero. SLAM II will "fix up" the alteration so that the capacity becomes zero and will now report this action.

New Network Variables

Two new variables are now recognized in network statements, NRUSE and STOPA. NRUSE(RLBL), where RLBL is the name of a resource, provides the number of units of RLBL currently in use. The current capacity of the resource RLBL, then, is the sum of NNRSC(RLBL) and NRUSE(RLBL).

The variable STOPA may be used in an ASSIGN statement to effect the end of an activity with a STOPA duration. The network statement "ASSIGN, STOPA = 3;" has the same effect as the Fortran statement "CALL STOPA(3)".

Queueing

When variable file numbers were made available in SLAM II, Version 2.0, the ability to share a variable file number among AWAIT nodes was not provided. For example, if the statements "AWAIT(ATRIB(1) = 1,3)" and "AWAIT(ATRIB(2) = 3,4)" were included in a model, file 3 would only be valid for the second AWAIT node. This restriction has been lifted and the ability to share file numbers among AWAIT nodes has been fully restored.

Zero-capacity QUEUE nodes have now been implemented. An arrival to a zero-capacity QUEUE node may proceed to an available service activity, block the preceding service activity, or balk. A QUEUE node which precedes a MATCH node or a SELECT node with the AMS selection rule must have a positive capacity.

Random Sampling Parameters

In earlier version of SLAM II, constant and variable parameters could not be mixed when taking random samples. For example, "ACT,RNORM(XX(2),0.1);" was an illegal expression. This restriction has now been lifted.

Time-persistent Histograms

An additional output option available in Version 2.3 is the time- persistent histogram. A histogram is requested by including a cell specification on a TIMST statement in the same format used on a COLCT. For example, the statement "TIMST,NNQ(1))Q1 LENGTH, 6/0/1;" would result in a histogram of 8 cells, showing the percent of time the queue was of length 0, 1, 2, 3, 4, 5, 6, and 7 or above. Time-persistent histograms may be prepared for any of the XX, SS, DD, NNQ, NNCNT, NNRSC, or NRUSE variables.

Selective Statistics Clearing

Previous versions of SLAM II allowed statistics defined by STAT statements to be selectively cleared, with an all-or-nothing option for clearing statistics at COLCT nodes. Since the modeler has control over the statistics index assigned at COLCT nodes, the selective clearing option has been extended to all statistics based on observations. The JJCLR field of the INITIALIZE statement has the form "JJCLR/NCCLR", where the optional NCCLR field defines the first statistics index for which JJCLR does not apply. For example, "INIT,0,480,Y/3;" specifies that after each run the first and second set of statistics based on observations should be cleared. These statistics may have been requested by STAT or COLCT statements, or both.

Recall that COLCT node statistics are numbered beginning with one greater than the largest STAT index used before the network definition. This default numbering may be overridden by including the index in parentheses, as in COLCT(2),... This allows a given set of statistics to be collected at more than one network location, by using the same index at more than one node.

New Statistical Algorithms

A standard algorithm for computing the mean and variance of simulation statistics involves maintaining the sum of observed value and the sum of the squares of the values (weighted by time for time-persistent statistics). In long-running simulations these sums can become quite large, exceeding the ability of some computers to maintain them accurately. More accurate algorithms have been included in SLAM II Version 2.3, based on the work of Chan and Lewis and of West (see "Communications of the ACM", September 1979, pp.526-535).

These modifications should be transparent to the modeler, unless statistical values are accessed directly from SLAM II common storage. In this case, the modeler should be aware that the current mean is maintained where summed values used to be stored, and the variance is maintained where the sum of squares used to be stored.

New Support Programs

The following new subprograms are now available for use in combined modeling.

Subprogram	Purpose
FUNCTION NRUSE(IR)	Returns the number of units of resource type IR currently in use. IR must be a positive integer.
SUBROUTINE TRACE	Turns on the SLAM II trace. Used instead of the MONTR,TRACE statement when the time to start tracing is unknown at the beginning of a run.
SUBROUTINE UNTRA	Turns off the SLAM II trace.
SUBROUTINE PRNTB(ISTAT)	If ISTAT>0, prints the time-persistent histogram for variable type ISTAT. If ISTAT<0, prints all time-persistent histograms.

SLAM II in Fortran/77

With Version 2.3 of SLAM II, Pritsker & Associates has made available a Fortran/77 version of the program. This is version CSO is installing. The modifications required for the Fortran/77 standard are as follows:

Hollerith variables are replaced with CHARACTER type variables. This required a redefinition of several common blocks to prevent the mingling of CHARACTER and numeric data in a COMMON block. The following COMMON blocks have been split: GCOM4 becomes CCOM4 and GCOM4, GCOM5 becomes CCOM5 and GCOM5, GCOM7 becomes CCOM7 and GCOM7, GCOM8 becomes CCOM8 and GCOM8, and XCOM5 becomes XCCM5 and XCOM5.

FUNCTION NNTBL is now a CHARACTER function. Any subprogram invoking this function must contain the statement

        CHARACTER NNTBL*4

The scratch file used in input decoding, usually unit 7, has been replaced with an internal file. TAPE7, therefore, need not be declared.

The variables controlling maximum array sizes are assigned values in a PARAMETER statement, which is included in each subprogram. This will facilitate making larger versions of SLAM, if that should be necessary.

SPURT PACKAGE TO BE REMOVED FROM GRAB

Stan Kerr

The SPURT simulation package, which we acquired from Northwestern University when we installed the Cyber 175, has received very little use. Since there are other simulation packages (e.g., SLAM) which do much more than SPURT, there seems little reason to retain it. SPURT will be removed from GRAB at the end of the Spring semester, and perhaps put in a suitable place for unsupported software.

HELP WANTED

PROGRAMMER WANTED

Desired: Full time programmer. Knowledge of DEC VAX 750 and UNIX and VMS computer systems is desirable but not required. Will be using the above system along with the CSO's Cyber 175 and IBM 4341s, and an IBM PC-AT. The work on the IBM PC-AT system will involve the use of the high level relational data base management system dBASE III to build and maintain several types of water resources data bases. The job will require knowledge or the desire to learn to use the above computers since the programming projects will vary from one computer system to another and sometimes involve more than one system.

Please contact: Bob Sinclair, Illinois State Waer Survey, 51 Water Resources Building, telephone: 333-4952.

HALF-TIME RESEARCH ASSISTANT NEEDED

The Computing Services Office has an opening for a half-time research assistant to work in the Statistical Services area. The duties are to provide consulting assistance in the use of statistical software. The applicant must have at least a Bachelor's degree and some training in applied statistics, good communication skills, and a working knowledge of the SAS and SPSS statistical packages. Starting date: As soon as possible. Salary: Negotiable. In order to ensure full consideration, applications must be received by February 15, 1985.

Please contact: Beth Richardson, 189 DCL, telephone: 333-6276.

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University of Illinois at Urbana-Champaign   VOL. 13, NO. 3 March 1985

CSO DIRECTORY - STAFF AND SERVICES

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Text Processing Consulting		118	DCL	333-7318
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Tape Service Information		123	DCL	333-8640

Dial-up Numbers	CYBER 175 (NOSA)	300	baud	333-4000
	CYBER 174 (NOSB)	300	baud	333-4004
	IBM 4341 L10 (VME)	300	baud	333-4005
	IBM 4341 M2 (VMD)	300	baud	333-4006
	Switch	1200	baud	333-4008
	TELENET (local no.)			384-6428

Asst Dir User Services	Robert Penka	173	DCL	333-4709
Asst Dir Systems and Operations	Sandra Moy	177	DCL	333-4703
Asst Dir Development	J. M. Randal	1207	W.Springfield	333-9772
Asst Dir Networking	Sue Greenberg	187	DCL	333-3723
Manager Accounting Services	Gary Bouck	1208	W Springfield	333-7752
Manager Statistical Services	Beth Richardson	189	DCL	333-6276
Microcomputer Laboratory	Jack Knott	86	Comm West	333-6562
User Training (Short Courses, Videotapes)	Ron Szoke	131D	DCL	333-8630
Documentation	Lynn Bilger	120	DCL	333-6236
CYBER-IBM Operations	Myra Williams	194a	DCL	333-7685
	Ann Ryczer			
	Rex Duzan			
VAX Operations	Debbie Hudson	1207	W Springfield	333-8150
Laboratory Support Project	Mike Gardner	1207	W Springfield	333-7904
Site Operations	Sylvia Hansen	65	ME	333-6285
	Chuck Harnsberger			

CSO Sites (see Reference Guide RF-0.3 for operating hours)

Agriculture	N-120	Turner Hall	333-8170
Chemistry	153	Noyes Lab	333-1728
Commerce West	70	Comm West	333-4500
CRH Snack Bar	120	Snack Bar	333-1851
DCL Routing Room	14	DCL	333-6203
Electrical Engineering	146	EEB	333-4936
Florida Ave Res Hall		FAR	333-2695
Illinois St Res Hall		ISR	333-0307
Mechanical Engineering	65	MEB	333-1430
Psychology	453	Psych Bldg.	333-7815
Social Science	202	Lincoln Hall	333-0309

CSO operates a CDC Cyber 175 with 262K words of central memory and a CDC Cyber 174 with 196K words of central memory. The 175 and 174 run under the NOS Operating System and share 512K words of ECS. The 175 serves over 200 simultaneously active text and graphics terminals and the 174 serves over 100 simultaneously active terminals. CSO also operates an IBM 4341 Model M2 with 8 million bytes of memory running HASP-OS/MVT under VM and an IBM 4341 Model L10 with 4 million bytes of memory running VM. In addition, CSO operates a DEC VAX 11/780 with 4 million bytes of memory, running under the UNIX Operating System and driving a GSI CAT-8 phototypesetter.

Operating Hours (see HEARYE,SCHEDUL for exceptions):

	CYBERS 174/175	IBM
M-F	8 am - 6 am	8 am - 6 am
SAT	8 am - Midnight	8 am - 6 am
SUN	Noon - 6 am	Noon - 6 am

Manuals

Introduction to Graphics on the Cyber System (new -- free)	January 1985
CSO Utilities Manual (revised -- free)	December 1984
SOUPAC Statistical Package Program Descriptions (new -- $7.00)	1985

FEATURE ARTICLES

WHY BACK UP YOUR DATA?

This article has been reprinted (with some modifications) from the *Computing Center Newsletter*, Volume 18, Number 1, University of New Mexico. The article was written by Jim Pittman.

Many people who use the computing center's Cyber facilities seldom or never worry about backing up their data. When you log on to one of the computer systems at CSO, you can look at a list of files in your directory, get a file, edit it as needed, and save it. The next time you log on the system you confidently expect to find all your files in your directory, in exactly the condition you left them the last time you looked at them.

Occasionally you may purge a file and then realize that you really didn't mean to do that. Now what? If the file was short or not very important, you may retype it, or just forget about it and go on to other work. If it was important or lengthy, you will probably want the computing center to restore the file from backup so you won't have to spend time re-entering the information. To restore files from the computer center's backup tapes, you must see the consultants. The process usually will take overnight, but can be worth it because of the time and effort it will save you. Meanwhile, you promise yourself to be more careful when you purge files in the future.

What is this backup business anyway? You never though about it before, but now it has saved you a lot of work. Well, you should realize that when you "save" a file, it is recorded somewhere, and when you "purge" the file, it is erased. Where is it recorded? Is it still recorded somewhere even after being purged?

Saving a file means that all the information in the file is recorded on a "disk," a high-speed, high-capacity magnetic storage device that is part of the computer system. When you log on the computer and "get" a file, the computer copies the file's data from the disk into your temporary "workspace" for you to read or edit. If you "replace" the file after editing it, a new copy of the data overwrites (replaces) the copy that was on the disk.

The hundreds of thousands of files on our disk system are a vital resource to users of the computing center's facilities. In order to protect against the possibility of any accidental loss or corruption of the data in these files, all of the disks are routinely "backed up" at various intervals. That is, some or all of the data on the disks is written onto magnetic tape. In an ordinary backup procedure, only files that have been modified since the most recent backup will be saved to tape, but more expensive backups, such as are done weekly, record the entire contents of the disk system to tape (see Reference Guide RF-0.6 Disk Policy for complete details).

If anything happens to one or more files on one of the disks, it is easy to read information from the tape back into the disk system. Of course, the files on tape may be several days old, depending on the computing center's backup schedule, so the most recent work you have done may not in fact be retrievable.

Why not save your data on tape in the first place? You can, and many users do use tape storage for part of their data. But there are at least three reasons why you might not want to do this. First, extra expense and effort are needed to record you files to tape, purge the files from disk, and later get them back from tape. Second, it is quite time-consuming to retrieve data from tape. Perhaps we are spoiled by disk technology, but we usually want to log on and view any of our files right now. We don't want to wait for a tape to be located, loaded on a tape drive, wound to the right segment of the tape, and finally read onto disk where we can access it.

The third reason, of course, is that by experience we have found that our files are pretty safe on the computing center's disk system and we are confident nothing is likely to go wrong.

Another meaning of the term "backup" can be applied to your own work habits. Let's say you are going to edit a file. You can get it, edit it, and replace it, all under the same filename. But what happens if the computer goes down? Or if your phone line develops a case of snap, crackle, pop? Or you have just done a "replace" when you remember there was a paragraph on the original version of the file that you wish you had kept. Maybe you can plan ahead and make a copy of the file to edit, keeping the original intact. Of course, when you have finished, you need to purge all the old files that are no longer useful, or you'll be charged for keeping them on the system. You have to balance the cost of keeping lots of files online (or the irritation of having your directory quota or limits fill up) against the convenience of having all that "backup" information available.

Is this all you need to know about backups? Maybe not. Do you have a microcomputer in your office, or do you plan to get one? If so, who is responsible for backing up the data you use when you work with the microcomputer? Right, you are. Unless you have an arrangement with the person next door, the only person who will be making copies of your files at regular intervals and keeping them safe from harm is you.

Many people these days are enthusiastic about obtaining microcomputers and using them for all sorts of chores. Most of these computers use "floppy diskettes," which are miniature (and slow) versions of the disk systems on large computers. Typically your program will be recorded on one diskette which you will load into "Drive A" and you will save your data to an empty diskette you load into "Drive B." The data diskette can be removed and stored until the next time you need it. So far, so good. You know what you have recorded on the diskette and you can store it in a safe place. But you should realize that as storage media, floppy diskettes are not particularly robust. A great many things can go wrong with them. Sooner or later, something will. Your task is to be prepared for that event. How to be prepared? By making "backup" copies of your diskettes.

Remember the stereo fanatic in college who wouldn't let anybody touch his records, who was always cleaning the record player stylus, who removed records from their plastic sleeves as if he were about to perform a brain surgery operation? Well, if you always treated your floppy diskettes the way this fellow handled his records, your diskettes would live longer, happier lives and you'd have a lot less need to worry about backups. But it's hard for most of us to be that careful. We take a diskette out of the drive and toss it on the desk with the paper clips and pencil eraser debris. We pick it up by the wrong side and maybe one day we'll grab the exposed magnetic surface through the slot and leave a glob of cheeze frito grease. Goodbye, diskette. Goodbye, data.

Let's be good scouts and be prepared. Make a copy of every important diskette you have. Every time you update your data, take the time to save the file to the backup diskette as well as to the working copy. Sure, it takes time. But ask yourself how much time it would take to reproduce all the information on the diskette if something happened to it.

What about commercial program diskettes that are copy-protected? There are basically three (legal) ways to deal with copy-protected software. One is not to buy it in the first place. But with so many popular and useful programs available only as copy-protected commercial packages, this is not a realistic attitude.

A second approach is to be sure the package includes at least two program diskettes (that is, a master and a backup) and to be sure that you can obtain replacement copies from your dealer or from the publisher at reasonable cost and in a reasonable amount of time.

The third approach is to imitate our friend from college and use the utmost care in handling the program diskettes. With care and luck you may be able to use the program for years without failure.

Remember that these are well-established procedures, a whole crew of people, and a room full of expensive machines at the computing center, all dedicated to keeping your data intact and instantly available to you. In your office, with your own microcomputer, it's all up to you.

HELP WANTED & SALES

SYSTEMS AND SCIENTIFIC APPLICATIONS PROGRAMMER

The Illinois Natural History Survey will have an opening in April for a part-time programmer to work with one or more minicomputer systems. The position will probably be supported for several years and will provide experience in taking charge of a multi-user operating system, software for control of new peripheral hardware, and graphics and numerical applications programming.

Apply by sending a brief resume to:

George McKee   or   George McKee
Section of Wildlife Research   Illinois Natural History Survey
172 Natural Resources Bldg.   607 E. Peabody
CAMPUS MAIL   Champaign, IL 61820

LEAR SIEGLER VIDEO DISPLAY TERMINALS
FOR SALE

The department of Plant Biology presently has two video terminals available for sale by interdepartmental transfer. The first is a Lear Siegler ADM 11 general purpose ergonomic conversational terminal, configuration number A1A10110020. The unit has a separate, low profile keyboard, a tilt/swivel monochrome green monitor, and is ideally suited for use as a dumb terminal with mainframe computers. This terminal is less than one year old, is in excellent condition, and was originally purchased for use with an EPSON LQ-1500 printer. Owing to incompatibility, the system has not been utilized as expected.

The second unit is a Lear Siegler ADM 5 Dumb Terminal with RETRO-GRAPHICS (Digital Engineering Model RG 1000/LS 60) enhancement. This system is two years old and is in excellent working condition.

The first terminal was originally purchased for $510.00, the second, including the RETRO-GRAPHICS card, for $1249.00. We are seeking parties interested in departmental transfer at or below these prices. For more information contact Dr. Daniel Nickrent, Department of Plant Biology at 333-1519.

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Secretaries	Joyce McCabe	150 DCL	333-1637
	Barbara Sweet	150 DCL	333-1637

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	IBM 4341 L10 (VME)	300 baud	333-4005
	IBM 4341 M2 (VMD)	300 baud	333-4006
	Switch	1200 baud	333-4008
	TELENET (local no.)		384-6428

Personal Computers/EXCEL	Robert Penka	173 DCL	333-4709
Supercomputer Activities	Sandra Moy	177 DCL	333-4703
Development	J. M. Randal	1207 W.Springfield	333-9772
Networking	Sue Greenberg	187 DCL	333-3723
Maintenance	Larry Crotser	169 DCL	333-5190
Consulting	Stan Kerr	179 DCL	333-4715
Statistical Services	Beth Richardson	189 DCL	333-6276
Accounting Services	Gary Bouck	1208 W Springfield	333-7752
Microcomputer Laboratory	Jack Knott	86 Comm West	333-6562
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Site Operations	Sylvia Hansen	65 ME	333-6285
	Chuck Harnsberger		

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Operating Hours (see HEARYE,SCHEDUL for exceptions):

	CYBERS 174/175	IBM
M-F	8 am - 6 am	8 am - 6 am
SAT	8 am - Midnight	8 am - 6 am
SUN	Noon - 6 am	Noon - 6 am

FROM THE DIRECTOR'S OFFICE

There has been an enormous amount of activity in the computing area during the past few months. In this issue of *OFF-LINE* we will attempt to bring people up-to-date on a number of these activities, along with their effects on CSO's organization and services. Separate articles will discuss three major areas: the revised organization of CSO, the various supercomputing activities, and the progress that CSO is making on plans for campus services for the fall of 1985. The three areas are closely intertwined.

REVISED ORGANIZATION OF CSO

As will be seen in the two following articles, CSO is deeply involved in the new supercomputer activities, as well as in the campus computing scene in general. We would like to take this opportunity to describe how the organization is changing and the new roles being played by a number of key people on our staff.

Computing activities on the campus are being subjected to all of the pressures of the technological revolution; in particular, pressures that evolve from the constantly increasing number of people involved with computing and the number of options available to meet their needs. We view one of our primary missions as helping the University to take advantage of changes while presenting a minimum amount of stress to our faculty and student users. We expect computing to evolve into a very comprehensive and complex environment, ranging from supercomputers at one end to personal workstations at the other. We expect the increasing availability of interesting software to be an opportunity as well as a major challenge to users. We view networking, the tying together of diverse systems, as being a fundamental requirement of the future. Finally, we believe that the availability of a talented staff, sufficient to support these changes, is the most important single ingredient in the transition.

Two of the major forces with which we are confronted are the increasing availability of personal workstations and the networking requirements that they almost immediately present.

Personal computers, ranging from a simple keyboard and small memory device through advanced workstations costing several hundred thousand dollars apiece, are coming onto the campus at a rapid rate. Something in excess of a thousand units per year are being purchased by the University, while many other units are being donated through grants such as the IBM project EXCEL.. In addition, the number of personally-owned systems is increasing at a similar rate. Since these devices are the primary contact with computing for a very large part of the population, we have created a new division within CSO that will be responsible for their support. Robert Penka, who has served as Assistant Director for User Services, is heading up this new division and will be putting together a plan for user support, the acquisition of software and equipment, short courses, and other services. In addition, we will be making available on-campus maintenance contract programs, beginning with the IBM PC family. Details on this program should be available in about a month. Two areas of particular interest to persons in this group will be additional grant programs for acquiring large amounts of equipment and our attempt to get campus-wide software licenses for commonly desired software.

Although the personal computer or workstation has a great deal of interest as a stand-alone device, it also presents a need for interconnection to various other services. In addition, the proliferation of departmental or project machines, such as the VAX, requires communication services and other types of network services be used effectively. The need for good network facilities has increased dramatically with the advent of the supercomputer and the mass storage system that is being attached to the network. The networking group, under the direction of Sue Greenberg, is being substantially expanded and is beginning to take on responsibilities for network services, as well as the network itself.

The basic CSO services provided by the Cybers, IBM systems and the UNIX systems are a third major part of the CSO organization. Since we plan to make some major additions to campus computing, this is a particularly important area at the present time. We will be seeking a new assistant director to take responsibility for this area in the very near future. While we are going through this transition period, we have made some temporary assignments. Most noticeable of these is the appointment of Stan Kerr as head of the consulting services, since Robert Penka has moved into the personal computer area.

As will become clearer in the discussion of the supercomputer activity, CSO will have two major areas of responsibility. We will be serving as facilities manager for the supercomputer, as well as having responsibility for academic computing for the campus at large. In order to have these two areas well represented, we will have two associate directors, one for each area. Sandra Moy will be responsible for our participation in the supercomputer program, although major portions of activity, such as networking and workstation support, will be mixed in with the campus activities under Sue Greenberg and Robert Penka.

On the campus side, we will be conducting a search for a permanent associate director; in the interim Mike Randal will deal with campus computing. The major responsibility here will be in dealing with the planning for this fall, as well as developing new plans for campus computing support.

The two positions described for campus computing can be roughly divided as follows: an associate director responsible for overall planning and guidance and an assistant director responsible for the day-to-day management of ongoing services.

Finally, we should point out that new changes in organization and new opportunities do not automatically generate greater resources. While the supercomputer activity and project EXCEL are bringing many new people into our activities, the general moves toward networking and personal computer support have not yet resulted in an increase in our available staff. In order to support these activities, which we feel are absolutely critical to the future, we will be forced to borrow support from other activities; thus, you may not find quite the same level of attention to some things that we have provided in the past.

SUPERCOMPUTER ACTIVITIES

Large-scale computing has been a part of the heritage of the Urbana-Champaign campus for as long as there have been computers. The University entered the field with the construction of the ILLIAC I. Since that time we have been a major force, particularly up through the construction of ILLIAC IV in the early 1970s. Arthur C. Clark in 2001 identified Urbana as the birthplace of Hal, and other popular writings cite Illinois' significance in the field.

This tradition is being continued with the initiation of two new centers. The first to be started was the Center for Supercomputing Research and Development under the directorship of Professor David Kuck. The second, which is only now getting underway, is the National Center for Supercomputer Applications, under the directorship of Professor Larry Smarr. In this article, we will try to clarify the objectives of the two centers and outline some facets of the Applications Center that should be of interest to the campus computing community.

The Research and Development Center continues the tradition of designing, building and studying large-scale computers. Supercomputers have been characterized as the largest and fastest machines that are technically possible to build at any time. Today, however, instead of just trying to design bigger single machines, more emphasis is being placed on organizing commercially available components into more interesting computer architectures. There is also an increased emphasis on the software and algorithms necessary to exploit these more complex machines. In particular, the emphasis in modern

supercomputers is on multiple parallel processors and even multiple semi-independent processors. The Research and Development Center will be working in these areas; designing and building machines, and developing software and algorithms.

The Applications Center has quite a different mission. This group will attempt to take the best that the industry has to offer in the way of commercially available supercomputers, networking, and workstations and to create an environment that is highly productive for scientists and engineers. These scientists and engineers will be conducting research in all areas of application.

The Applications Center arose after a long period during which American universities did not have the best available computers. A number of national committees studied this problem and made recommendations for a national program to correct the problem. Only after a few scientists began to initiate specific proposals and to carry the case to Congress and the funding agencies did action really begin.

The University of Illinois was the first and most aggressive at promoting this program. We submitted a proposal in draft form almost two years ago and the official proposal in November of 1983. At that time, neither the National Science Foundation nor any other government agency had a program to which this proposal was responsive. However, because of our proposal and other developing proposals, NSF created a review process and a new office of Advanced Scientific Computing. Congress appropriated new funds in the FY85 budget to allow NSF to support several new centers.

Part of that appropriation process was the requirement for a national competition before making awards of new centers. While this represented a delay in the approval process for the Illinois proposal, it had the enormous benefit of institutionalizing supercomputing within the NSF programs. In late February the competition came to a conclusion with the awarding of centers to the University of Illinois and Cornell University, plus two large consortia located in Princeton and San Diego. The Illinois and San Diego centers will be based on CRAY Research Systems. The Princeton consortium will be using a CDC Cyber 205 to be replaced by a new ETA system at sometime in the future. Cornell will be working with a large IBM system supplemented by Floating Point Systems array processing units.

Each of these centers is to be national in scope and the time on the systems is to be available through open competition on a nation-wide basis. Each university or consortium will have a reserved share; more on this appears later in the article.

The Illinois center will consist of two major activities, one housed at CSO and one in the newly organized Application Center. The Application Center activity will focus on science and engineering using supercomputers and powerful workstation networks. It will bring together local and visiting faculty, high-level consultants, and professional scientists and engineers to help the research investigators through their knowledge of both computing and the discipline. The Center will offer a number of seminar programs and will work closely with the Research and Development Center because the users will present the problems for future generations of supercomputers.

The facilities will be managed through CSO. Indeed, the new organization of CSO is intended to reflect this second mission as well as the great strength it will add in areas of networking and workstation technology.

The facility is to be located on the second floor of the Astronomy Building and the remodeling for that is well under way. Those of you who have been on campus for some time will recognize that this was originally the second floor of the Advanced Computation Building, the planned home for ILLIAC IV. Since that machine never came on campus, the mechanical systems were never completed and the facility was not used as originally intended. It will now be the home of the CRAY supercomputer. Remodeling will be completed and the machine should arrive approximately August 15, 1985. The beginnings of service, without full support, should follow approximately two months later. A reasonably comprehensive service should be in place by January of 1986.

Access to the computer will come through a variety of means, including the direct attachment of terminals or workstations, interconnections via network to some departmental computing facilities, and attachment to a variety of national networks. A longer term part of the NSF program is to put in place a high-speed national network that would allow the services presented at remote user campuses to approximate those available at the host sites.

Negotiations are currently going on with the National Science Foundation and the four host sites as to how use of the computer will be governed. There will be some division, as yet unspecified, between the host site and the national community. Along with this, the University will need to specify the practices it expects to follow with respect to making its share available. We expect these issues to be resolved by approximately June 1, well in advance of the availability of service.

The heart of the Illinois proposal was using the supercomputer for two related purposes. The first was to attack those problems that are so large that it is impractical to attack them with any other computing system, even small dedicated machines assigned to a single investigator. The second was to educate a generation of graduate students into the implications of such computers and to develop them as knowledgeable users of future generations of large-scale machines. This mission would overlap only slightly with the services provided by the general campus computing facility, even if these services were to be upgraded to the high end of general purpose machines. Thus, we can expect a reasonably clear distinction between the work that should be done on the supercomputer and the work that should remain with the general campus and departmental computing facilities. More detail on the scientific and engineering program will appear in other articles. We will report later on the terms and conditions of use and the options for access.

CAMPUS COMPUTING PLANS FOR FALL '85

Although the plans for this coming fall are not yet complete, we thought it would be worthwhile to report some of the directions in which we are heading before people leave for the summer.

Most of the services at CSO have now been in place for quite a long time. In the case of the Cyber service, this means that for many users the functionality of the system is insufficient and obsolete. In the case of the IBM systems, it means that the capacity is insufficient to meet the demands. In the case of the UNIX service, the limitations on availability have been unattractive to most users.

We hope to address a number of these problems in time for the opening of school in the fall. The exact means of doing this will involve some mixture of additional UNIX services, additional IBM services, and possibly some modernization of the CDC Cyber service.

Lest anyone worry about the continuity issue, we want to reassure users that the Cyber services in their present form will continue to be available for those who find them attractive. We would give advance warning of at least one year of any intention to completely retire this service. Even if more modern CDC equipment is acquired, continuity would be provided.

We expect to have additional UNIX services available, and to begin making them available through the Research Board allocation system by this fall. We expect UNIX to grow to be a substantial part of the services offered, and to be available not only on superminis but to be available down through workstations and probably up through large-scale machines. This evolution will take place over several years and we have no fixed target as to the percentage of services to be delivered in this way. Instead, we hope that the capacity will be driven by the expressed needs of the users and the availability of software.

In order to introduce more general availability of UNIX, we will have to put in place support services such as short courses and consulting. In addition, because UNIX is not generally strong in the area of manageability, we will have to do considerable work in areas such as account management and operating policies. This, as much as the availability of capacity, will control the rate of introduction. We expect, by this fall, to offer a minimum of 50 concurrent users worth of service and a maximum of approximately 200. One of the particular strengths of UNIX is the degree to which it supports networking activities, and we expect that the UNIX services we offer would rapidly move into an environment of networking to other UNIX systems, including personal workstations. Work on this part of the networking activity is already going on.

There is a clear need to continue the growth of IBM service because of the large number of applications that are being used. We are looking at alternatives to increase this service as rapidly as possible. The demand in this area is caused partially by functionality, particularly the large address space. The availability of interesting applications packages and the ability to process large jobs effectively, such as SAS and ASPEN, are other sources of demand.

As we upgrade this service we also hope to be able to reduce the bureaucratic overhead which has been necessitated by the lack of available resources.

IBM

CMS BMDP NOW AVAILABLE

Joan Mills

The BMDP Statistical Software Package is now available on IBM CMS timesharing on the VMD machine. CMS BMDP is the 1983 (latest) release of BMDP and corresponds to the 1983 Revised Printing of the BMDP user's manual. The new manual (available at the CSO Documentation Center, 1208 W. Springfield) documents changes to four specific BMDP programs, discusses some new common options and abilities, and contains corrections of typographical errors.

To run BMDP, issue the command:

```
LINKTO BMDP
```

This command calls up (links to) the exec file for BMDP, which will call for the remaining part of the BMDP library as needed.

The user's program should be prepared as a CMS file with filetype BMDP such as:

```
TESTPROG BMDP A
```

Data may be added to the end of the program in this file (BMDP assumes this if no data location is given in the program code). If data is to be in a separate file, BMDP must be told about it. This is done by issuing a FILEDEF command; for example,

```
FILEDEF 7 DISK TEST DATA A
```

where 7 is the unit number (unit numbers 1-6, 26, 28 and 29 are reserved and may not be used for data). DISK means your data is on your CMS disk rather than a tape and TEST DATA A are the filename, filetype and filemode of the data file itself. If unit 7 is given on the FILEDEF command then the line

```
UNIT IS 7.
```

is included in the input paragraph of the BMDP program file. CAUTION: The FILEDEF command must be reissued for each new run of the BMDP program containing inputted file units.

To run the BMDP program, issue a CMS command of the form BMDP fn (prog. For example,

```
BMDP TESTPROG (BMDP1D
```

This command takes the user's program TESTPROG with filetype BMDP and processes it with the BMDP library program called BMDP1D. The following alternative forms of the above command are equivalent:

```
BMDP TESTPROG (P1D
```

```
BMDP TESTPROG (1D
```

The BMDP package on CMS has some additional parameters (appearing after the parenthesis on the BMDP statement). These are used, for example, to bring in a user's Fortran transformations. Users requiring additional memory/storage to run BMDP can issue the CP command, DEFINE STORAGE. (BMDP needs 712K to run most procedures.) These and other advanced BMDP CMS features will be described in forthcoming handouts, which will be available shortly at the Statistical Consulting Office, 85 Commerce West.

After a BMDP run the user's output (statistical results) appears on a file of the form, fn LISTING A. For example,

```
TESTPROG LISTING A
```

Note that the output has the same filename as the input program file that generates it. This CMS file will be overwritten with successive BMDP runs of the input program. It may be examined with TYPE or XEDIT, and may be printed with NPRINT. For example,

```
NPRINT TESTPROG LISTING (CC EJ DEST COMM BIN 97
```

MATHEMATICAL SERVICES

IMSL EDITION 9.2 INSTALLED IN GRAB/F

Stan Kerr

Edition 9.2 of the IMSL Subroutine Library has been installed on the Cyber systems under GRAB/F. It can be accessed by the command

GRAB, IMSL/F

It will remain under GRAB/F until May 1, at which time it will become the default, barring problems.

Edition 9.2 is being installed on the IBM systems as well, and may be available by the time you read this; please check system announcements or ask the consultants (333-6133 and 333-2170).

This edition is purely a corrective change and involves no new routines or changes to the usage of old routines. Following are the routines that were corrected; a list of the reasons for correction can be viewed in either of the CSO consulting offices (85 Commerce West and 1208 W. Springfield).

ABIBN	BEMSON	CTPR	CTPR1	CTRBYC	DGEAR	EHBCKF
EHOUSS	ELZVC	EQRH3F	EQRT2S	EQZVF	FLINV	FTFREQ
MDTNF	MDTPS	MMBSJR	MMDEN	OFCOMM	RLFOR	RLFOTW
UGETIO	USPKD	DROTG	SROTG	VDSWAM	VSAD	VSAR
VSARER	VSSWAM	ZANLYT	ZXMWD	ZXSSQ		

(Some of the above are internal routines, not called directly by user programs.)

PLOTTING SERVICES

REMINDER: GCS IS NOT SUPPORTED

Allan Tuchman

The GCS graphics package is not supported by CSO. This means that consulting help may not be available, no corrections will be made for errors found in GCS, and no new graphics devices will ever be supported. No new or updated documentation will be available. GCS will not be installed on any new computer system in the future. For these reasons, we do not encourage any new program development using GCS for any reason.

The existing GCS libraries will be supported for as long as possible, for existing programs that depend on GCS. These libraries may fail to execute properly if and when we install a new operating system version. We will not attempt to convert GCS to another computer system in the future. In this light, users may want to gradually convert GCS programs to use other software as part of any periodic program maintenance or changes.

The DI-3000 graphics software and associated products provide all the functionality of GCS, and more. These products are vendor supported and include excellent documentation. The products will support new graphics devices as we acquire them. DI-3000 is widely used on over 1000 computer systems worldwide, and executes on most available mainframes and minicomputers.

A newly written CSO manual, *Introduction to Graphics on the Cyber Systems*, provides an overview of all the supported graphics software on the Cybers, including all the DI-3000 based products. The overview includes a brief description of the product, often with sample output, and references to all related manuals and documents. You may pick up a free copy of this manual at the CSO Documentation Center, 1208 W. Springfield Avenue.

MAINTENANCE & REPAIR

COMPUTER PERIPHERALS REPAIR
AND IBM PC REPAIR

Larry Crotser

CSO's Computer Peripherals Repair (formerly the Electronics Shop) and IBM PC Repair have both found new homes in the Horticulture Field Lab (see map). These moves were necessary to free up much needed space for the supercomputer installation.

We would like to thank you for your patience and understanding when you found that our phones were disconnected, and service personnel were hard to find.

Both repair facilities are back in full operation and the staff is ready to serve you in any way they can. If you have maintenance questions, please call Estil Carter at 333-6173 (Computer Peripheral Repair) or Darlene Hawkins at 333-3994 (IBM PC Repair). For general maintenance information, call Larry Crotser at 333-5190.
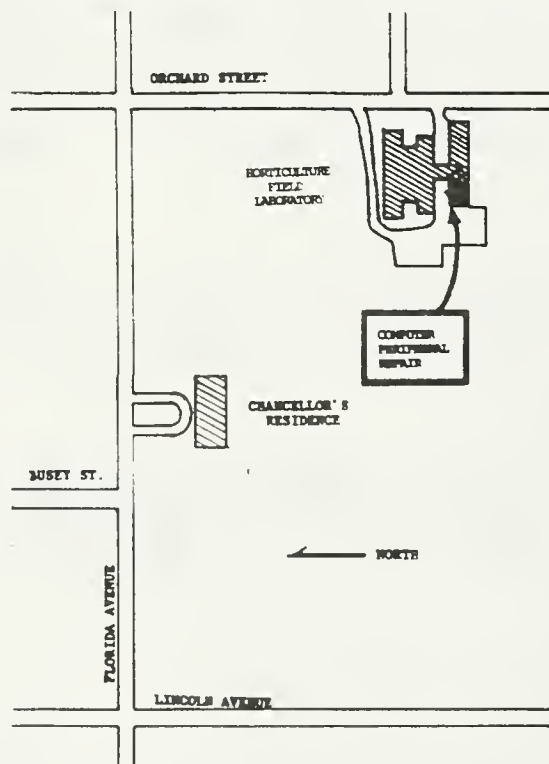
FEATURE ARTICLES

IBM FORTRAN V2.00 OR
PROFESSIONAL FORTRAN FOR MY PC?

One of the questions frequently asked by PC owners is, "I use Fortran to do most of my programming. What package should I buy for my PC?" As a service to our PC user community, we have tried, in this article, to compare two popular IBM Fortran packages that are available. We hope this will be of help in selecting a package best suited to your particular needs.

The two packages being compared are IBM Fortran Version 2.00 and IBM Professional Fortran.

IBM Fortran Version 2.00

Version 2.00 is a Fortran 77 compiler (although not a full Fortran 77) that can be used with or without a math coprocessor. The compiler is a two-pass compiler requiring a minimum of 128 Kb of storage.

The compiler can be used to produce code that uses a math coprocessor, if installed, or software emulation of floating point operations if a math coprocessor is not installed. The compiler generates in-line instructions for use with the math coprocessor, or code that uses interrupt-driven routines if a math coprocessor is not installed. Fortran Version 2.00 utilizes one of three math libraries when it is compiling the code to run on your machine. The library selected has a significant effect on how the mathematical operations are performed, the speed with which they are performed, the precision used, and the size of the .EXE files created.

The three libraries are:

- 8087ONLY. This library provides the fastest speed and highest precision of the three available libraries. It will only work if the math coprocessor is installed and turned on.

- REGMATH. This library is optimized for speed at the expense of precision. It does not use the math coprocessor. Calculating basic arithmetic is faster and, if a math coprocessor is not available, programs that do floating point arithmetic will run faster than those using the EMULATOR library.

- EMULATOR. This library may be used with or without a math coprocessor; it has the same precision as the 8087ONLY library. The EMULATOR library is designed to emulate the instructions used by an 8087 Math Coprocessor. When run with a math coprocessor, the program is just as fast as the 8087ONLY library. When run without a math coprocessor, the program runs much slower, but with the same precision.

However, if you wish to carry out tests using the different libraries described above, you have two problems:

- You must install the product three times. The libraries are built at install time, and you can only build one at a time.

- The three libraries must be in separate directories, on separate diskettes, or you must continually rename the libraries. The linker will always call FORTRAN.LIB. An alternative would be to create a dummy library called FORTRAN.LIB and specify your selected library as a parameters to the linker.

The product comes with a program, 8087.COM, which sets or resets the software switch indicating the presence of a math coprocessor. It is useful for performance evaluation or for testing a program that will later have to run on a machine without a math coprocessor. The subroutine library also has routines to set or inspect the time and date.

As mentioned above, Version 2.00 is a two-pass compiler. The compiler options are limited to whether you wish to produce source and object listings. You can, however, specify the names of these source and object files.

Version 2.00 is significantly slower than Professional Fortran. Its compile and link times are significantly longer, and the execution time for compiled code is almost always slower. Because it is not a "full" 77 standard version, uploading and downloading from mainframes may present problems, and conversion of many parts of your programs may be necessary. It lacks complex number and string function capability.

In general, Version 2.00 is recommended only if you have one of the following situations:

- You do not have a math coprocessor (Professional Fortran requires one).

- You are developing code that also has to run on a machine with no math coprocessor.

Professional Fortran

Professional Fortran is an ANSI Fortran 77 (full Fortran 77) compiler and library. The compiler requires a math coprocessor (most of CSO's PCs have math coprocessors) and a minimum of 256 Kb of storage. It is a one-pass compiler, optimized for high-performance execution. Professional Fortran also includes interactive symbolic debug capabilities, and has a high degree of compatibility with VS Fortran.

As stated above, the compiler contains an interactive debugger. With this feature, debugging your program becomes a relatively simple procedure. Using a compile time option and an additional library at link time, your program can be made to run under the interactive debugger. You can initiate break points at specified statement lines and entry or exit points to subroutines. You have a TRACE command and a WHEN command to allow monitoring changes. You may also list or set values of variables.

There are 13 compile time options, seven of which are used to control the printed output. These seven controls specify what to print for the gamut from an error-only listing to a full list with cross-references. Page width and length can also be specified. Other options control the inclusion of debug code and the specification of allowing more than the 64Kb for adjustable and assumed-sized arrays.

This compiler uses the "full" Fortran 77 standard with complex number and string function capabilities. As such, it is highly compatible with mainframes using the 77 standard. For example, uploading or downloading programs between your PC and the IBM or Cyber mainframes here at CSO is a simple procedure. When uploading or downloading to CMS, there will be little or no conversion necessary. On the Cyber (FTN5), you may need to convert some single precision REALs to double precision, and perhaps add some OPEN statements. In any case, it is much simpler to upload and download when using Professional Fortran than when using Version 2.00.

There are however, several things you may need to consider. The Professional Fortran compiler does require a math coprocessor. It will terminate a compilation if a math coprocessor is not installed. This makes it impossible to compile programs on a system without a math coprocessor for execution on a system with a math coprocessor. Also, you cannot specify the name of the object file produced -- it will

always be the source file name with the extension of .OBJ. The cost may be a factor for some users -- Professional Fortran costs about half again as much as Version 2.00 (and you must also have a math coprocessor).

Brief Summary

The following table provides a brief summary of the two packages. In general, we recommend Professional Fortran as the package that would best meet most user's needs (with the exceptions mentioned above -- cost factor in some cases, or if you need to run your programs on another machine that does not have a math coprocessor).

	Version 2.00	*Professional Fortran*
Cost	--	1/2 again as much
Minimum Storage Required	128 Kb	256 Kb
Math Coprocessor Required	No	Yes (Code cannot be run on machine without math coprocessor)
Compile and link times		Faster
Compiled code execution time		Faster
Fortran 77 standard	not full Fortran 77 no complex numbers no string functions lacks many features for good compatibility with CSO mainframes	full Fortran 77 complex numbers string functions very compatible with CSO mainframes -- CMS and Cyber FTN5
Debugging	None	Interactive debugging

MISCELLANEOUS

X3J3 TO MEET IN URBANA-CHAMPAIGN

The next meeting of X3J3, the ANSI committee on Fortran, will be held May 6-10, 1985 on the campus of the University of Illinois at Urbana-Champaign. These meetings are open to the public. If you are planning on attending the X3J3 meeting, please notify Kurt Hirchert (333-8627) of the CSO systems consulting staff. He is making the arrangements for this meeting and will also be able to brief you on the specific topics that may be expected to be considered at this meeting.

HELP WANTED

WANTED - SURPLUS PDP-8 HARDWARE

Wanted-- surplus PDP-8 hardware:

TC08P DECtape controller Board 868

Internal Expansion Chassis

Core Memory

If you have surplus PDP-8/E items to dispose of, please contact Mike Berger, 252 Engineering Research Lab, 333-7452.

HALF-TIME RESEARCH ASSISTANTSHIP - SUMMER 1985

A half-time Research Assistantship is available for Summer, 1985 for Computer Music Programming.

Project:	To adapt and refurbish sound analysis/synthesis/graphics programs for the School of Music's LMC supermicro computer. The Computer Music Project system will consist of the LMC (which runs UNIX Version 7, 4.1 BSD), a vector graphics terminal, an ink-jet printer, a smart modem, and a special device for record/playback/storage of digital audio data.
Compensation:	$1028 up (depending on experience) plus tuition-fee waiver. (Possibility for continuation in the fall.
Desireable Experience:	C and Fortran language programming, UNIX operating system, digital signal processing, graphics.

If you are interested in this position, call Prof. James Beauchamp at 344-3307 or 333-1089 for an appointment.

OFF-LINE's Mailing List

If you wish to be placed on our mailing list for future issues of *OFF-LINE*, if you wish to be removed from the list, or if you wish to enter an address correction, please complete and return this page. **(Current subscribers are kept on the mailing list until a specific request for removal is received, or until a mailing is returned as undeliverable.)**

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City -- State -- Zip Code

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SEND TO: **OFF-LINE**
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                      Urbana, Illinois 61801

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CSO DIRECTORY - STAFF AND SERVICES

Administrative

Director	George Badger	150	DCL	333-4103
Assistant to Director	Karolyn Eisenstein	175	DCL	333-8847
Business Manager	Stanley Rankin	150	DCL	333-6530
Secretaries	Joyce McCabe	150	DCL	333-1637
	Barbara Sweet	150	DCL	333-1637

User Services and Hardware/Software Support

User Accounting		1208	W Springfield	333-7752
Documentation Office		1208	W Springfield	333-9230
Systems Consulting		1208	W Springfield	333-6133
Statistical Services Consulting		85	Comm West	333-2170
Text Processing Consulting		118	DCL	333-7318
Maintenace & Repair Service		194	DCL	333-0969
Tape Service, Special Plots, Xerox Laser Printer		123	DCL	333-8640

Dial-up Numbers	CYBER 175 (NOSA)	300	baud	333-4000
	CYBER 174 (NOSB)	300	baud	333-4004
	IBM 4341 L10 (VME)	300	baud	333-4005
	IBM 4341 M2 (VMD)	300	baud	333-4006
	Switch	1200	baud	333-4008
	TELENET (local no.)			384-6428

Personal Computers/EXCEL	Robert Penka	173	DCL	333-4709
Supercomputer Activities	Sandra Moy	177	DCL	333-4703
Development	J. M. Randal	1207	W.Springfield	333-9772
Networking	Sue Greenberg	187	DCL	333-3723
Maintenance	Larry Crotser	169	DCL	333-5190
Consulting	Stan Kerr	179	DCL	333-4715
Statistical Services	Beth Richardson	189	DCL	333-6276
Accounting Services	Gary Bouck	1208	W Springfield	333-7752
Microcomputer Laboratory	Jack Knott	86	Comm West	333-6562
User Training (Short Courses, Videotapes)	Ron Szoke	131D	DCL	333-8630
Documentation	Lynn Bilger	120	DCL	333-6236
CYBER-IBM-VAX Operations	Myra Williams	168	DCL	244-0186
Laboratory Support Project	Mike Gardner	1207	W Springfield	333-7904
Site Operations	Sylvia Hansen	65	ME	333-6285
	Chuck Harnsberger			

CSO Sites (see Reference Guide RF-0.3 for operating hours)

Agriculture	N-120	Turner Hall	333-8170
Chemistry	153	Noyes Lab	333-1728
Commerce West	70	Comm West	333-4500
CRH Snack Bar	120	Snack Bar	333-1851
DCL Routing Room	14	DCL	333-6203
Electrical Engineering	146	EEB	333-4936
Florida Ave Res Hall		FAR	333-2695
Illinois St Res Hall		ISR	333-0307
Mechanical Engineering	65	MEB	333-1430
Psychology	453	Psych Bldg.	333-7815
Social Science	202	Lincoln Hall	333-0309

OFF-LINE is the monthly newsletter of the Computing Services Office at the University of Illinois at Urbana-Champaign. Unless otherwise indicated, permission to reprint is freely granted, provided that the author, if named, and the Computing Services Office (CSO) are credited. Information in this issue is current as of May 30, 1985.

CSO operates a CDC Cyber 175 with 262K words of central memory and a CDC Cyber 174 with 196K words of central memory. The 175 and 174 run under the NOS Operating System and share 512K words of ECS. The 175 serves over 200 simultaneously active text and graphics terminals and the 174 serves over 100 simultaneously active terminals. CSO also operates an IBM 4341 Model M2 with 8 million bytes of memory running HASP-OS/MVT under VM and an IBM 4341 Model L10 with 4 million bytes of memory running VM. In addition, CSO operates a DEC VAX 11/780 with 4 million bytes of memory, running under the UNIX Operating System and driving a GSI CAT-8 phototypesetter. The above systems are for general campus computing; other "special" systems are also maintained by CSO.

Operating Hours (see HEARYE,SCHEDUL for exceptions):

	CYBERS 174/175	IBM
M-F	8 am - 6 am	8 am - 6 am
SAT	8 am - Midnight	8 am - 6 am
SUN	Noon - 6 am	Noon - 6 am

POLICY

FURTHER REDUCTION IN SUMMER SERVICE

In the May *OFF-LINE*, we announced somewhat reduced summer consulting hours. In order to carry out several campus computing upgrade projects, we will be further reducing some summer services. Our revised summer consulting hours will be:

Monday, Wednesday, Friday	9am - 1pm
Tuesday, Thursday	1pm - 5pm

The consulting office at 1208 W. Springfield will be staffed during these hours by one systems consultant and one statistical consultant. The statistical consulting office at Commerce West will be closed for the summer.

Also, because of system upgrades during the summer, CSO will not be offering short courses (see the following article).

This summer will see upgrades in IBM and UNIX services, and quite possibly also in CDC services. At this writing, we do not know the precise nature of the IBM and CDC upgrades, since the final decisions have not been made; by the time you see this, these decisions should have been made and we will be proceeding in one of several directions. One of those directions is a major improvement to the size and power of the IBM system, with a corresponding increase in the need and demand for CMS consulting and education. In this case, there is a considerable amount of internal training we must do to prepare properly, and a great deal of new software which must be installed on the new system.

Another project is studying the possible upgrade paths within the CDC hardware and software product lines.

In addition to IBM and CDC work, we will be involved in the preparation of at least one UNIX machine to be available to Research Board accounts. We are also looking at further expansion of instructional UNIX support. Our consulting staff will be spending time both in helping to prepare an adequate service and in training themselves in the use of UNIX.

Because of all these various projects, we feel it is imperative that we considerably reduce the consulting and educational load so that the Systems and Statistical consulting staffs can help with the upgrades and prepare for the Fall. We realize this will be unpleasant to bear during the summer, but hope that the expected benefits will outweigh the short-term suffering. User services are expected to return to normal levels as school opens in the fall.

USER TRAINING ANNOUNCEMENT

Due to a number of urgent projects that will absorb all available staff time this summer, CSO will not offer its usual short course program. We believe that this redeployment of effort to the upgrading of system resources will, in the long run, be of greater benefit to the user community than an attempt to offer summer short courses. Some services may be upgraded in a such a way that new course material will be required next year.

In lieu of the CSO short course program, we offer the following (probably incomplete) list of area agencies and organizations that we believe are offering some form of computer-related training this summer.

NOTE: the list is provided for information only, and presence on the list, or absence from it, is not to be interpreted as an evaluative judgment.

Some Computer Training Opportunities
in the Urbana-Champaign Area, Summer 1985

Administrative Information Systems Development, UIUC: 333-5527

Administrative Information Systems and Services, UIUC: 333-4181 or 333-6288

Busey Bank Microcomputer Training Center: 384-4580

Champaign Park District: 398-2550

Communiversity, Illini YMCA: 337-1533

Computer stores: see the Urbana-Champaign telephone directory "yellow pages" under "Computers-Dealers"

Continuing Education and Public Service, UIUC: 333-6305

Parkland College: general information, 351-2200; computer science and data processing courses, 351-2213; counseling and course selection, 351-2219

Personnel Services Office, UIUC: 333-6110

University High School, UIUC: 333-2870

Urbana School District #116: 384-3602

Questions, comments and suggestions should be addressed to the CSO training coordinator: Ron Szoke, 333-8630, or TELL,SZOKE from a Cyber terminal, or NOTE SZOKE @ UIUCVMD from a CMS terminal.

MANUALS

The following manuals are strongly recommended to Cyber users. These documents may be purchased individually at the Illini Union Bookstore (Reference Section), 715 South Wright Street, or may be purchased as a set at the CSO Distribution Office, 1208 W. Springfield.

1. Introduction to the Cyber Systems, $2.00

2. A Tutorial Guide to the ICE Text Editor, $1.25

3. ICE Reference Manual, $3.25

4. RNF Documentation: Tutorial, Macros and Reference, $4.00 (NOTE: This manual is not included in the package; it must be purchased separately.)

5. An Index to Software on the Cyber, $3.25

6. Cyber Fortran Debugging, $1.25

TRAINING TAPES

CSO makes available to the user community nineteen training videotapes: three introducing the Cyber system, six on the fundamentals of using SAS (Statistical Analysis System), and ten on SAS color graphics (SAS/GRAPH). The tapes may be obtained at the Media Desk in the Undergraduate Library (upper level, in back). Show your University ID to the clerk on duty there and state the title of the videotape you wish to use. If a machine is available, you will be taken to a room containing the video- tape equipment and shown how to operate it. If all machines are in use you can make a reservation for a later time.

CSO Videotapes

CSO has produced a series of three videotapes (comprising eight segments) which introduce the novice to computing on the Cyber system. A viewing guide containing the major displays in this series is available and can be used to facilitate note taking. Ask for your free copy of the viewing guide when you check out any of these videotapes for viewing.

The title and a brief synopsis of each segment is given below. Running time is 10 to 15 minutes for each segment.

1. **CSOVT1.**
    1.1 Introduction to Computing at CSO: A brief look at the steps required to solve a problem using a computer, and at some of the hardware used.

2. **CSOVT2.**
    2.1 Using a Terminal: A description of the physical operation of a terminal and some of the keys that have a special meaning to the Cyber.

    2.2 Introduction to Cyber Timesharing: A tutorial on logging on and off the Cyber.

    2.3 File Usage: Local files and indirect access to permanent files. An introduction to Cyber files and the commands used to manipulate them.

    2.4 Introduction to ICE Text Editing: A tutorial on entering and modifying files with ICE.

3. **CSOVT3.**
    3.1 Running a Fortran Program: Concepts. A discussion of the concepts of compilation, load- ing and execution.

    3.2 Running a Fortran Program: The PROGRAM statement. A discussion of the PROGRAM statement and its relationship to files accessed by the program.

    3.3 Running a Fortran Program: Control Statement. A discussion of the control statements used to compile, load, and execute a Fortran program.

A copy (Beta-1 format) of these videotapes is available for loan from CSO to any instructor wishing to use them in class. They have been effectively used in this environment several times recently, with the instructor stopping the playback equipment whenever he/she wished to elaborate further or questions arose from the class. To borrow a videotape for classroom use and obtain copies of the viewing guide for class distribution, call the CSO training coordinator: Ron Szoke, 333-8630. If you do not already have access to the required videotape equipment, Betamax viewing equipment can be borrowed from the Office of Instructional Resources, 333-3690.

SAS Videotapes

CSO has leased the SAS Basics 100-Series video training course. The course combines video and workbook media to deliver performance-based SAS training. The information in the course is contained in six videotapes.

The videotaped instruction is not complete without the workbook, which contains exercises and illustrations to reinforce the material presented in the videotapes. A copy of the workbook is available for reference at the Media Desk. You may, however, wish to obtain a personal copy of the workbook to complete the exercises, to take notes, and to use as a reference after the course is completed. The workbook may be purchased for $8.00 at the CSO Distribution Center, 1208 West Springfield, Urbana.

NOTE: The SAS videotapes are not available for loan.

The title of each of the videotapes is given below. Running time is about 45 to 60 minutes for each tape.

B101.   Introduction to SAS.

B102.   Getting Your Data Into a SAS Data Set.

B103.   Program Processing.

B104.   Working with SAS Data Sets.

B105.   Report Writing.

B106.   SAS procedures.

A Cyber terminal user may obtain more information about each via:

        TYPE,SASVID/AS/UN=COURSES.

The Media Desk also has the ten tapes in the SAS color graphics (SAS/GRAPH) series and a reference copy of the student workbook. For more details:

        TYPE,SASGRAF/AS/UN=COURSES.

Audio Cassettes

CSO makes available to the user community three sets of audio cassette tapes for the training of microcomputer users:

1.   How to Operate the IBM Personal Computer (on 3 cassettes)

2.   How to use MultiMate (3 cassettes)

3.   How to use Lotus 1-2-3 (4 cassettes)

These cassettes, with accompanying printed materials, may be borrowed for up to one week by contacting Ron Szoke, 333-8630.

CYBER SYSTEMS

SPURT REMOVED FROM CYBER SYSTEMS

Stan Kerr

The SPURT simulation package on the Cybers has been removed, as per a previous announcement in *OFF-LINE*. It will be retained in UN=MATHLIB, but on a use-at-your-own-risk basis; we reserve the right to remove it totally at any time.

IBM SYSTEMS

IBM CSMP HAS BEEN REMOVED

Stan Kerr

As per an announcement in a previous *OFF-LINE*, the IBM CSMP package has been removed from the IBM system. If for some reason you were unaware of its impending removal, and would like assistance converting a CSMP program to ACSL on the Cyber systems, please see Stan Kerr (179 DCL, phone 333-4715).

NETWORKING SERVICES

EXTENSION TO SYTEK (LOCALNET 20) NETWORK

Scott Lathrop

CSO currently offers a networking service using LocalNet, a product of Sytek, Inc. This service has been available only to buildings connected to the campus broadband coaxial cable and extending the cable to other buildings has proven to be both expensive and time-consuming. CSO is now announcing a new service, also a product of Sytek, Inc., which will allow almost all of the University buildings to connect to the network via the University's cable TV facilities.

The equipment used for this new facility is compatible with the existing Sytek network. Devices attached to the broadband cable (mid-split system) will be able to communicate with those on the TV cable (sub-split system) and vice versa. We will continue to place people on the mid-split network whenever possible since total costs for the mid-split network are less.

Although the same equipment types are available on both systems, the prices differ slightly, as shown below:

	mid-split	*sub-split*
2 port Tbox	$981	$1161
8 port Tmux	$3375	$3555
2-32 port Smux	$1980 + 495/2 ports	$2160 + 495/2 ports

Delivery of sub-split equipment generally takes longer than mid-split equipment. CSO will attempt to keep 2-port Tboxes in inventory.

There will be a network access fee of $150 per year per port for all sub-split ports. See the following article, Sytek Installation Costs, for installation cost information.

For further information, please contact Rex Duzan, 333-0969.

SYTEK (LOCALNET 20) INSTALLATION COSTS

Scott Lathrop

CSO is changing the rates for Sytek installations for all future orders. In the past, there has been a fixed fee of $70 to have Sytek equipment installed. Experience has shown that this fixed fee does not recover costs. As a result, the fixed fee is being increased to $140. If a department chooses to have the entire building wired, as a few departments already have, then the installation fee will continue to be $70 for each modem installed. This cost is for attaching equipment to the campus coaxial cable (mid-split) system. Connections made to the campus cable TV (sub-split) system will be billed based on time and materials, since this work is not done by CSO. Estimates for such installations will be provided to the customer for approval before any work is started.

EIA-RS232 cables will still cost a minimum of $50 each to install. Higher costs will be a result of extra time and materials and will be made known to the customer. All RS232 cables are two pair with no handshaking. If you require additional RS232 signaling pins, you must submit a special request, and this will increase the installation cost.

Please refer all questions to Rex Duzan, 333-0969.

MICROCOMPUTER SERVICES

INTERESTED IN MICRO SHAZAM?

Esther Edwards-Iwe

Various users have expressed an interest in purchasing the micro version of SHAZAM. If we can get a firm commitment to purchase this package from enough people, we will be able to obtain it for them at the discount price of $50.00 per copy (regular price is $250.00 per copy). However, we can only obtain this discount price if we can guarantee the purchase of at least 125 copies. At the present time we have no idea of how many people would be interested; therefore, we are asking interested parties to contact us (see below).

The micro version of SHAZAM can be operated on any IBM PC-compatible microcomputer that has at least one diskette drive, at least 448K of memory, and the DOS 2.0 (or higher) operating system. A printer is useful, but not necessary.

There are two different versions of micro SHAZAM, depending on whether or not it will be used with an 8087 co-processor. The two versions are the regular version and the 8087 version. The regular version will work with or without the 8087 co-processor (if used with a co-processor, it is just as fast as the 8087 version, but uses more memory). The 8087 version uses slightly less memory, but **must** be used with a co-processor.

If you are interested in obtaining the micro version of SHAZAM or would like more information about the package, please contact Esther Edwards-Iwe, 131-B DCL, 333-8629 (if no answer please leave name and phone number at the DCL office, 333-1637, so that your call may be returned).

NOTE: Please note that the SHAZAM program is protected by copyright laws. Use is only permitted on a single computer system.

MICROCOMPUTER PUBLIC DOMAIN SOFTWARE
NOW AVAILABLE FROM CSO

Jack Knott

CSO is pleased to announce the acquisition of 25 diskettes of public domain software. This is the initial installment in a library of public domain software we are building for campus distribution.

To make a copy of any of this software, being your own diskette to the PC site at 70 Commerce West. To check out the master copy of any diskette, you must submit one of the following to the operator in charge:

1. University student ID
2. Drivers License
3. University Faculty/Staff ID

Upon return of the master copy to the operator, you will receive your ID back.

Public domain software currently available includes:

1. Various communications packages   Disks 16, 17, 18
2. Free Calc -- spreadsheet   Disk 12
3. PC-Write   Disk 13
4. Epistat   Disk10
5. PC editors & text utilities   Disk 15
6. Assembler -- disassembler   Disk 14
7. Library utilities -- Finance   Disk 11
    Quick Graf
8. Disk utilities   Disk 19
9. Games   Disks 20, 21

There are also 10 diskettes of public domain software from PC-Sig which contain a multitude of files. Please see the operator for a listing.

The software is available in Room 70 Commerce West. Hours of operation for Commerce West are:

Regular Schedule:
    Monday-Saturday   8:00 am - 12 midnight
    Sunday   12 noon - 12 midnight

Intersessions Schedule (May 18 - June 9 and August 3 - August 28)
    Monday-Friday   8:00 am - 12 midnight
    Saturday   8:00 am - 5:00 pm
    Sunday   12 noon - 5:00 pm

Summer Term Schedule
    Monday-Saturday   8:00 am - 12 midnight
    Sunday   12 noon - 5:00 pm

NEW NEWSLETTER INTRODUCED AT UIUC

Reprinted from *Micro Notes*

Micro Notes is a newsletter conceived by several central offices at UIUC that saw the need to address the issues and concerns of the growing number of microcomputer users on campus. During the last two years, the number of personal computers has multiplied on campus, and more and more people who may never have been exposed to computers are having to cope with the microcomputer "explosion."

The need for people to understand what these machines are capable of doing and just where they fit into the university environment has become obvious to those responsible for presenting this first issue of *Micro Notes*.

Who would be interested in *Micro Notes*? Well, anyone who currently uses a personal computer; anyone who wants to use a personal computer; or anyone who does not want to use a PC, but wants or needs to know the capabilities of the personal computer. In other words, *Micro Notes* is targetted for everyone who is affected by the advent of microcomputers. *Micro Notes* can be beneficial to everyone from clerical staff to managers to faculty.

We hope to publish articles that review software and hardware, discuss office applications of personal computers, discuss the use of personal computers in research and teaching, and present ways to help one understand the uses for the personal computer. We also hope to provide a forum for discussion of campus policies and current issues relating to the use of microcomputers at the University, create a "hub for exchange" among users with similar applications, help users be their own experts by understanding the function of personal computers, and provide expertise on new technology, such as networks and micro-to-mainframe links.

We will attempt to provide listings of services available on the campus, including training. We will announce both on- and off-campus meetings of User Groups (formal and informal, self-directed groups of people with similar computer interests). We would like to help you get in touch with others who have similar applications for their personal computers.

We think *Micro Notes* is a much needed newsletter, but we need to know whether you like the idea, too. At the end of this issue of *OFF-LINE* is a response page. Please return it if you want to be put on the permanent mailing list. We also encourage any suggestions and contributions for articles that you

would like to have printed. Indeed, your feedback and participation is vital to the continuation of *Micro Notes*.

In addition, you can indicate on the response page your willingness to complete a questionnaire so that your hardware and software can be listed in a database maintained by the Information Center at Administrative Information Systems and Services. (Editor's note: CSO already maintains such a database for microcomputer users. Current plans include the possibility of combining CSO's information with the responses to the questionnaire from AISS, thereby establishing a central "master file." This "master file" would then be maintained by either CSO or AISS -- to be decided. Therefore, if you are already listed in CSO's file, you do not need to duplicate this information.)

To add your name on the permanent mailing list, please complete the form and send it to: *Micro Notes* Editor, 54 Administration. We encourage you to make a photocopy for anyone else who may be interested in receiving *Micro Notes*.

MAINTENANCE & REPAIR

CSO ANNOUNCES IBM PC MAINTENANCE PLAN

Larry Crolser

The Computer Maintenance Group of CSO will be offering maintenance contracts on IBM personal computers and their options beginning **July 1, 1985**. The maintenance contracts will initially be written only on IBM PCs that are part of the IBM EXCEL program, or on IBM PCs that are currently on University of Illinois inventory.

Those persons now owning PCs that are not under warranty or are not presently on a CSO maintenance plan who wish to obtain a maintenance contract will be assessed a $36.00 one-time certification fee per computer, plus the cost of any defective parts found during the certification, before being eligible for a CSO maintenance contract.

Presently there are three maintenance options that will be offered by CSO. All components of a system must be on the same option.

Option 1   On-site repair. CSO will repair and test the failing machine at the customer's site. This option will be available for those customers located on the University of Illinois at Champaign-Urbana.

Option 2   The customer will deliver the failing machine to the PC repair station, which is presently located in the Horticulture South Annex. CSO will repair the machine and notify the customer as soon as it is ready to be picked up.

Option 3   Individual boards swap. The customer may bring in the defective board(s) to exchange for working board(s). Under this option, a customer will be assessed a per-time service fee of $25.00 plus the IBM repair charge for the board.

Options 1 and 2 will have a one-time yearly charge, paid for at the time the maintenance contract is written, and this will cover all problems incurred for a one-year period.

Copies of the IBM Personal Computer Maintenance Program, which contains pricing information, will be available in Room 150 DCL. Also feel free to call Darlene Hawkins at 333-3994 or Larry Crotser at 333-5190 for any additional information.

MISCELLANEOUS

MSCC STATISTICAL HELP

The Mathematical and Statistical Consulting Committee (MSCC) provides assistance to members of the University Community, government, and private industry on statistical problems in their research work. Aide is available in designing experiments, constructing surveys, analyzing data, extending theoretical research, and utilizing computers in statistics. The 1984-85 director of the MSCC is Professor Robert Bohrer who is assisted by graduate statistics students Laurie Hansen, Robert Nagel, and Bruce Richardson.

Up to two hours of consulting is provided free of charge to members of the University community. Problems that require a considerable amount of consulting time and effort are welcome, but faculty members anticipating the need of substantial statistical help (for themselves or their students) are urged to try to obtain funding for this purpose. Free assistance in the preparation of statistical sections of research proposals is available from the MSCC.

To use the service or to set up an appointment to see a consultant, call 333-2167, or stop by the MSCC office in 221 Altgeld Hall. The MSCC hours for the summer term are 9:00 to 12:00, and 1:00 to 5:00, Monday through Friday.

HELP WANTED

SYSTEMS ANALYST

Temporary position available for a Systems Analyst to aid in the development of a computerized data base for use in pavement management. Salary open. Direct inquiries to Professor Mike Darter, 333-6253.

DATA BASE AND GRAPHICS DEVELOPMENT

Faculty member with interest in data base and graphics development for a Civil Engineering research project. Salary open. Please direct inquiries to Professor Mike Darter, 333-6253.

FULL OR PART_TIME SCIENTIFIC PROGRAMMER

One full-time or two part-time positions are open immediately for programmers with suitable skills. The position(s) should be supported for several years, could be Research Assistantships, and will be concerned with radar studies of migrating birds and insects. The position(s) will be challenging, including systems work and applications programming, graphics, image processing, or the opportunity to integrate new hardware. In-house dedicated RT11/TSX and VAX/VMS systems will be used, and experience on these systems is desirable although not essential.

Send a letter and resume or call:

Dr. Ron Larkin
Illinois Natural History Survey
Section of Wildlife Research
607 E. Peabody   OR   172 Natural Resources Bldg.
Champaign, IL 61820   CAMPUS MAIL

217-333-7513

QUARTER-TIME RESEARCH ASSISTANTSHIP
AVAILABLE IMMEDIATELY

A quarter-time Research Assistantship is available, starting immediately, for a tutor to teach parallel and serial computer interfacing, and analog-to-digital conversion, etc. The depth of understanding called for will be at the level of Steve Leibson's "The Handbook of Microcomputer Interfacing". The desired person must possess excellent communication skills. The principal computer involved is a DEC LSI-11 used in the collection of psychophysiological data.

The assistantship will last through Summer 1986, and will include a full tuition-and-fees waiver.

If you're interested in this position, call Prof. John Gottman at 333-4328 or 344-0490. Or else, please send an application for immediate consideration to:

Prof. John Gottman
609 Psychology Building
603 E. Daniel St.
Campus

STUDENTS NEEDED AS MICROCOMPUTER CONSULTANTS

CSO is now hiring a staff of microcomputer consultants and has several positions available for qualified students. If you are a student and are interested in working as a microcomputer consultant, please contact Robert Penka, 173 DCL (333-4709).

Micro Notes' Response Form

To be placed on the permanent mailing list for the newsletter, please complete this form and return it to the address listed at the bottom of the page. Fill out the bottom portion of this form if you choose to participate in the survey project by completing a simple questionnaire.

Name:_____

Title:_____

Department:_____

Campus Mailing Address:_____

Telephone:_____

_____Place my name on the *Micro Notes* mailing list
_____Delete my name from the mailing list
_____Note my new/corrected address

Does *Micro Notes* interest you?   Yes _____   No _____
Do you think it would be worth a small subscription fee?   Yes _____   No _____

We need to know what you want to read about in *Micro Notes*. Please share your comments and suggestions with us in the space below.

_____

We encourage you to complete the voluntary questionnaire to register your inventory with the Information Center at Administrative Information Systems and Services. With this information, campus units that support computer users will be able to assess your needs, project trends, and evaluate policies. Completing the questionnaire will help campus support units serve you.

Please send me a questionnaire. I have the following equipment:

_____Word Processor

_____Microcomputer/Personal Computer

Return To: *Micro Notes* Editor
54 Administration
506 S. Wright
Urbana, Illinois 61801

OFF-LINE's Mailing List

If you wish to be placed on our mailing list for future issues of OFF-LINE, if you wish to be removed from the list, or if you wish to enter an address correction, please complete and return this page. **(Current subscribers are kept on the mailing list until a specific request for removal is received, or until a mailing is returned as undeliverable.)**

Check one:
- ☐ Place my name on mailing list
- ☐ Make the following corrections or changes
- ☐ Delete my name from mailing list

_____

First name -- Initial -- Last Name

Campus Address:

_____

Room - Building

_____

Department

Off-campus Address:

_____

Organization or Company (if applicable)

_____

Street Address

_____

City -- State -- Zip Code

If address correction, give old address and zip code below.

_____

_____

_____

6/85

SEND TO:

OFF-LINE
150 Digital Computer Laboratory
University of Illinois at Urbana-Champaign
1304 West Springfield Avenue
Urbana, Illinois   61801

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CSO DIRECTORY - STAFF AND SERVICES

Administrative

Director	George Badger	150	DCL	333-4103
Assistant to Director	Karolyn Eisenstein	175	DCL	333-8847
Business Manager	Stanley Rankin	150	DCL	333-6530
Secretaries	Joyce McCabe	150	DCL	333-1637
	Barbara Sweet	150	DCL	333-1637

User Services and Hardware/Software Support

User Accounting		1208	W Springfield	333-7752
Documentation Office		1208	W Springfield	333-9230
Systems Consulting		1208	W Springfield	333-6133
Statistical Services Consulting		85	Comm West	333-2170
Text Processing Consulting		118	DCL	333-7318
Maintenace & Repair Service		194	DCL	333-0969
Tape Service, Special Plots, Xerox Laser Printer		123	DCL	333-8640

Dial-up Numbers	CYBER 175 (NOSA)	300	baud	333-4000
	CYBER 174 (NOSB)	300	baud	333-4004
	IBM 4341 L10 (VME)	300	baud	333-4005
	IBM 4341 M2 (VMD)	300	baud	333-4006
	Switch	1200	baud	333-4008
	TELENET (local no.)			384-6428

Personal Computers/EXCEL	Robert Penka	173	DCL	333-4709
Supercomputer Activities	Sandra Moy	177	DCL	333-4703
Development	J. M. Randal	1207	W.Springfield	333-9772
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Accounting Services	Gary Bouck	1208	W Springfield	333-7752
Microcomputer Laboratory	Jack Knott	86	Comm West	333-6562
User Training (Short Courses, Videotapes)	Ron Szoke	131D	DCL	333-8630
Documentation	Lynn Bilger	120	DCL	333-6236
CYBER-IBM-VAX Operations	Myra Williams	168	DCL	244-0186
Laboratory Support Project	Mike Gardner	1207	W Springfield	333-7904
Site Operations	Sylvia Hansen	65	ME	333-6285
	Chuck Harnsberger			

CSO Sites (see Reference Guide RF-0.3 for operating hours)			
Agriculture	N-120	Turner Hall	333-8170
Chemistry	153	Noyes Lab	333-1728
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CRH Snack Bar	120	Snack Bar	333-1851
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Florida Ave Res Hall		FAR	333-2695
Illinois St Res Hall		ISR	333-0307
Mechanical Engineering	65	MEB	333-1430
Psychology	453	Psych Bldg.	333-7815
Social Science	202	Lincoln Hall	333-0309

CSO operates a CDC Cyber 175 with 262K words of central memory and a CDC Cyber 174 with 196K words of central memory. The 175 and 174 run under the NOS Operating System and share 512K words of ECS. The 175 serves over 200 simultaneously active text and graphics terminals and the 174 serves over 100 simultaneously active terminals. CSO also operates an IBM 4341 Model M2 with 8 million bytes of memory running HASP-OS/MVT under VM and an IBM 4341 Model L10 with 4 million bytes of memory running VM. In addition, CSO operates a DEC VAX 11/780 with 4 million bytes of memory, running under the UNIX Operating System and driving a GSI CAT-8 phototypesetter. The above systems are for general campus computing; other "special" systems are also maintained by CSO.

Operating Hours (see HEARYE,SCHEDUL for exceptions):

	CYBERS 174/175	IBM
M-F	8 am - 6 am	8 am - 6 am
SAT	8 am - Midnight	8 am - 6 am
SUN	Noon - 6 am	Noon - 6 am

CYBER SYSTEMS

CYBER MESSAGE FACILITY - INTERMACHINE VERSION

Scott Lathrop

On September 3, the WHO, TELL and MESSAGE utilities on the Cyber computer systems will be updated to support intermachine mail capabilities. It will be possible to pass mail between the CDC Cyber systems, the IBM systems and the VAX/UNIX systems at CSO. This in turn will give you access to the various mail networks available to both the IBM and UNIX systems, including BITNET, MAILNET, ARPANET, UUCP and CSNET. The Cyber systems' mail will look like BITNET mail nodes.

A few of the changes may alter your use of the utilities. In addition, there will be some new features that you may find advantageous. The changes are intended to support ARPA standards for interchange of mail. The ARPA rules should be followed whenever they apply.

CHANGES

Some syntactical changes that will directly affect the use of MESSAGE are as follows:

1. A period will no longer be used to delimit the end of a command and the beginning of text for a message, as in

    TELL, person. text

    This is because the period is used to delimit an ARPA domain name. Instead, a semicolon will be used to delimit the end of a command and the beginning of text, as in

    TELL, person; text

2. Classes previously were delimited with parentheses, but will now be delimited with square brackets, as in

    WHO [CSO, PS0012]

    This is because parentheses are used to delimit comment fields in ARPA message headers.

ENHANCEMENTS

Several enhancements are being made to the MESSAGE utility to support intermachine routing and to change the appearance of displays. These are described below.

1. Message size -- Previously messages were limited to 4 PRUs. The new MESSAGE will allow messages of up to 8 PRUs.

    When a message that is over 8 PRUs in length comes from another host, the message will be broken into multiple messages, each no more than 8 PRUs in length. If the incoming message is over 64 PRUs, it will be truncated, and the truncated portion will be thrown away. The last

line of the message will indicate that a truncation has occurred, but the original sender will not be automatically notified of the truncation.

2.   FORWARD will now prompt for text to be added to the message being forwarded. In the past, such text had to begin on the command line. If you don't want to add any text, use FORWARD/NOTEXT.

3.   A /NOTEXT option will allow you to do a TELL or FORWARD without adding any text. In the case of TELL, you will be able to create a SUBJECT header with no text body.

4.   To send mail to a person on another host (such as UIUCVMD) on BITNET, you will need to use the form:

   TELL, person@ host

such as in

   TELL,LATHROP@UIUCVMD

The syntax to include domain names (such as ARPA, CSNET, UUCP, or MAILNET) will be:

   TELL, name@ host.domain

When entering addresses, the characters — (dash), % (percent), and ! (exclamation mark) are often used and will be allowed.

   NOTE: Many times the case of names is important, and will be honored except on a Cyber control statement. If you need lower case names, enter the names while in MESSAGE or when prompted by WHO, TELL, or MESSAGE.

Names for people on other hosts may be included in the OPTION file simply by replacing the user number or University ID entry with the full name and host address, as in

   MAIL
   lathrop@uiucuxc,scott
   persona@uiucvmd,user-name
   PERSONB,USERNAME

The OPTION file **must be edited in /ASCII mode** if you are going to include at-signs (@) or lower case information. You may change your OPTION files now without impacting the old version of MESSAGE, provided you don't try to send mail to the new off-host entries before the new version of MESSAGE is installed.

5.   Routing -- You will be able to route messages to anyone, on or off the Cyber. Routing implies that all mail sent to you is automatically passed along to whomever you have specified with the ROUTE option of MESSAGE. For example, if while logged in under user number 3DNNLCM the following command was issued   .

   ROUTE,lathrop@uiucvmd

it would cause all mail sent to 3DNNLCM to automatically be sent to LATHROP on the CSO system UIUCVMD.

6. Cyber names -- People sending mail from another host to the Cyber **must** use the Cyber user's University ID or user number.

7. Subject -- When entering a message, you will be asked for a subject, which can be one line long. When using REPLY and FORWARD, a /SUBJECT option may be added to prompt you for a new subject header to replace the current header. If you don't request a change, REPLY and FORWARD will retain the current subject header.

8. Carbon copy lists -- If you wish to add a carbon copy field to the mail, use the /CC option on any TELL, REPLY, or FORWARD command. It will take effect only on that command invocation, unless you have specified /CC in your OPTION file.

   When responding to a message (if it had a carbon copy list), you will be asked whether you want to retain the same carbon list. If you do not wish to retain the list, simply answer NO. If you have an OPTION file which contains /CC, you will then be prompted for a list -- simply enter a null line if you do not want to send the reply to anyone else.

9. Reply -- When sending a REPLY (or SREPLY), if you want to send the message to everyone on the "To:" list as well as everyone on the "From:" list, you will be able to use the /ALL option on the REPLY command, as in

       REPLY/ALL

   Normally, REPLY only goes to people on the "From:" list and the "Resent By:" list. The "Resent By:" list would include anyone that has forwarded the message.

10. When you send mail to someone on another host, there will be no way to track the progress of the delivery or to cancel the mail. If you send mail to only one person, and that person is on another host, the message will not even go into the Cyber mail database.

11. When you are sending mail to someone on the Cyber and the database becomes busy, the message will be automatically placed into a queue to be delivered later, provided the queue itself is not full (which might happen if the database were locked up for an extended period - like half a day).

    You will not see the message in your summary until it has actually been added to the database.

    If you are reading mail, you may still see "MAILBOX BUSY" messages.

12. When you send mail to a large number of people, the header will indicate the number of people rather than listing every individual. When you send mail to a class (e.g., [CSO,PS0012]) the class name will appear in the header, to provide brevity.

    To see the full list of people, you will have to enter the EXPAND command before listing the message. The NOEXPAND command then reverts to condensing the "To:" list.

13. Mail from another host will be placed in a queue. A system utility will "wake-up" every few minutes and deliver any incoming mail. In the same manner, outgoing mail will be picked up and sent in about the same interval.

    This is the same process used to deliver mail when the database is busy. The time interval can be adjusted to accommodate traffic.

For purposes of reporting problems or inquiring about names on the Cyber systems, a signon of POSTMASTER may be addressed. Simply enter

TELL,POSTMASTER

to pass along any comments or questions.

IBM SYSTEMS

SOME OS/MVT PROCS TO BE REMOVED

Beth Richardson

Due to lack of use, the following IBM OS/MVT procs will be removed from the system on September 23, 1985:

ALGOLW	COB	FMACLKED	GTFSNP	RPGLDGO
ALTRAN	COBLDGO	FMACLKGO	ICES	RPGLKED
ALTRANTR	COBLKED	FMT	LDGOCOB	RPGLKGO
ASSIST	COBLKGO	FORMAT	LDGORPG	SNOBOL
CC	DATATEXT	GOCOB	LKEDCOB	SPASM
CCG	DKLST	GOFMAC	LKGOCOB	SPITBOL
CCL	ECAP	GPSS	LKGORPG	SPITLKED
CCLG	FMAC	GTF	MULV	WATBOL
CLEAN	FMACLDGO	GTFCCW	RPG	

If this action will cause you serious difficulties, please contact Beth Richardson, 189 DCL, 333-6276.

IBM SOUPAC IS GOING AWAY

Joan Mills

The SOUPAC statistical package, which has been on the IBM 4341 under the OS/MVT operating system and two previous IBM systems, will be discontinued when the OS/MVT system is taken off at the end of this year. The CDC Cyber version will continue.

CSO would like to anticipate users' continuing needs, and provide alternative programs and advice to IBM SOUPAC users. If you will have computing problems related to the removal of IBM SOUPAC, we would like to hear from you. Please send your comments to Joan Mills, 129E DCL (333-2172), or TELL,UN=3IEUZMN on the Cyber, or NOTE MILLS at UIUCVMD.

TECHNIQUES FOR TRANSFERRING
SAS DATA SETS FROM OS/MVT

Vicky Dingler

There are several techniques for transferring SAS data sets from OS/MVT disks to other types of storage devices and mediums. The data sets can be copied either to tape or to disk. The choice should be made with long term goals and short term goals in mind. These techniques are described in a technical report titled "TECHNIQUES FOR TRANSFERRING SAS DATA SETS FROM OS/MVT." If you have an OS/MVT SAS data set, you should get a copy of this report from either the CSO Distribution Office or the Consulting Office at 1208 W. Springfield.

If the data set is to be used only at the University of Illinois, it can be stored on either tape or CMS disk. However, if the data set has been used under OS/MVT and not under CMS, the data set will have to be reformatted before using it under CMS. Examples of reformatting data sets for use on CMS disk are shown on pages 10 and 13 of the technical report; examples for reformatting data sets and storing them on tape are shown on pages 4 and 7.

If the data set is to be used here only for a short period of time and then is to be used at another installation, you can write the SAS data set to tape or disk for use under CMS as described above. However, a better technique is to write the SAS data set to tape in 80 column raw data format. This allows maximum use of your data set here and is the best method to use for transferring data to another site. This technique is described on page 16 of the technical report.

Techniques for copying SAS data sets from SAS data libraries are described beginning on page 4 for using tape storage and on page 10 for using CMS disk storage.

Cyber users can use the same techniques if they have userids on the IBM. Two additional statements are necessary to send the OS/MVT batch jobs across the hyperchannel. They are the /JOB and the /NOSEQ statements before the //userid JOB statement.

Any questions concerning these techniques can be directed to Vicky Dingler, the CSO SAS Coordinator, IBM userid DINGLER or Cyber UN DINGLER. The CSO consulting staff is also available for advice.

USING THE IBM 7171 TO ACCESS CMS IN FULL-SCREEN MODE
FROM A LINE-ORIENTED (ASCII) TERMINAL

Dan Theriault and Joan Alster

CSO has purchased two control units which provide links between line-oriented terminals and the IBM computers. The IBM 7171 ASCII Device Attachment Control Units allow users to run CMS in full-screen mode from line-oriented terminals. Using an IBM 7171 is similar to using the simulator (via DIAL SIM), but has several advantages:

1. The keystroke sequences required to use PF keys and other function keys are shorter and often easier to use.

2. The 7171 provides type-ahead capabilities so the terminal does not lock up when the user is typing and receives a message.

3. Individuals or departments with their own LocalNet (Sytek) connections can access CMS through the 7171 at 9600 baud. (Access through the switch or through CSO public sites on LocalNet will continue to be at 1200 baud.)

Accessing CMS through a 7171 can be accomplished as follows:

LocalNet call numbers:

    VMD: 4500
    VME: 4700

Switch classes:

    VMD: VMDFS   (Note: The FS stands for "full-screen.")
    VME: VMEFS

Dial-up switch classes:

    VMD: DVMDFS
    VME: DVMEFS

After connecting to the 7171, you will be asked to enter your terminal type. If you press RETURN, you will receive a list of valid terminal types. After entering the correct terminal type, the VM logo will be displayed, and logon can proceed as usual.

To obtain help information for the 7171, including appropriate keystroke sequences for full-screen emulation, issue the command:

    HELP CSO 7171

after logging on. To obtain a hard copy of the help file, type

    WRITEUP CSO 7171

and follow the instructions provided for specifying print destination and bin number.

Unlike SIM, the 7171 is not interruptible. Thus, there is no function analogous to #help in SIM which allows a user to obtain a list of appropriate keystroke sequences at any point during a terminal session. Therefore, users are advised to consult the above-mentioned help file **before** first using the 7171.

NETWORKING SERVICES

LOCALNET ACCESS AND MAINTENANCE FEES

In the last issue of *OFF-LINE*, we described how the LocalNet network was to be expanded by making use of the University's cable TV facilities (called the sub-split system). In that article we announced that a Network Access Fee of $150.00 per year would be charged for both the coaxial cable (mid-split system) and the cable TV (sub-split system). Due to some changes in the pricing structures, we would like to correct that statement to the following: *A LocalNet Access Fee of $150.00 per port per year will be charged for equipment connected to the coaxial (mid-split) cable system and a fee of $200.00 per port per year will be charged for equipment connected to the cable TV (sub-split) system.*

This fee is charged to users having CALL privileges (those whose LocalNet ports are configured to allow outgoing calls) and is not charged to user ports attached to incoming Host or other "receive only" device ports (those whose LocalNet ports are configured to receive, but not make calls). A user whose TMux, TBox, or SMux (also referred to as Packet Communication Unit or PCU) has a mixture of incoming and outgoing ports will be assessed the access fee for only those ports which are configured to be outgoing.

The purpose of the yearly Access Fee is to help defray the costs of maintaining the LocalNet network, including equipment needed for Network Control and Operation and the Physical Layer Broadband Cable equipment. In addition, this fee covers any necessary maintenance of user PCUs, including temporary installation of a "loaner" PCU should a malfunctioning user device need to be taken away for repair.

This LocalNet Access Fee is **not** intended to cover repairs of PCU failures due to negligence or misuse, or failures that turn out to be improper operation of PCU-attached user equipment or errors attributable to the user himself. Any service calls made by CSO that result from such "user faults" will result in an additional charge of $36.00 per service hour. This means that it is to the user's advantage (1) to understand the operational characteristics of his LocalNet equipment, and (2) to be certain that it is the PCU and **not** his own equipment that is at fault before requesting a service call.

As in the past, CSO will continue to maintain its "hotline" service number (333-0969) for assistance to users who may be in doubt about where their problem lies.

MICROCOMPUTER SERVICES

A REMINDER: MICRO SHAZAM

Esther Edwards-Iwe

In the last issue of *OFF-LINE*, we announced that if we received a firm commitment from enough users who were interested in the Micro SHAZAM package, we would be able to obtain it at a discount price of $50.00 per copy (regular price is $250.00 per copy).

Since that article was published, we have had a number of inquiries as to what SHAZAM is and what it can do. This article provides a brief description of SHAZAM. In addition, to provide us with a firm

idea of the number of people wanting this package, we are requesting that those persons interested please fill out the form at the end of this issue and return it to CSO.

SHAZAM is a comprehensive computer program for econometricians, statisticians, engineers and others who use techniques common to econometrics in their work. SHAZAM has been made available on the Cyber as well as the IBM/CMS system for some time. SHAZAM is relatively easy and inexpensive to use and has great flexibility. It has primary capabilities in regression analysis, simultaneous equation estimation, and principal components. Secondary capabilities are in factor analysis, analysis of variance, sorting and plotting of variables. SHAZAM provides extensive data manipulation capabilities. For more information on the SHAZAM package, see the on-line writeup on either of the mainframes.

On the Cyber:

        WRITEUP,SHAZAM.
        PRINT,SHZDOC/AS/CC/EJ/FORMS=PPS.

On the IBM/CMS:

        SHAZAM WRITEUP
        NPRINT SHAZDOC

The micro version of SHAZAM is available on three diskettes (it can be copied onto hard disk if desired). It is essentially the same as the version on the mainframe computers. Micro SHAZAM can be operated on any IBM PC-compatible computer that has at least one diskette drive, at least 448K of internal memory, and the DOS 2.0 (or higher) operating system. A printer is useful, but not necessary.

There are two versions of Micro SHAZAM, depending on whether or not your microcomputer has an 8087 math coprocessor. The two versions are the regular version (used without an 8087 math coprocessor) and the 8087 version (used with an 8087 math coprocessor). The 8087 version uses slightly less memory than the regular version.

If you are interested in this Micro SHAZAM package, please complete the form at the end of this issue, specifying which version you want. If you have further questions, please contact Esther Edwards-Iwe, 131-B DCL, 333-8629 (if no answer please leave your name and telephone number at the CSO office, 333-1637, so that your call may be returned.)

DOCUMENTATION

NEW AND REVISED DOCUMENTATION

Following is a list of new and revised CSO Reference Guides.

(Note: The Reference Guide List, RF-0.1, may show some revision dates for reference guides that are not yet in the drawers. We try to announce revisions and new guides only when we are sure they will actually be available at the time of the printing of *OFF-LINE*; however, there are occasionally times when a delay at the printers causes some problems. If we announce a revision, and you do not find updated copies at the sites, it is probably due to a delay in printing -- mention it to the site operator if you wish, and then check again in a few days. We are sorry if this occasionally causes our users some inconvenience.)

Reference Guides

RF-0.1	Reference Guide List	Revised 06/15/85
RF-0.4	Routing Codes	Revised 06/15/85
RF-1.7	Xerox 2700 Laser Printer	Revised 05/22/85
RF-2.6	Pascal	Revised 05/30/85
RF-12.1	Compilers	Revised 03/28/85
RF-17.1	Cataloged Procedures	Revised 03/28/85
RF-20.1	Using the IBM 3178 Terminals	Revised 06/15/85
RF-20.2	SIM3278 (SIM) for IBM Timesharing	Revised 06/15/85
RF-20.3	Sending Files to CMS from the Cybers	Revised 04/15/85
RF-20.4	Some Differences Between the CMS Primer and CMS at the University of Illinois	New 06/15/85
RF-23.1	SAS Under CMS	Revised 04/15/85
RF-25.1	NPLOT	Revised 06/15/85
RF-25.2	Producing Hard-Copy Zeta Plots with SAS/GRAPH	Revised 06/15/85

NOTE: There have also been some minor changes made in the tape technical notes, TN-150, TN-152 and TN-153. However, since the changes were minor in nature, the dates were not changed at this time.

MISCELLANEOUS

SRL ACCEPTING SUMMER WORK

The Survey Research Laboratory will be accepting a limited amount of data entry and programming work during the 1985 summer term. This service is available to all University of Illinois faculty, staff and students, and projects are accepted on a first come, first serve basis. For more information, please call the Survey Research Laboratory Data Processing Section (333-1257 or 333-7328).

HELP WANTED AND SALES

STUDENTS NEEDED AS MICROCOMPUTER CONSULTANTS

CSO is now hiring a staff of microcomputer consultants and has several positions available for qualified students. If you are a student and are interested in working as a microcomputer consultant, please contact Robert Penka, 173 DCL (333-4709).

PERMANENT HALF-TIME STATISTICAL RESEARCH PROGRAMMER

Available immediately or starting August 21, this position will involve management and statistical analysis of biomedical data sets generated in collaborative research projects with health science

investigators, an increasing amount of research programming in biostatistical methods and, potentially, some work on development of computer-based teaching using IBM-mainframe computers or micro-computers. Strong statistical background and knowledge of SAS programming are major qualifications, as is an ability to work collegially with researchers in other disciplines who are not necessarily statistical or computer sophisticates. Experience with UI IBM and Cyber mainframe computer systems is helpful, as is experience with SAS in a CMS environment. Send a full written resume/description of background and qualifications, with names of at least two references, to:

> Prof. Peter B. Imrey
> Coordinator, Medical Statistics and Epidemiology
> Dept. of Medical Information Science
> College of Medicine
> 190 Medical Sciences Building
> 506 S. Mathews Ave.
> Urbana, IL 61801

Working schedule and salary negotiable.

ILLINOIS STATE GEOLOGICAL SURVEY

Computer Scientist and Head, Computer Research and Services Unit. Job description: direct, coordinate, develop, and participate in research and service programs that inform the public and assist industry and government agencies in the logical and responsible application of computers to mineral resource and environmental problems of Illinois; provide assistance to Survey Staff involved in research/service projects and/or Survey administration; provide advice concerning the coordination of other computer activities outside of the Unit; actively seek support and funding for Unit programs; recommend and administer Unit Staff development and training; and execute other special duties and projects that may be delegated or assigned by the Chief of the Survey or Group Heads.

Qualifications: Advanced degree in Computer Science; degree in Geology or related field and/or record of successful scientific application of computers to geological problems desirable. Other requirements desired: minimum of 6 years of professional experience with 3 years of experience in systems management and development; minimum of 3 years experience in management of personnel and funds; ability to generate funding; good communication skills.

Salary negotiable. Closing date: August 31, 1985. Send resume and names and addresses of three references to:

> Personnel Office
> Illinois State Geological Survey
> 615 E. Peabody Drive
> Champaign, IL 61820

ISGS is an Affirmative Action/Equal Opportunity employer.

COMPUTER PROGRAMMER WANTED

The Illinois Natural History Survey has an opening for a part-time programmer for up to 20 hours per week. The position is available immediately and will last at least until the end of the fall semester, with preference being given to those candidates who could also be available for the spring semester. The

person hired will assist the regular programming staff on one or more of the following tasks: (1) Working with a *scientific* database management system, INFO, on the PRIME computer system to develop an insect pest reporting system; (2) Working with the INFO system to develop a weather database for use with scientific models; (3) Manipulating large data files; (4) Transferring files between computer systems; (5) Translating existing Fortran programs to run on a PRIME or on an IBM-PC; (6) Developing application programs for the PRIME or the IBM-PC.

If you have skills in one or more of these areas, we would like to talk to you. We are especially interested in those candidates with interest and/or experience with database management programs, as a large portion of the work will involve these applications. It is not necessary, however, to have specific experience with INFO. It is possible that this position could be converted to a graduate assistantship. For further information, and to apply for this position, please respond *in writing* to:

Laura Lynn Walsh
Illinois Natural History Survey
172 Natural Resources Bldg.
Champaign, IL 61820

Please include a brief description of your abilities and experience, and a statement of your availability, both in terms of weekly schedule and long term plans. Samples of program code are also welcome.

TAPES FOR SALE

The Bureau of Economic and Business Research has approximately twenty used nine-track 1600 bpi rated tapes for sale at $5.00 each. For more information, or if you are interested in purchasing one or more tapes, contact:

David Mandy
Bureau of Economic and Business Research
428 Commerce West
1206 S. Sixth St.
Champaign, IL 61820
Telephone: 333-2330

CSO'S TI-745 TERMINALS FOR SALE

On July 1, 1985, CSO went out of the terminal rental business. As a result, we are interested in selling our TI-745 terminals; price is $400.00 with a 90-day guarantee on the printhead. These terminals can be purchased on by those persons having a University account number -- no personal sales. If you are interested in obtaining one of these terminals, please contact Don McCabe, 162 DCL (333-4349).

QUESTIONAIRE FOR SAS USERS

THIS QUESTIONAIRE IS DESIGNED TO DISCOVER THE NEEDS OF THE SAS USER COMMUNITY, AND THE ROLE THAT SAS PLAYS IN RESEARCH ACTIVITIES ON CAMPUS. PLEASE FEEL FREE TO ANSWER THE QUESTIONS IN ANY FASHION, USING THE REVERSE SIDE IF NECESSARY.

1. UNVERSITY ID

    _____

2. NAME

    _____

3. DEPARTMENT

    _____

4. CAMPUS ADDRESS

    _____

5. COMPANY NAME

    _____

6. STREET ADDRESS

    _____

7. CMS LOGON

    _____

8. CYBER LOGON

    _____

9. LEVEL OF SAS EXPERTISE
    __BEG   __INT   __ADV

10. WILLING TO PAY FOR SHORT COURSES?
    ____YES   ____NO

11. WHAT LACK OF KNOWLEDGE MOST LIMITS YOUR USE OF SAS? _____
    _____

12. WHAT ARE YOUR MOST COMMON USES OF SAS?
    ___REGRESSION   ___ANOVA   ___ETS   ___REPORT WRITING   _____OTHER
    _____

13. WERE YOU AWARE OF THE NEWLY FORMED SAS USERS GOUP FOR THE URBANA CAMPUS?
    ____YES   ____NO

14. WHAT TOPICS SHOULD BE PRESENTED AT FUTURE SAS USERS GROUP MEETINGS?
    _____
    _____

15. HOW FREQUENTLY SHOULD SAS USERS GROUP MEETINGS BE SCHEDULED?
    ____EACH SEMESTER   ____SPRING AND FALL SEMESTERS   _____OTHER
    _____

16. IF YOU DO NOT USE CMS FOR YOUR SAS PROCESSING, WHAT ARE THE CONSIDERATIONS
    FOR DOING SO?_____
    _____

MICRO SHAZAM ORDER FORM

Please indicate below if you are interested in ordering a copy of Micro
SHAZAM at the discounted rate of $50.00 (regular price $250.00)

Date: _____

Name: _____

Address: _____

Telephone: _____

Please indicate the number of copies:

"regular" version   _____

"8087" version   _____

Send this form to:

Esther Edwards-Iwe

131-B DCL

1304 W. Springfield

Urbana, Illinois 61801

PLEASE DO NOT SEND PAYMENT WITH THIS ORDER FORM.

OFF-LINE's Mailing List

If you wish to be placed on our mailing list for future issues of *OFF-LINE*, if you wish to be removed from the list, or if you wish to enter an address correction, please complete and return this page. **(Current subscribers are kept on the mailing list until a specific request for removal is received, or until a mailing is returned as undeliverable.)**

Check one: □ Place my name on mailing list
                    □ Make the following corrections or changes
                    □ Delete my name from mailing list

_____

First name -- Initial -- Last Name

Campus Address:

_____

Room - Building

_____

Department

Off-campus Address:

_____

Organization or Company (if applicable)

_____

Street Address

_____

City -- State -- Zip Code

If address correction, give old address and zip code below.

_____

_____

_____

7/85

SEND TO: **OFF-LINE**
                      150 Digital Computer Laboratory
                      University of Illinois at Urbana-Champaign
                      1304 West Springfield Avenue
                      Urbana, Illinois   61801

Computing
Services
Office

Off-Line

HELP WANTED & SALES

INDEX OF 1984-85 ARTICLES

CSO DIRECTORY - STAFF AND SERVICES

Administrative

Director	George Badger	150 DCL	333-4103
Business Manager	Stanley Rankin	150 DCL	333-6530
Secretary	Joyce McCabe	150 DCL	333-1637

User Services and Hardware/Software Support

User Accounting		1208 W Springfield	333-7752
Documentation Center		1208 W Springfield	333-9230
Systems Consulting		1208 W Springfield	333-6133
Statistical Services Consulting		85 Comm West	333-2170
Text Processing Consulting		118 DCL	333-7318
Maintenace & Repair Service		194 DCL	333-0969
Tape Service, Special Plots, Xerox Laser Printer		123 DCL	333-8640

Dial-up Numbers	CYBER 175 (NOSA)	300 baud	333-4000
	CYBER 174 (NOSB)	300 baud	333-4004
	IBM 4341 L10 (VME)	300 baud	333-4005
	IBM 4341 M2 (VMD)	300 baud	333-4006
	Switch	1200 baud	333-4008
	TELENET (local no.)		384-6428

Personal Computers/EXCEL	Robert Penka	173 DCL	333-4709
Supercomputer Activities	Sandra Moy	177 DCL	333-4703
Networking	Sue Greenberg	187 DCL	333-3723
Maintenance	Larry Crotser	169 DCL	333-5190
Consulting	Stan Kerr	179 DCL	333-4715
Statistical Services	Beth Richardson	189 DCL	333-6276
Accounting Services	Gary Bouck	1208 W Springfield	333-7752
Microcomputer Laboratory	Jack Knott	86 Comm West	333-6562
User Training (Short Courses, Videotapes)	Ron Szoke	131D DCL	333-8630
Documentation	Lynn Bilger	120 DCL	333-6236
CYBER-IBM-VAX Operations	Myra Williams	168 DCL	244-0186
Laboratory Support Project	Mike Gardner	1207 W Springfield	333-7904
Site Operations	Sylvia Hansen	65 ME	333-6285
	Chuck Harnsberger		

CSO Sites (see Reference Guide RF-0.3 for operating hours)

Agriculture		N-120 Turner Hall	333-8170
Chemistry		153 Noyes Lab	333-1728
Commerce West		70 Comm West	333-4500
CRH Snack Bar		120 Snack Bar	333-1851
DCL Routing Room		14 DCL	333-6203
Electrical Engineering		146 EEB	333-4936
Florida Ave Res Hall		FAR	333-2695
Illinois St Res Hall		ISR	333-0307
Mechanical Engineering		65 MEB	333-1430
Psychology		453 Psych Bldg.	333-7815
Social Science		202 Lincoln Hall	333-0309

CSO operates a CDC Cyber 175 running under the NOS 1 operating system and a CDC Cyber 174 running under the NOS 2 operating system. CSO also operates several IBM 4341s and an IBM 3081 running VM. In addition, CSO operates a DEC VAX 11/780 running under the UNIX Operating System and driving a GSI CAT-8 phototypesetter, and several other Vax and Pyramid systems. The above systems are for general campus computing; other "special" systems are also maintained by CSO.

Operating Hours (see HEARYE,SCHEDUL for exceptions):

	CYBERS 174/175	IBM
M-F	8 am - 6 am	8 am - 6 am
SAT	8 am - Midnight	8 am - 6 am
SUN	Noon - 6 am	Noon - 6 am

POLICY

USER TRAINING PROGRAM

Short Courses, Manuals and Training Cassettes
for the CSO Computer Systems
Fall Semester 1985

SHORT COURSES

CSO is offering the following noncredit short courses during the Fall semester 1985 to acquaint potential users with our computing systems, facilities and services.

Short Course Policy

Please note that:

1. CSO makes a small charge for most short courses. This is due to two factors: (1) There is a need for equipment to support improvement in teaching methods; (2) The volume of short courses has risen to the point where it is a serious drain on consulting staff time, and some compensation in staffing must be made. The income is dedicated to support of the short course program.

2. REGISTRATION IS REQUIRED for all courses except where noted. Registration is accomplished by filling out a SEPARATE copy of the registration form and SEPARATE check or voucher for each registration and sending these documents to CSO in either campus or U.S. mail. Walk-in registrations will be accepted in room 150 DCL only during the hours of 3pm to 5pm on working days.

3. The registration form is available on-line on the Cyber 175 via:

    TYPE,REGFORM/AS/UN=COURSES

    or you may call 333-1608 and request that one be sent.

4. Each registrant will be sent a confirmation of registration on which the place of meeting is noted. This slip must be taken to all meetings of the class and shown when requested.

5. Refunds of fees will be made only for canceled classes, or upon receipt of an application for refund on or before the day BEFORE the second meeting of the class. There will be no such refunds for classes that meet only once. Application for a refund must be made in room 150 DCL during normal office hours; no applications will be accepted by telephone. Refunds are made by means of a credit memorandum (good for one year); exceptions will be made only in extremely unusual circumstances and at the discretion of the user training coordinator.

6. A copy of the current (updated) short course listing may be examined on-line on the Cyber 175 via:

    TYPE,COURSES/AS/UN=COURSES.

7. Updates (changes) since the printed short course listing was issued may be examined on-line on the Cyber 175 via:

    TYPE,UPDATES/AS/UN=COURSES.

    This file contains current information on courses and sections that have been newly opened, canceled, filled and closed, etc.

8. CSO reserves the right to cancel courses or sections with insufficient enrollment. All fees paid for these classes will automatically be returned.

9. Tax deduction for educational expenses: Treasury Regulation Section 1:162-5 permits an income tax deduction for educational expenses (such as registration fees) undertaken (1) to maintain or improve skills required in one's employment or other trade or business; or (2) to meet express requirements of an employer or a law imposed as a condition for retention of employment, job status, or rate of compensation.

Questions, comments and suggestions should be addressed to the CSO user training coordinator: Ron Szoke, 333-8630 or TELL,SZOKE from a Cyber 175 terminal or NOTE SZOKE @ UIUCVMD from a CMS terminal.

Short Course Summary: Titles

NOTE: For ease of reference, short courses are now classified into six groups, depending on the computing system addressed:

G series: **General and Introductory**
G10.   Orientation to CSO Facilities and Services
G18.   Data Communications and Networking
G23.   Computing for Poets

M series: **Microcomputers (Especially the IBM PC)**
M15.   Basic Concepts in Computer Information Processing
M21.   Quick PC
M41.   Using a Word Processing Package
M43.   Using a Spreadsheet Package
M45.   Using a Database Package
M61.   Using a Decision-aiding Package
M63.   Instructional Use of Computer-controlled Video

Statistical Computing

M73.   Using a Statistical Package

C series: **The CDC Cyber Network Operating System (NOS)**
C11.   Introduction to the Cyber System: NOS Version 1
C12.   Introduction to the Cyber System: NOS Version 2
C15.   Use of MANAGE

Computer Graphics

C61.   Easy Graphing
C62.   Using Blaze Graphics

I series: The IBM VM/CMS System

  123.   Introduction to IBM Timesharing: CMS and XEDIT
  131.   Using BITNET
  151.   Introduction to the VM/SP System Product Interpreter

Statistical Computing

  171.   Introduction to Statistical Package Computing
  176.   Introduction to SPSSX
  181.   Orientation to CSO SAS Services
  183.   Introduction to SAS (Statistical Analysis System)
  184.   Update on SAS Version 5 (1985)

Statistical Package Graphics

  198.   Introduction to CMS SAS/GRAPH

U series: The UNIX System

  U11.   Introduction to the UNIX System
  U13.   Introduction to the UNIX Editors: ex and vi
  U15.   Introduction to the UNIX Shells
  U19.   The UNIX Package

X series: Mixed and Other Systems

Statistical Computing

  X79.   Repeated Measures Analysis Using SPSS or SPSSX MANOVA

Short Course Listing

G series: General and Introductory

G10.   Orientation to CSO Facilities and Services

A brief, nontechnical presentation for prospective users on the following topics: the mission and organization of CSO; computing equipment; locations of facilities and hours of operation; available software; where to obtain documentation; user training (short courses and training tapes); consulting and other services; how to set up a computer account. Recommended manual: *An Index to Software on the Cyber 175* (see MANUALS, below). No prerequisites. No fee. NO REGISTRATION IS REQUIRED. Six sections will be offered.

  1.   August 28   12N-1pm   115 DCL [Dingler]

  2.   August 30   12N-1pm   441 Altgeld [Bruce Richardson]

  3.   September 3   8am-9am   137 Administration [staff]

  4.   September 5   3pm-4pm   505 E. Green, Room 226 [staff]

  5.   September 10   3pm-4pm   505 E. Green, Room 226 [Szoke]

  6.   September 12   8am-9am   115 DCL [Mills]

G18. Data Communications and Networking

This class will discuss: connecting a terminal to a computer both locally and remotely; long distance communication media; EIA RS232 standard interface wiring; modems; multiplexing; file transfer between computers and the software available for accomplishing this. Assumes M15 or equivalent knowledge of computer fundamentals. Fee: $10.

November 11,13,15   3pm-4pm   [Krol]

G23. Computing for Poets*

A brief general orientation to computers and computing for those in the humanities and fine arts. Intended especially for those with "computer anxiety" and those who are "anti-computer" or "anti-technology." The course assumes no background in computing, mathematics, or any other technical field. NOTE: This is not a "hands-on" course and there is substantial overlap with M15. Prerequisites: none. Fee: $15.

*"Poets" is meant poetically, not literally.

September 16,17,18,19   12N-1pm [Szoke]

M series: Microcomputers (especially the IBM PC)

M15. Basic Concepts in Computer Information Processing

An introductory survey of computer information processing concepts and terminology, intended especially for those thinking of acquiring a small computer or word processing equipment. The needs of UI administrative, clerical and nonacademic personnel have been central to the planning of the course. Some guidelines for buying a personal or microcomputer are suggested, but attendees will NOT be told which one to buy, nor which one is "best." NOTE that there is no laboratory or "hands-on" component to this course, and that its contents substantially overlaps G23. No prerequisite. Fee: $15.

September 9,11   3pm-5pm [Szoke]

M21. Quick PC

A concise review of essentials of using the IBM Personal Computer: basic hardware configuration (keyboard, system unit, disk drives, printer); proper care and handling of diskettes; hands-on experience using the PC-DOS operating system to format a diskette and to copy, type, rename and delete files; software packages available from CSO and how to check them out; how to load and run BASIC programs and other software packages. Prerequisite: Course G10 and familiarity with basic computer terminology equivalent to one of the following: courses G23 or M15. Enrollment limited to 20 per section. Fee: $10 (includes one diskette).

1. September 9   3pm-5pm [Knott]

2. September 11   3pm-5pm [Knott]

3. September 16   3pm-5pm [Knott]

4. September 18   3pm-5pm [Knott]

5. September 23   3pm-5pm   [Knott]

6. September 25   3pm-5pm   [staff]

7. September 30   3pm-5pm   [staff]

8. October 2   3pm-5pm   [staff]

M41. Using a Word Processing Package

How to use a microcomputer (the IBM PC) and word processing package to produce (create, revise and print) publication-ready manuscripts. Prerequisite: Quick PC (course M21) or consent of instructor. Enrollment limited to 10 per section. Fee: $25 (includes one diskette).

1. Volkswriter Deluxe.
   October 21,22,23,24,25   12N-1pm   [Szoke]

2. PC-Write.
   November 5,7,8   3pm-5pm   [Dewan]

3. Microsoft Word.
   November 19,21,22   3pm-5pm   [Dewan]

M43. Using a Spreadsheet Package

Electronic spreadsheet packages (such as VisiCalc, its successors and spinoffs) are widely considered the most impressive and useful software available for microcomputers. This course introduces participants to the analytical and "what if --" capabilities of a new generation spreadsheet package, Lotus 1-2-3 on the IBM PC. Also, glimpses of this package's database and graphics features if time permits. Prerequisite: course M21. Enrollment limited to 15. Fee: $20 (includes one diskette).

September 23,24,25,26,27   12N-1pm   [Szoke]

M45. Using a Database Package

An introduction to microcomputer database management emphasizing the fundamentals of using database software. Using dBASE II or III we will design and create an information file, enter, select and sort data, and use the package to write a report. If time permits, we may also write a simple program file in the dBASE language. Prerequisite: course M21 or equivalent. Enrollment limited to 15. Fee: $25 (includes one diskette).

October 8,10,11   3pm-5pm   [Szoke]

M61. Using a Decision-aiding Package

A non-technical, hands-on introduction to software designed to process (1) a set of goals to be achieved, (2) alternatives to achieving them, and (3) relations between goals and alternatives in order to choose the best alternative (or combination) in light of the goals, alternatives, and relations. Special concern for dealing easily with multidimensional goals, missing information, overwhelming alternatives, and conflicting constraints. Prerequisite: none. Enrollment limited to 15. Fee: $15 (includes one diskette).

October 7,9   11am-1pm   [Nagel]

M63.   Instructional Use of Computer-controlled Video

This is a one-hour demonstration of a computer-controlled videodisk system for instructional presentations. Some suggestions will be made on how course planners can begin to develop similar technology for the delivery of instruction. Prerequisite: instructional responsibilities at UIUC. Fee: none.

October 22   4pm-5pm   [Smith]

Statistical Computing

M73.   Using a Statistical Package

This course demonstrates how to download a data set from the Cyber 175 system to an IBM PC diskette file. A microcomputer statistical package (probably Microstat) is then used to obtain basic descriptive statistics and do an illustrative regression and analysis of variance. Prerequisite: course M21 or equivalent knowledge. Enrollment limited to 15. Fee: $20 (includes one diskette).

October 21,22,23,24,25   3pm-4pm   [Mills]

C series: The CDC Cyber Network Operating System (NOS)

C11.   Introduction to the Cyber System: NOS Version 1

This course is intended for the first time Cyber 175 system user. Covers signing on, obtaining system information, and basic file concepts and maneuvers. The emphasis is on timesharing usage and the ICE text editor. Batch usage may also be discussed. Prerequisite: course G10. Fee: $15. Enrollment limited to 15 per section. Three sections will be offered.

1.   September 3,4,5,6   12N-1pm   [Scheid]
     (plus two hours to be scheduled)

2.   Sept. 30, Oct. 1,2,3,4   3pm-4pm   [staff]

3.   Oct. 28,29,30,31 Nov. 1   12N-1pm   [Albin]

C12.   Introduction to the Cyber System: NOS Version 2

This course is intended both for new users who wish to learn about the new NOS Version 2 system on the Cyber 174, and for old Cyber users familiar with the NOS Version 1 system as it continues to run on the Cyber 175. Main features of the course are: use of terminals, Cyber files, the ICE text editor, accounting restrictions, and software presently available on NOS 2. If time permits, new features of CCL (Cyber Control Language) will also be discussed. Prerequisite: G10. Fee: $15. Enrollment limited to 15 per section. Three sections will be offered.

1.   September 16,17,18,19,20   12N-1pm   [Kerr]

2.   October 7,8,9,10   7pm-8:30pm   [Kerr]

3.   November 11,12,13,14   7pm-8:30pm   [Pommert]

C15.   Use of MANAGE

How an instructor or project manager allocates computer resources to individual users. Assumes familiarity with simple use of the Cyber 175 (equivalent to course C11). Fee: none.

September 10   8am-10am   [Primer]

Computer Graphics

C61.   Easy Graphing

Elementary presentation of a high-level interactive plotting program for X-Y plots, bar and pie charts. Its English-like commands require no programming experience to generate plots. Assumes course C11, C12, or equivalent knowledge. Fee: $10.

September 23,25,27   3pm-4pm   [Albin]

C62.   Using Blaze Graphics

Blaze is a versatile library of Fortran-callable subroutines for producing X-Y graphs. It is built upon DI-3000, though no knowledge of DI-3000 is necessary for using Blaze. The full range of DI-3000's device-independent functionality is available to the user. Assumes a working knowledge of Cyber Fortran. Fee: $5.

October 9,11   3pm-4pm   [Tuchman]

I series: The IBM VM/CMS Systems

I23.   Introduction to IBM Timesharing: CMS and XEDIT

This course presents an introduction to general CMS (Conversational Monitor System) virtual machine and XEDIT concepts. The CMS portion covers standard and locally-written CMS commands and utilities, sending files between the Cyber 175 and CMS, guidelines for utilizing the available documentation, how to use the full-screen simulator (SIM3278). The XEDIT portion introduces the text editor used under CMS. The presentation covers useful commands for both "ASCII typewriter" and "full-screen" or "simulated full-screen" terminals. Useful locally-written XEDIT commands are also discussed. Required reference and recommended prior reading: *CMS Primer*, available at the CSO Distribution Office, 1208 W. Springfield. Prerequisite: course G10 or equivalent knowledge. Fee: $15. Five sections will be offered.

1.   September 9,10,11,12,13   4pm-5pm   [Dingler]
     Lab: September 14   9am-11am

2.   September 23,25,27   4pm-6pm   [Kesner]
     Lab: September 28   8am-10am

3.   October 21,22,23,24,25   3pm-4pm   [Wetzel]
     Lab: October 26   8am-10am

4.   November 7,12,14   4pm-6pm   [Alster]
     Lab: November 16   9am-11am

5.   November 18,19,20,21,22   8am-9am   [Mills]
     Lab: November 23   8am-10am

131.   Using BITNET

A brief presentation on how to use the BITNET communications facility, which links some 165 IBM/CMS and RSCS-compatible sites in the USA, Canada, and several foreign countries, and which allows the transmission of files as well as messages. Prerequisite: I23 or equivalent knowledge of CMS and a CMS logon. Fee: none.

        September 24   3pm-4pm   [Wetzel]

151.   Introduction to the VM/SP Product Interpreter

This is an introduction to the System Product Interpreter (SPI) under CMS. SPI is a facility which allows you to write programs comprised of CP, CMS, and/or XEDIT commands using one of three languages: EXEC, EXEC2, or REXX (the Restructured Extended EXecutor language). Using SPI, you can write or tailor your own CMS commands (called execs) or XEDIT commands (called macros). You can also write procedures (called execs) which accomplish a sequence of repeated tasks by simply entering the name of the exec. This course gives an overview of SPI with primary emphasis on the REXX language. Examples will include creating your own PROFILE EXEC and PROFILE XEDIT files. Prerequisites: I23, I71, or the equivalent. Recommended references: *The VM/SP System Product Interpreter User's Guide* and the *VM/SP System Product Editor User's Guide*, available at 1208 W. Springfield. The course consists of two 2-hour lectures. Fee: $15.

        October 22,24   4pm-6pm   [Kesner]

Statistical Computing

171.   Introduction to Statistical Package Computing

The purpose of this course is to equip the novice computer user or the newcomer to this campus with the basic knowledge necessary to utilize CSO's IBM system to perform statistical analyses. The course assumes no prior experience with statistical packages or with the IBM CMS timesharing system. Topics: highlights of the major available statistical packages (BMDP, SAS, SPSSX, SCSS, IDA); what documentation is available, data organization and formats required for statistical package use; essentials of the CMS timesharing system; program and data entry using the XEDIT text editor; how to run sample jobs using the major statistical packages. (Note: this course is NOT intended to replace the regular introductory courses for each package.) Two 2-hour lectures followed by a 3-hour lab session covering the basic file concepts and timesharing terminal usage. Prerequisite: course G10. Fee: $25.

            October 15,17   4pm-6pm   [Alster]
            Lab: October 19   9am-12N

176.   Introduction to SPSSX (Statistical Package for the Social Sciences)

This course is designed to present the basics of SPSSX usage. Topics will include file definition, data input, and sample procedure specification. The emphasis of the course will be on the structure and implementation of SPSSX programs. Examples will be used extensively. Recommended reference: *SPSSX Introductory Statistics Guide*, available from the CSO Distribution Office, 1208 W. Springfield for $14. Prerequisite: I23, I71, or equivalent. Fee: $25.

            October 8,10   7pm-9pm   [Bruce Richardson]
            Lab: October 12   9am-11am

181.   Orientation to CSO SAS (Statistical Analysis System) Services

A brief overview of the SAS computing facilities and services offered by CSO, including: the SAS Institute Program Products offered on CSO's CMS systems, available documentation, user training offerings, how to get started using SAS, and a brief demonstration of SAS products (e.g., the BASE, GRAPH, FSP, ETS and OR software). This class is offered twice this semester. Fee: none. NO REGISTRATION IS REQUIRED.

1. September 16   4pm-5pm   505 E. Green, room 226   [Dingler]

2. September 18   4pm-5pm   505 E. Green, room 226   [Dingler]

183.   Introduction to SAS (Statistical Analysis System)

An introduction to SAS processing using the IBM CMS timesharing system. Topics include using SAS interactively and non-interactively, using the DATA and PROC steps, creating temporary and permanent SAS data sets under CMS, reading and writing external data files, using basic SAS procedures, programming in the DATA step, using SAS/FSP (the SAS Full-Screen Product) to interactively edit SAS data sets, highlights of other SAS/FSP features, and an overview of CSO SAS features and services. NOTE: All SAS users are urged to make the transition from Cyber timesharing to CMS to perform their SAS processing because of the significant advantages CMS offers for such work. Prerequisite: 123, 171, or equivalent knowledge of CMS and XEDIT. Recommended references: *SAS Introductory Guide* and the *SAS Companion for the VM/CMS Operating System*. The course consists of two 2-hour sessions. Fee: $15.

Sept. 30, Oct. 2   7pm-9pm   [Dingler]

184   Update on SAS Version 5 (1985)

SAS Institute, Inc., has recently released Version 5 of the CMS SAS system. A preliminary introduction to newly released products will be given, along with a description of the full-screen interactive editor called Display Manager. This course willbe offered only ONCE this semester. Prerequisite: 123, 183, or equivalent. Fee: $5.

November 13   4pm-6pm   [Dingler]

Statistical Package Graphics

198.   Introduction to CMS SAS/GRAPH

An introduction to using SAS/GRAPH on the IBM CMS timesharing system and CMS/SAS. Topics include: how to use SAS/GRAPH with various graphics devices, how to produce hardcopy Zeta plots from SAS/GRAPH output, global features of SAS/GRAPH, using map data sets, calculating dimensions and proportions for Zeta plots, and highlights of new features in SAS/GRAPH. Prerequisites: 171 and 183 or equivalent knowledge of CMS, XEDIT, and SAS. Fee: $15.

October 21,23   7pm-9pm   [Dingler]

U series: The UNIX System

U11.   Introduction to the UNIX System

This course introduces the new user to the UNIX timesharing system. It covers terminal setup, logging in and out, file commands, and useful utility programs. It also discusses how to set up a file directory, how to communicate with others through the mesg and mail facilities, and how to use the on-line help programs. Prerequisite: G10. Fee: $10. Two sections will be offered.

1. October 15   7pm-9pm [Pommert & Scheid]

2. November 18 7pm-9pm [Edwards-lwe]

U13.   Introduction to the UNIX Editors: ex and vi

This course covers the "command mode" and "insert mode" for both the line-oriented "ex" editor and the screen-oriented "vi" editor. In ex, command structure and addressing along with the most useful editing commands are presented. The basics of vi are discussed along with learning how to physically move through files and around the terminal screen. Prerequisite: U11 or equivalent. Fee: $10.

1. October 16   7pm-9pm [Pommert & Scheid]

2. November 19 7pm-9pm [Edwards-lwe]

U15.   Introduction to the UNIX Shells

An explanation of shell concepts is given: pipelines, filters, tees, background processing, sub-shells, and redirecting input-output. Features specific to the C and Bourne shells are covered. The UNIX "make" utility will also be discussed. Prerequisite: U13 or equivalent. Fee: $5. ·

1. October 17   7pm-8pm [Pommert & Scheid]

2. November 20 7pm-8pm [Edwards-lwe]

U19.   The UNIX Package

You can register for short courses U11, U13, and U15 as a combined package for a reduced fee. Fee: $20. Two sections will be offered.

1. October 15,16,17   [Pommert & Scheid]

2. November 18,19,20 [Edwards-lwe]

X series: Mixed and Other Systems

Statistical Computing

X79.   Repeated Measures Analysis Using SPSS or SPSSX MANOVA

After a brief review of concepts and terminology useful for understanding SPSS documentation for MANOVA repeated measures analysis, examples are presented in a step-by-step fashion with emphasis on interpretation of MANOVA output. Guidance is provided on the choice of

contrasts for answering specific research questions and on the presentation and summarization of results. Prerequisite: Some knowledge of analysis of variance and at least minimal experience using a statistical computer package. Fee: $5.

October 2   7pm-9pm   [Alster]

MANUALS

Access to the following manuals is strongly recommended for certain short courses. These documents may be purchased individually at the Illini Union Bookstore (Reference Section), 715 South Wright Street, or may be purchased as a set at the CSO Distribution Office, 1208 W. Springfield.

1.   Introduction to the Cyber (175) Systems, $2.00
     (an Introduction to NOS 2 is being prepared. It should be available shortly, free, at 1208 W. Springfield.)

2.   A Tutorial Guide to the ICE Text Editor, $1.25

3.   ICE Reference Manual, $3.25

4.   RNF Documentation: Tutorial, Macros and Reference, $4.00 (NOTE: This manual is not included in the package; it must be purchased separately.)

5.   An Index to Software on the Cyber 175, $3.25

6.   Cyber Fortran Debugging, $1.25

NOTE: Manuals for NOS 2 are being prepared and should be available free at the CSO Distribution Office soon.

TRAINING CASSETTES

CSO makes available to the user community nineteen videotape training cassettes: three introducing the Cyber 175 system, six on the fundamentals of using SAS (Statistical Analysis System), and ten on SAS color graphics (SAS/GRAPH). The tapes may be obtained at the Media Desk in the Undergraduate Library (upper level, in back). Show your University ID to the clerk on duty there and state the title of the videotape you wish to use. If a machine is available, you will be taken to a room containing the videotape equipment and shown how to operate it. If all machines are in use you can make a reservation for a later time.

CSO Videotapes

CSO has produced a series of three videotapes (comprising eight segments) which introduce the novice to computing on the Cyber 175 system. A viewing guide containing the major displays in this series is available and can be used to facilitate note taking. Ask for your free copy of the viewing guide when you check out any of these videotapes for viewing.

The title and a brief synopsis of each segment is given below. Running time is 10 to 15 minutes for each segment.

1. **CSOVT1.**
   1.1 Introduction to Computing at CSO: A brief look at the steps required to solve a problem using a computer, and at some of the hardware used.

2. **CSOVT2.**
   2.1 Using a Terminal: A description of the physical operation of a terminal and some of the keys that have a special meaning to the Cyber 175.

   2.2 Introduction to Cyber Timesharing: A tutorial on logging on and off the Cyber 175.

   2.3 File Usage: Local files and indirect access to permanent files. An introduction to Cyber files and the commands used to manipulate them.

   2.4 Introduction to ICE Text Editing: A tutorial on entering and modifying files with ICE.

3. **CSOVT3.**
   3.1 Running a Fortran Program: Concepts. A discussion of the concepts of compilation, loading and execution.

   3.2 Running a Fortran Program: The PROGRAM statement. A discussion of the PROGRAM statement and its relationship to files accessed by the program.

   3.3 Running a Fortran Program: Control Statement. A discussion of the control statements used to compile, load, and execute a Fortran program.

A copy (Beta-1 format) of these videotapes is available for loan from CSO to any instructor wishing to use them in class. They have been effectively used in this environment several times recently, with the instructor stopping the playback equipment whenever he/she wished to elaborate further or questions arose from the class. To borrow a videotape for classroom use and obtain copies of the viewing guide for class distribution, call the CSO training coordinator: Ron Szoke, 333-8630. If you do not already have access to the required videotape equipment, Betamax viewing equipment can be borrowed from the Office of Instructional Resources, 333-3690.

SAS Videotapes

CSO has leased the SAS Basics 100-Series video training course. The course combines video and workbook media to deliver performance-based SAS training. The information in the course is contained in six videotapes.

The videotaped instruction is not complete without the workbook, which contains exercises and illustrations to reinforce the material presented in the videotapes. A copy of the workbook is available for reference at the Media Desk. You may, however, wish to obtain a personal copy of the workbook to complete the exercises, to take notes, and to use as a reference after the course is completed. The workbook may be purchased for $8.00 at the CSO Distribution Center, 1208 West Springfield, Urbana.

NOTE: The SAS videotapes are not available for loan.

The title of each of the videotapes is given below. Running time is about 45 to 60 minutes for each tape.

B101. Introduction to SAS.

B102. Getting Your Data Into a SAS Data Set.

B103. Program Processing.

B104. Working with SAS Data Sets.

B105. Report Writing.

B106. SAS procedures.

A Cyber 175 terminal user may obtain more information about each via:

        TYPE,SASVID/AS/UN=COURSES.

The Media Desk also has the ten tapes in the SAS color graphics (SAS/GRAPH) series and a reference copy of the student workbook. For more detail, enter (on the Cyber 175):

        TYPE,SASGRAF/AS/UN=COURSES.

Audio Cassettes

CSO makes available to the user community three sets of audio cassette tapes for the training of micro-computer users:

1. How to Operate the IBM Personal Computer (on 3 cassettes)

2. How to use MultiMate (3 cassettes)

3. How to use Lotus 1-2-3 (4 cassettes)

These cassettes, with accompanying printed materials, may be borrowed for up to one week by contacting Ron Szoke, 333-8630.

CONSULTING SERVICES

CHANGES -- SYSTEMS CONSULTING OFFICE

Stan Kerr

CSO Systems Consulting hours for the Fall have returned to their regular 9-5 schedule, with the following exception:

        The consulting office will be closed from 11:45am to 1pm
        on Wednesdays, for a regular staff meeting.

This Fall, the systems consultants will begin the official offering of consulting in areas we have not dealt with before (except on an ad hoc basis). We will be consulting in CMS, UNIX, and NOS Version 2. This article outlines how we will approach consulting in each of these areas.

Over the course of time, all consultants will become familiar with many basic features of all the systems, but it is no longer possible for all consultants to be expert in all systems; so, we are announcing primary consultants for each of the new systems. Questions should be taken to these consultants first, for the best chance of getting an answer; other consultants can be asked, but may not be able to help.

For CMS, the primary consultants are:

Becky Wetzel
Stan Kerr
Bruce Gletty
Greg Kesner

Users can expect any of these people to help them with basic system features such as means of accessing and editing files, and how to run programs in common languages such as Fortran and Pascal. More advanced language debugging questions may require a specialist. All of the above people can consult in at least one of the exec languages available on CMS (EXEC, EXEC2, REXX), but we cannot promise that any individual will consult in all of the exec languages. REXX, the newest exec language, is recommended for most use, and should eventually be supported by all CMS consultants.

For NOS 2, the primary consultants are:

Kurt Hirchert
Stan Kerr

We will offer the same type of consulting on NOS 2 as on NOS 1 in the past.

However, some of the applications packages we have supported on NOS 1 will not initially be available on NOS 2, due to limited human and machine resources; because of this, some consulting requests ("please put so-and-so on the 174") will have to be rejected.

For UNIX, the primary consultants are:

Dan Pommert
Beth Scheid
Esther Edwards-Iwe
Stan Kerr

Our UNIX consulting is offered only to users of the various CSO UNIX systems, not to general campus users. We will consult on basic system software, such as the file system, editors, and most of the commands and tools described in Volume 1 of the UNIX programmer's manual. Questions on Fortran and (to a lesser degree) C may be freely asked. We cannot guarantee consulting in specialized tools such as nroff, troff, awk, sed, yacc; users should inquire first whether there is a consultant willing to deal with a question in these areas. Requests for special software to be installed on UNIX will be handled on an ad hoc basis; we do not promise that any particular request will be granted.

CHANGES -- STATISTICAL CONSULTING OFFICE

Beth Richardson

On Monday August 26th the CSO Stat Services Consulting Office, which was temporarily located at 1208 W. Springfield during the summer, returned to its old location 85 Commerce West. Staffing shortages necessitate a reduction in the hours the consulting office is open. The CSO Stat Services Consulting Office hours are Monday, Wednesday and Friday from 9am to 1pm, Tuesday and Thursday from 9am to 5pm.

CYBER SYSTEMS

THE NOS VERSION 2 OPERATING SYSTEM ON THE CYBER 174

Stan Kerr

A new operating system is now available on the Cyber 174. The system is called NOS Version 2 (we are running Version 2.2, to be precise), and is a significant upgrade from the NOS Version 1 system which hitherto has run on both the Cyber 174 and the 175. This article describes the main features (and the limitations) of the new system as we have installed it on the Cyber 174. CSO is offering 3 sessions of a short course on NOS 2 (see above). The fall semester will be used to complete work on the 174 NOS 2 service.

We are preparing user documentation for NOS 2; some of this may be available when you see this. In particular, there will be documents corresponding to our *Introduction to the Cyber* and the *Cyber Primer*, but oriented to NOS 2; as well as a document describing the differences between the two systems. The CDC published manuals consist of a 4-volume reference set, with the following names

> *NOS 2 Reference Set Volume 1, Introduction to Interactive Usage*
> *NOS 2 Reference Set Volume 2, Guide to System Usage*
> *NOS 2 Reference Set Volume 3, System Commands*
> *NOS 2 Reference Set Volume 4, Program Interface*

The most useful of these for our users is probably Volume 3, which corresponds with the old NOS Volume 1 reference manual. Unfortunately, CDC's price for this manual is $38, so we do not expect to stock or to sell very many of them.

Users wishing to get an account for NOS 2 should contact the CSO Accounting Office, 1208 W. Springfield (333-7752), or Kurt Hirchert, 129C DCL (333-8627).

> **NOTE: The Cyber 174 is now running disjointly from the Cyber 175. Files created on one system cannot be accessed from the other system.**

In many respects, NOS Version 2 behaves like NOS Version 1. The differences and new features are described in the following sections.

Local CSO Utilities

Many of the locally-developed utility programs which we have on the Cyber 175 are not available on the Cyber 174. The facilities they provide may be provided in different ways on the Cyber 174, so we do not guarantee that these locally-developed commands will exist in exactly the form they have on the Cyber 175. Users may have to use some of the standard CDC commands to accomplish the same things these utilities do on the 175. Some of the commonly used commands affected by this are: TYPE, PRINT, MESSAGE, TELL.

System Limitations

Our present hardware on the 174 is quite limited compared with the 175. Some equipment which was formerly shared by the Cyber 174 and 175 is now dedicated to the Cyber 174, with some effect on the performance of the Cyber 175. We are short on memory and disk space, so users should not consider the 174 for their work (at this time) if they will need more than several thousand PRUs of disk space and more than about 120000 (octal) or 40000 (decimal) words of memory. (Consultants can help estimate the relevant figures.)

The migration system is not available on NOS 2, and will not be for some time. The ability to retain, via migration, far more information than can actually fit on the disk system (a valuable feature of the Cyber 175) does not exist at all on NOS 2 (yet), so we must be very parsimonious with our disk space. We have been accustomed on the Cyber 175 to casually keeping huge amounts of data on-line; this casual approach can't be supported on NOS 2.

Tapes -- The 174 has only two tape drives, capable of handling 800 BPI or 1600 BPI. We therefore do not encourage heavy tape use on NOS 2. Tape jobs running in the late evening may be subject to sudden cancellation if operators need the tape drives to perform backup file dumps.

Applications Packages Available

Because of our limited resources, we will not attempt to move all our software packages to NOS 2. We will start with a limited selection, consisting primarily of IMSL, RNF, and UOILIB, and grow from there. Others which we expect to have available are: ARCHIVE (see note on system limitations), EXAMINE, COPYCH. Requests for software to be installed on NOS 2 will be considered on an individual basis, until our space limitations are alleviated.

Differences in Signon Procedure and General Usage

NOS 2 user name -- Users are identified by a 7-character "user name", rather than a 9-digit ID number. The user name is the same concept as the Cyber user number on the 175. For most users, the NOS 2 user name will be determined from the University ID number as it is on the Cyber 175. Thus, if your ID number is 351440611, the Cyber 175 user number is 3K9NYTD, and your assigned user name on NOS 2 will also be 3K9NYTD.

Terminal control characters -- To stop a program, whether or not is doing output on the terminal, you must enter a control-T followed by a RETURN (i.e., hold down the CTRL or ALT key, press T, then lift both keys and press the RETURN or CR key.) This termination sequence can even be altered on NOS 2.

To cancel a line of input, enter a control-X followed by a RETURN.

To temporarily suspend output which is appearing on your terminal, press control-S. To cause it to resume, press control-Q. (Formerly, any key could be pressed to cause output to resume; now, if the key is anything other than control-Q, it is taken as input to be processed by the system when the output is done with.)

Software That Won't Change

We will still use the ICE text editor under NOS 2, at least at the outset.

The various CDC file management commands (GET, SAVE, REPLACE, PURGE, DEFINE, CHANGE, PERMIT, COPY, and others) have not changed.

The locally-written LFNS command can still be used to get a quick list of local files.

Equivalent Facilities

Some of the facilities we have developed on the Cybers exist in NOS 2, but under different names and usages. Some of these are as follows:

- The Cyber FETCH queue exists, but is called the WAIT queue in NOS 2. The FETCH name is called the UJN (user job name) of the job which is running; the UJN of a deferred batch job (i.e., one submitted through the SUBMIT command) is normally the name appearing on the job statement at the beginning of the job, but can be changed by a SETJOB command within the job itself. It is also possible in NOS 2 to save a file in the WAIT queue, or to route a file to someone else's WAIT queue.

- Job inquiry is accomplished on NOS 2 via the ENQUIRE command (similar to the locally-written QUERY command on the Cyber 175). In particular, jobs in queues can be queried by the command ENQUIRE,UJN. This is how, for instance, you verify if anything is in your WAIT queue and what its name (UJN, or user job name) is in the queue. Jobs or files in queues are identified in two different ways, by JSN (Job Sequence Name) and by UJN (User Job Name), and can be referenced in either way.

- The CANCEL command, used to remove jobs from various queues on the Cyber 175, exists under the name DROP. A job or queued file may be dropped using either its UJN (user job name) or its JSN (job sequence name).

Enhancements in NOS 2

Terminal speeds greater than 1200 baud are supported. Because of limitations in our communications equipment, however, we will not allow everybody to run at the highest speed. We will announce later what terminals will have access to the higher baud rates. (1200 baud is the highest rate available on phone connections; LocalNet lines are all 9600 baud.)

Interactive procedures -- Procedure files have better facilities for interactive prompting of the user, as well as some built-in facilities for providing the user of the procedure with help. There are better facilities for screening of parameters to procedure, so that, for instance, a parameter which is supposed to be a file name can be checked automatically for validity of the name.

Type-ahead -- Under NOS 1, it was necessary to wait for the system to prompt for input (usually with a ?) before input could be typed. In NOS 2, you can type before the prompt appears; the input is saved and processed in due course. Many lines of input can be typed ahead this way. You can enter input even while the system is doing output on your terminal, in which case the output is suspended when you starting typing the input, and resumes when you press the return key.

Terminal definition commands -- NOS 2 offers users greater control of terminal handling. The user can enter terminal definition commands, which are preceded by a special character, the "network control character", which we have set to the percent (%) character on our system. These commands can be entered at any time, even while output is appearing on your screen. They can be used, for example, to change the backspace character, the termination character (normally control-T), the interrupt character (normally control-P), and to turn on special features such as "page wait." Page wait causes the system to pause periodically when outputting information to your terminal, without your having to use the control-S key; how often it pauses is determined by the "page length," which is the number of lines it outputs before the next pause. For example, the two commands

```
%PG=Y.
%PL=15.
```

turn page wait on and set the page length to 15 lines. When a long output appears on your terminal, the system automatically pauses every 15 lines and waits for you to press the RETURN key.

These terminal definition commands can also be entered via a regular command called TRMDEF, which may be used in a procedure file. For example,

```
TRMDEF,PG=Y,PL=15.
```

does the same thing as the two commands above, but must be entered in response to the system command prompt, while the former two commands can be entered at any point.

Program and procedure calls from libraries -- In NOS 2, a library file may contain procedures and main programs, and these may be called by their names, if the library is made a part of the "global library set" via the LIBRARY command. The LIBEDIT command has been improved to make library updating much easier than it was in NOS 1.

Some Software No Longer Supported

The old-style control language, called KCL, is no longer supported. If you have procedures which are accessed by the CALL command, they must be rewritten for NOS 2.

IBM SYSTEMS

IBM 3081 COMPUTER AVAILABLE

Beth Richardson

CSO has implemented a major upgrade to its IBM service with the installation of an IBM 3081-GX computer to replace the IBM 4341-M2. The 3081 is accessed as VMD. All userids and associated files formerly on the 4341-M2 were transferred on August 16th to the 3081. All software formerly on the 4341-M2 is now available on the 3081. The 4341-M2 has been moved to the basement of Commerce West and will be used there to support the large courses CS105, ECON173 and several smaller courses. The 4341-M2 is now accessed as VME.

The 3081 has two independent central processing units each of which runs from four to eight times faster than the 4341-M2 depending on the kind of work being done. The 3081 has increased disk space capacity which will allow more temporary disk space to be available. In addition, the 3081 has 24 megabytes (MB) of main memory, which is 3 times the memory on the 4341-M2. The limit on the amount of permanent disk space available to an individual researcher is 1MB, and there is a default memory of 1600K available for researchers. If a researcher needs more than 1MB of disk space or 2MB of memory then a hard money account must be charged, or the VMBATCH service must be used.

There are planned enhancements to the software offerings provided with the 3081. Future products will include ACRITH a package of high accuracy arithmetic subroutines, FORTRAN Interactive Debug, Release 4 of the VS/FORTRAN compiler, a FORTRAN Utilities package, and an Elementary Math Library.

Because of advancements in hardware technology the 3081 is not able to serve as the host computer for OS/MVT. The OS/MVT system has been placed on another IBM computer. CMS users should now use SENDMVT to send batch jobs to OS/MVT. CYBER users are not affected. The LINKMVT exec for accessing OS/MVT datasets and the $DJ command for inquiring about the status of a job are no longer available.

With the acquisition of the 3081 and the decision to implement the centralized file system and laser printer service with IBM equipment it is to be expected that IBM computers will play an increasingly important role in campus computing.

OBTAINING ACCOUNTS ON VMD OR VME

Joan Alster

Users may request a CMS account on CSO's VMD or VME machine by completing the "CMS Logon Accounting Form for Individual Users" or the "CMS Logon Accounting Form for Class Accounts." The form for individual users should also be used to request changes to existing individual CMS accounts. The form for class accounts is new and has been designed to enable professors to request CMS logons for their classes. Copies of the forms have been included at the end of this issue of *OFF-LINE* and also are available at the CSO Accounting Office, 1208 W. Springfield, Urbana. Completed forms should be returned to the CSO Accounting Office in person or by Campus Mail. Accounts will be placed on the machine appropriate for the applications stated.

INTRODUCING VMBATCH

Beth Richardson

The VMBATCH system has been chosen as a replacement for OS/MVT. It can be used presently to run batch jobs from a CMS environment. The VMBATCH system is controlled by a supervisory virtual machine which schedules jobs. It monitors worker virtual machines which are like initiators that process the batch jobs. Commands are available to submit a job, inquire about the status of a job, and cancel a job. You interface with the VMBATCH system by creating a CMS Exec which you submit to VMBATCH. The Exec language of VM is superior to JCL in capabilities thereby giving you more control over your jobs than you have with OS/MVT. In addition, VMBATCH makes the running of development and production jobs similar. If you have a timesharing job, you just need to add a few lines to it to make it a batch job. All datasets and load modules presently on OS/MVT disk packs must be converted to CMS in order to use the VMBATCH system. The OS/MVT system and its disk packs are scheduled to be removed at the end of the year.

To use the VMBATCH system you must create a submit file which uses the EXEC2 or REXX language. The file to be submitted must be in the form of an Exec and must have a file type of EXEC. To access the VMBATCH system type:

```
LINKTO VMBATCH
```

You are now able to submit jobs, inquire about the status of jobs, and cancel jobs. To submit a job for batch processing you can either type:

```
SUBMIT fn (options
```

where no prompts will be given, or instead you can simply type:

```
SUBMIT
```

where you will be prompted for needed information. If you choose the first method, then the options which may be specified are as follows:

ID jjjjjj	A 1 to 6 character job name especially useful with the CANCEL and STATUS commands. The job name must be unique. The default is a 6 digit number from VMBATCH.
CL c	A job class (A thru G or T) for efficient job processing. See the accompanying *OFF-LINE* article on job classes with VMBATCH. The default is class B.
SE nnnnn	Maximum CPU seconds the job is permitted to use. The default is 120 seconds.
PR nnnn	Maximum print lines (in 1000's) permitted the job. The default is 50 (50000 lines).
PU nnnn	Maximum punch records (in 1000's) permitted the job. The default is 50 (50000 punch records).
WB hhmm	Earliest time of day at which the job may be started. This is the start time window begin. The value can range from 0000 to 2400. The default is class dependent.

WE hhmm	Latest time of day at which the job may be started. This is the start time window end. The value can range from 0000 to 2400, and may be less than WB so that a window can span midnight. The default is class dependent.
	Note: The job will start execution between WB and WE, and will execute to completion once started.
RE xxx	Whether the job should be restarted in case of a computer failure. Value YES or NO. The default is YES.
PJ n	Priority of this job relative to other jobs belonging to the same user. Range is 0 to 9 where 0 represents the highest priority. The default is 9.

To obtain on-line help for the above options type:

```
LINKTO VMBATCH
SUBMIT ?
```

If you choose the second method of submitting a job to VMBATCH by not specifying anything on the SUBMIT command, then you will be prompted for needed information, and the SUBMIT Exec will figure your job class and submit the job. The following are the prompts which you will receive and the type of reply which you are to make.

Prompt:	What is the file name of the Exec you wish to submit?
Reply:	Specify the fn of the Exec file.
Prompt:	How much CPU time will your job take?
Reply:	Specify any of the following: hours minutes seconds minutes seconds seconds The default is 2 minutes.
Prompt:	How much memory does your job need?
Reply:	Specify in megabytes (e.g. 4M) or Kilobytes (e.g. 1600K). The default is 2M.
Prompt:	Does this job use any tapes?
Reply:	Answer with YES or NO. The default is NO.
Prompt:	Enter Job ID for this job.
Reply:	Specify a 1 to 6 character job name. This is especially useful with the STATUS and CANCEL commands.

Once a job has been submitted for batch processing you can inquire about the status of the job by typing:

```
STATUS jjjjjj
```

where jjjjjj represents the job ID assigned to the job. If the job ID is omitted, then the status of each submitted job belonging to you is reported. Likewise, you can cancel a running or queued job by typing:

CANCEL jjjjjj

where jjjjjj represents the job ID assigned to the job.

VMBATCH CLASS SPECIFICATION

Vicky Dingler

VMBATCH is a virtual machine running under the CMS operating system that functions as a supervisory machine. The VMBATCH supervisor machine will send jobs to several batch server machines for processing.

Several machines have been defined for VMBATCH so that multiple jobs can be processed simultaneously. Each machine has been assigned at least one class for efficient processing. Class A has been defined for quick-turn-around jobs that use less than 2 seconds of CPU time and 1600K of memory. Class G has been defined for jobs that will use more than an hour of CPU time and up to 16 megabytes of memory. There are several classes between A and G that will process varying types of jobs. The following charts define the classes in more detail.

Class	"Memory"	A-Disk	Time	Window	Default Lines for PRINT or PUNCH
A	1 MB	2 CYL	20 sec	24 hr/day	50K
B	2 MB	5 CYL	2 min	24 hr/day	50K
T	2 MB	5 CYL	2 min	24 hr/day	50K
C	4 MB	5 CYL	2 min	24 hr/day	50K
D	4 MB	5 CYL	15 min	24 hr/day	50K
E	4 MB	5 CYL	1 hour	24 hr/day	100K
F	16 MB	5 CYL	1 hour	8pm - 8am	1000K
G	16 MB	5 CYL	over 1 hour	8pm - 8am	1000K

NOTE: Class B is the default batch machine. The class B machine will process the job if no class is specified on the SUBMIT command.

NOTE: Class T is the quick-turn-around machine.

NOTE: Classes C, D, E, F, G and T are for tape use.

NOTE: Classes F and G will accept jobs for processing only from 8pm to 8am. These classes will process the jobs they accept beyond 8am.

```
OVER 1 HOUR  ^ . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . ^
             ^                              G                                   ^
   1 HOUR    ^ . . . . . . . . . . . . . . . . . . . . . ^ . . . . . . . . . . .^
             ^                                           ^                      ^
                                                         ^                      ^
             ^               E                           ^                      ^
  15 MIN     ^ . . . . . . . . . . . . . . . . . . . . . ^                      ^
             ^                                           ^                      ^
             ^                                           ^                      ^
             ^               D                           ^                      ^
             ^                                           ^                      ^
   2 MIN     ^ . . . . . . . . . . . . . . . . ^ . . . . ^          F           ^
             ^                                 ^         ^                      ^
             ^           B    T'      ^    C             ^                      ^
  20 SEC     ^ . . . . . . . . ^                ^        ^                      ^
             ^                 ^                ^        ^                      ^
             ^        A        ^                ^        ^                      ^
             ^ . . . . . . . . ^ . . . . . . . . ^ . . . . . . . . ^ . . . . . .^
                      1M              2M              4M                  16M
```
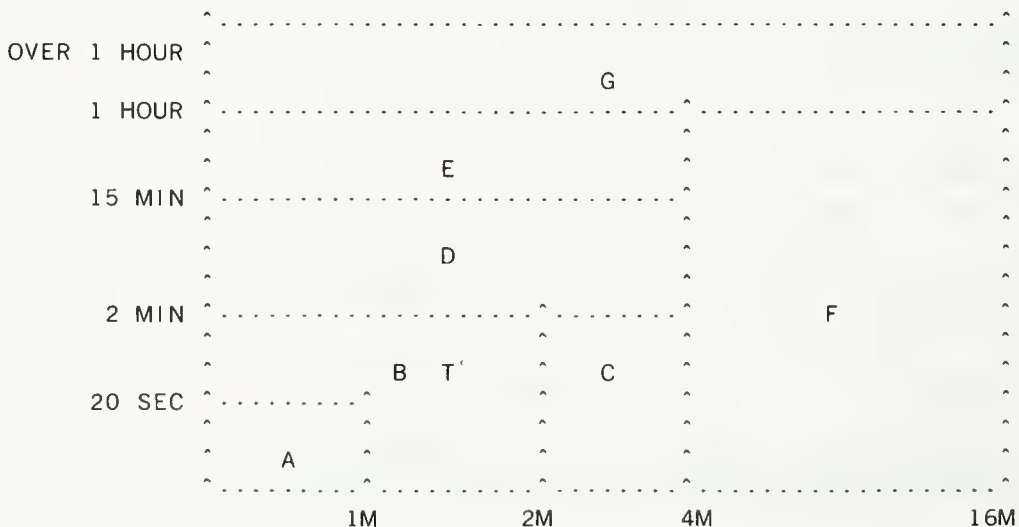
TSP VERSION 4.0 INSTALLED ON IBM/CMS (UIUCVMD)

Esther Edwards-Iwe

We have recently installed TSP, the Time Series Processor on the IBM/CMS. TSP provides regression, forecasting, and other econometric tools. Areas where TSP can be useful include:

- Sales forecasting

- Macroeconomic research and forecasting

- Cost analysis and forecasting

Although TSP was developed by economists and most of its uses are in economics, there is nothing in it's design that limits its usefulness to economic time series. Any application involving data sets of up to 2000 observations or more is suitable for TSP. The basic data object within TSP is the time series. Each series has a name, and you can request operations on all the observations just by mentioning the name of the series. TSP provide convenient ways to enter the time series, to create new series from existing ones, to display and print series, and to carry out statistical analysis of the relations among series. Some of the most important basic features of TSP are:

- Both data and commands are entered in free format.

- Data can be transformed by convenient algebraic statements.

- Leads and lags are specified in a natural way.

- There are few restrictions on the order of the operations in a run.

- The output of one econometric procedure can easily be used as input to another.

- All standard econometric techniques are available in an accurate and efficient form; ordinary least squares, two stage least squares, polynomial distributed lags, least squares with autoregressive correction, and weighted least squares.

- Advanced techniques include nonlinear and simultaneous equation estimation, hypothesis testing, Box-Jenkins (ARIMA) procedures, forecasting and model simulation, multivariate regression, three stage least squares, full information maximum likelihood, and solution of nonlinear models.

- A full set of matrix operations makes it possible for you to program your own estimators.

- Small and medium-sized cross-section problems (up to 2000 observations) can be handled easily.

- Another interesting feature available in TSP is databank storage capability. This makes the storage of data employed in logitudinal studies fairly easy and accessible.

To run TSP program, prepare a file using the XEDIT text editor with a filetype of TSP containing the TSP commands and (optionally) data. This file should have fixed length, 80 column records and may reside on your A - disk or any other accessed disk. TSP commands are entered in free format starting in column one and terminating with a semi-colon (;). For details on the command language syntax, see the TSP User's Guide version 4.0 as well as TSP Reference Manual version 4.0, available for sale at the CSO Distribution Center, 1208 W. Springfield.

To access and run TSP on the IBM/CMS, enter the following command:

LINKTO TSP   *allows you access to the TSP disk*
TSP ?   *provides a brief syntax on how to run TSP*
TSP filename   *where* filename *is your TSP program*

The results will appear as FILENAME> LISTING A. To direct the LISTING file to a specific disk, say your temporary disk with a file mode of B, type the command

TSP filename B

All questions regarding the TSP package should be directed to Esther Edwards-Iwe, 333-8629 or TELL,3SDYNT3 on the Cyber 175.

STATISTICAL SERVICES

USING VMBATCH WITH SPSSX

Beth Richardson

The VMBATCH System can be used to submit SPSSX programs for batch processing from a CMS environment. In order to use VMBATCH you must create a CMS Exec written in either the EXEC2 or REXX language which you submit to VMBATCH. The following examples show typical situations for using VMBATCH and appropriate Exec's are provided. In the generic Exec's the notation in capital letters must be specified exactly as indicated, while notation in lower case letters represents information to be supplied by you. The numbers to the left of the generic Exec's are reference aids used in explanation of the text; you should not type in these numbers when you create your own Exec.

Example 1

Let's begin with a simple example and suppose that the SPSSX job has the data in the same file as the program statements. Suppose that the following lines are in the file PROG1 SPSSX A.

```
DATA LIST /X 1
CONDESCRIPTIVE X
BEGIN DATA
1
2
3
4
5
END DATA
```

An appropriate generic Exec for running this program in batch mode and an example Exec are as follows.

```
              Generic Exec

1.   &TRACE
2.   CP SP CON userid START
3.   CP LINK userid 191 vaddr RR rpass
4.   ACCESS vaddr fm
5.   CP SP PRT userid
6.   EXEC SPSSX progfile (PRINT


              Example Exec

&TRACE
CP SP CON BETHRICH START
CP LINK BETHRICH 191 299 RR SECRET
ACCESS 299 N
CP SP PRT BETHRICH
EXEC SPSSX PROG1 (PRINT
```

The following is an explanation of the lines in the generic Exec.

1.   Establishes this as an EXEC2 Exec.

2.   Creates a console file which will be sent to your virtual reader. The console file will contain any system error messages which are generated.

3.   Temporarily adds your 191 disk (your A disk) to VMBATCH's virtual machine configuration. Supply your own userid when you type this command (this is the same as what you typed on the logon command). The notation "vaddr" stands for virtual address. Supply for "vaddr" a three digit number not already in use by VMBATCH. You cannot use 190, 191, 193, 19E, 319 and 31A. The notation "rpass" stands for read password. Supply for "rpass" the read password of your 191 disk.

4.   Associates a file mode with the virtual address. The notation "fm" stands for file mode and is one of the alphabetic letters A thru Z. Supply for "fm" a file mode letter not already in use by VMBATCH. You cannot use A, D, E, P, S, X and Y. The number you type for "vaddr" is the same number you typed for "vaddr" in the previous command (3).

5.   Sends the SPSSX results file to your virtual reader. The command specifies that the file on VMBATCH's virtual printer is to be directed to your virtual reader.

6.   Executes the SPSSX program. For "progfile" supply the name of the SPSSX program file. The option PRINT on the SPSSX command instructs SPSSX to route the results file (the LISTING file) to VMBATCH's virtual printer. However, the previous command (5) directs the file on VMBATCH's virtual printer to your virtual reader.

Suppose that the lines of the example Exec are stored in the file BATCH1 EXEC A. To access the VMBATCH System type:

```
LINKTO VMBATCH
```

To submit the job for batch processing type either:

```
SUBMIT
```

where you will be prompted for needed information, or type:

```
SUBMIT BATCH1 (options
```

where no prompts will be given. For a list of the prompts and the options available refer to the *OFF-LINE* article entitled "Introducing VMBATCH". When the job has finished executing VMBATCH will send two files to your virtual reader, a console file and a printed results file.

The presence of these files can be verified by typing:

```
Q RDR ALL
```

Looking under the column labeled CLASS, the console file will be labeled CON and the results file will be labeled PRT. You can peek at these files or receive them into your permanent file directory by using the RL command. Refer to the *CMS Primer* fro a description of how to use the RL full-screen facility.

Example 2

Now let's modify the program in example 1 by assuming that the data is stored in a separate file from the program statements. Suppose that the data is stored in file BIRDS DATA A, and that the program statements are stored in file PROG2 SPSSX A. The following lines are the contents of the file PROG2 SPSSX A.

```
FILE HANDLE IN/NAME='BIRDS DATA N'
DATA LIST FILE=IN/X 1
CONDESCRIPTIVE X
```

An appropriate generic Exec for running this program in batch mode and an example Exec are as follows.

```
            Generic Exec

1.   &TRACE
2.   CP SP CON userid START
3.   CP LINK userid 191 vaddr RR rpass
4.   ACCESS vaddr fm
5.   CP SP PRT userid
6.   EXEC SPSSX progfile (PRINT


            Example Exec

&TRACE
CP SP CON BETHRICH START
CP LINK BETHRICH 191 299 RR SECRET
ACCESS 299 N
CP SP PRT BETHRICH
EXEC SPSSX PROG2 (PRINT            ·
```

Notice that the generic Exec is the same as in example 1. The explanation of lines 1 thru 6 of the generic Exec is the same as for example 1. The only difference between the example Exec of examples 1 and 2 is that line 6 of the example exec has changed to refer to the program file in PROG2. The trick to remember here is that the data in the file BIRDS DATA A is stored on your A minidisk (your 191 disk), but in the example your 191 disk is linked and accessed as VMBATCH's N minidisk. That's why

the FILE HANDLE in the program file referred to the data with

```
NAME='BIRDS DATA N'
```

The file mode (fm) specified on the ACCESS command of the Exec must be the same as the file mode specified on the FILE HANDLE statement of the program file. The job can be submitted and the results file accessed using the same method as was described in example 1.

Example 3

Now let's modify example 2 to create an output file. This example shows creating a raw output file using the WRITE command, but you could use the same Exec pattern whether you were writing out a correlation matrix from the PEARSON CORR procedure, or writing factor scores from the FACTOR procedure, or creating an SPSSX system file with the SAVE command. Suppose the input data is in file BIRDS DATA A, the raw output file is to be written to file BIRDS1 DATA A, and the program statements are in file PROG3 SPSSX A. The following lines are the contents of file PROG3 SPSSX A.

```
FILE HANDLE IN/NAME='BIRDS DATA N'
FILE HANDLE OUT/NAME='BIRDS1 DATA A'
DATA LIST FILE=IN/X 1
COMPUTE Y=X+1
WRITE OUTFILE=OUT/Y (F1.0)
EXECUTE
```

An appropriate generic Exec for running this program in batch mode and an example Exec are as follows.

```
          Generic Exec

1.   &TRACE
2.   CP SP CON userid START
3.   CP LINK userid 191 vaddr RR rpass
4.   ACCESS vaddr fm
5.   CP SP PRT userid
6.   EXEC SPSSX progfile (PRINT
7.   CP SP PUN userid
8.   DISK DUMP outfn outft A


          Example Exec

&TRACE
CP SP CON BETHRICH START
CP LINK BETHRICH 191 299 RR SECRET
ACCESS 299 N
CP SP PRT BETHRICH
EXEC SPSSX PROG3 (PRINT
CP SP PUN BETHRICH
DISK DUMP BIRDS1 DATA A
```

The following is an explanation of the lines in the generic Exec.

1. thru 6.   Same as example 1.

7.   Sends the SPSSX generated raw output file to your virtual reader. It specifies that the file on VMBATCH's virtual punch is to be directed to your virtual reader.

8. Transfers the SPSSX generated raw output file to VMBATCH's virtual punch. The notation "outfn" and "outft" represent the file name and file type of the output file. SPSSX stores the raw output file on VMBATCH's A disk, then this command transfers the file from VMBATCH's A disk to VMBATCH's virtual punch, finally the previous command (7) directs the file on VMBATCH's virtual punch to your virtual reader.

Suppose that the lines of the example Exec are stored in the file BATCH3 EXEC A. To access the VMBATCH System type:

    LINKTO VMBATCH

To submit the job for batch processing type either:

    SUBMIT

where you will be prompted for needed information, or:

    SUBMIT BATCH3 (options

where no prompts will be given. For a list of the prompts and the options available refer to the accompanying *OFF-LINE* article entitled "Introducing VMBATCH." The BATCH3 Exec causes VMBATCH to store three files on your virtual reader, a console file, a results file, and a raw output file. You can verify that the files are on your reader by typing:

    Q RDR ALL

You will receive a display such as the following.

ORIGINID	FILE	CLASS
VMBATCHB	1947	PRT
VMBATCHB	1948	PUN
VMBATCHB	1945	CON

The file labeled CON is the console file which contains any system error messages. The file labeled PRT is the results file. Both the CON file and the PRT file can be peeked at or received into your permanent file directory using the RL command. Refer to the *CMS Primer* fro a description of how to use the RL full-screen facility. The file labeled PUN is the SPSSX generated raw output file which was DISK DUMP'ed. It can be read from your virtual reader using the DISK LOAD command. However, before you can DISK LOAD this file you need to make it appear first on your reader. This can be accomplished by typing:

    ORDER RDR spoolid

where **spoolid** is the number that appears next to the PUN file under the column labeled FILE. In this example you would type:

    ORDER RDR 1948

Now you can type DISK LOAD and the file that was DISK DUMP'ed will become part of your permanent file directory and will have the same file name and file type as those specified on the DISK DUMP command.

USING VMBATCH WITH SAS

Vicky Dingler

SAS users can use the newly installed batch machine under CMS called VMBATCH for their batch processing. VMBATCH will serve as an alternative for batch processing commonly done on OS/MVT.

VMBATCH is a virtual machine running under the CMS operating system that functions as a supervisory machine. The VMBATCH supervisor machine will send jobs to several batch server machines for processing. To access the VMBATCH machine, issue the following command at the CMS ready message (R;):

```
LINKTO VMBATCH
```

Several machines have been defined for VMBATCH so that multiple jobs can be processed simultaneously. Each machine has been assigned at least one class for efficient processing. Class A has been defined for quick-turn-around jobs that use less than 2 seconds of CPU time and 1600K of memory. Class G has been defined for jobs that will use more than an hour of CPU time and up to 16 megabytes of memory. There are several classes between A and G that will process varying types of jobs. (Please refer to the article about VMBATCH class specifications under IBM SYSTEMS.)

Submitting a job to VMBATCH can be done by issuing the SUBMIT command at the CMS ready message. For example:

```
SUBMIT jobfile (cl a
```

Where:

jobfile	is the file that is submitted to VMBATCH for processing
cl	is the class specification parameter
a	is the job class

If there is no jobfile specified, the system will prompt with questions about time and region specifications. The system will then define a job class for the job and display it on the screen. The system defined job class can be used in the SUBMIT command.

The jobfile must have a filetype of EXEC. The filename can be any combination of 1 to 8 characters. The file must contain EXEC2 or REXX control cards that define the minidisk configuration of the batch machine to which the job is sent. For example:

```
&TRACE OFF
CP SPOOL CONSOLE DINGLER
CP LINK DINGLER 191 299 RR readpassword
ACCESS 299 B
CP TR PRT ALL DINGLER
EXEC LINKTO SAS
SAS BATCH1 (PPRINT LPRINT
```

In this example, &TRACE is an EXEC2 control statement. The next statement spools the console to the reader of the user specified. This is useful for a complete diagnosis of the job and it's progress. All of the messages that are displayed on the batch server's machine will be in a file on the user's reader. The next statement links the batch machine to the user's A disk. The ACCESS statement brings the user's A disk into the machine configuration of the batch machine at a defined address. The user's A disk contains the files and programs that the batch machine will execute. The next command transfers

the files on the virtual printer of the server batch machine to the virtual reader of the user. All of the output will be sent to the virtual reader of the user specified in this command.

The next command links the SAS disks. The next line invokes SAS to execute the program file called BATCH1 SAS. The program file is on the user's A disk and contains SAS programming statements that will analyze data. The options on the SAS command line will cause the procedure output (listing) and the saslog to be routed to the printer of the batch server machine. The batch server machine will route the output to the reader of the user specified on the spool command.

There will be times when a temporary disk will be necessary to complete a programming task. The jobfile can include a request for temporary disk space. The next example uses the TD exec to request temporary disk space in the batch server machine:

```
&TRACE OFF
CP CPOOL CONSOLE DINGLER
EXEC TD 10
CP LINK DINGLER 191 299 RR readpassword
ACCESS 299 C
CP TRAN PRT ALL DINGLER
EXEC LINKTO SAS
SAS BATCH1 (PPRINT LPRINT
```

The TD exec will request temporary disk space for the batch server machine and issue the LINK and ACCESS commands for the first available free minidisk in the batch server's minidisk configuration. In this case, the first free minidisk will be the B disk. Therefore, using this method, the temp disk will always be the B disk. This extra disk space can be used for the input/output functions of the SAS program.

NOTE: If there is a need for 5 cylinders or less of temporary disk space, the batch server's A disk can be used for input output functions. The files written to the batch server's A disk should be disk dumped to the user's reader. The next example demonstrates this method:

```
&TRACE OFF
CP SPOOL CONSOLE DINGLER
CP LINK DINGLER 191 299 RR readpassword
ACCESS 299 C
CP TRAN PRT ALL DINGLER
EXEC LINKTO SAS
SAS BATCH1 (PPRINT LPRINT
CP SPOOL PUNCH DINGLER CONT
DISK DUMP fn ft A
CP SPOOL PUNCH NOCONT
CP CLOSE PUNCH
```

The statement after SAS is invoked will spool the virtual punch of the VMBATCH server machine to the userid specified. The DISK DUMP command will dump the file specified to the virtual punch of the server batch machine. The DISK DUMP command is a CMS command that will preserve the integrity of SAS data sets, and other files as well. The filename and filetype of the file that was written to the server batch machine's A disk must be specified in the DISK DUMP command. The filemode is A. The next two commands spool the punch no-continuous and close the punch.

The following SAS program wrote the data set SAVE.MEANS to the batch server's A disk. The fileid of the file written to the batch server's A disk will be MEANS SAVE A.

```
cms fi in disk vmbatch data b;
cms fi save disk means save a;
```

```
data one;
input a b x;
infile in;
proc means;
var x;
output out = save.means mean = meanx std = stdx;
```

When the job completes, there will be several files on the user's reader. The first is the spooled console listing, the second is the SAS output, and the third is the file that was disk dumped from the batch server's A disk. The command sequence necessary to bring the disk dumped file onto the user's A disk is the following:

```
Q RDR ALL
ORDER RDR xxxx
DISK LOAD
```

The first command will display the files on the user's reader. The second command will order the reader such that the file with the spool file number xxxx is first. The DISK LOAD command will bring the first file on the reader to the user's A disk with the same filename and filetype that is listed on the reader. The other files can be brought onto the user's A disk with the CMS RECEIVE command.

If a tape is needed to store the data generated from a SAS job, the MOUNT command can be issued from within the exec. The MOUNT command is documented on-line and can be reviewed by issuing the command HELP CSO MOUNT. The next example demonstrates the use of the MOUNT command:

```
&TRACE OFF
CP SPOOL CONSOLE DINGLER
CP LINK DINGLER 191 299 RR readpassword
ACC 299 C
EXEC LINKTO SAS
CP TRAN PRT ALL DINGLER
EXEC MOUNT IBMSCH-TEMP RING IN 181 DEN 1600 (WAIT
&IF &RC NE 0 &EXIT
SAS BATCH3 (PPRINT LPRINT
```

The SAS program must contain the file definitions (filedefs) that refer to the tape and the data that will be written to the tape. The next example uses two filedefs. The first is used to define the data in an external file residing on the user's A disk (residing on the batch server's B disk). The second associates the tape (tap1) with the data that will be written to tape (save.means1).

```
cms fi in disk vmbatch data b;
cms fi save tap1 nl (lrecl 32760 block 800 recfm vba;
cms tape rew;
data one;
input a b x;
infile in;
proc sort; by x;
proc means;
var x;
output out = save.means1 mean = meanx std = stdx;
```

If there are any questions pertaining to SAS use with VMBATCH, please direct them to the consultants at 85 Commerce West.

SAS INTRODUCES SAS/AF

Vicky Dingler

SAS Institute, Inc. has developed SAS/AF software which is a full-screen tool for developing user-friendly menus and fill-in-the-blank screens. Applications are wide ranging. Full-screen menus can be designed to allow users to run SAS jobs without learning the SAS language. Menus can be designed for data entry personnel and easy report generation. Computer-based instruction makes use of the menu building facility in SAS/AF for interesting presentations.

Applications programmers can develop screens to meet almost any need in your department. SAS provides four screen building procedures that can produce seven types of screens. There will be two documents available to aid in program development. One will be a syntax manual and the other will be a technical report with examples of the various types of menus.

If you are interested in SAS/AF, please provide the following information:

Proposed use of SAS/AF: Affiliation with the University:

    Classes   Faculty Member
    Data Entry Personnel   Student
    Computer-Based Instruction   Staff
    Other   Other

Please send the above information to:

    Victoria W. Dingler
    CSO SAS Coordinator
    150 DCL
    1304 W. Springfield
    Urbana, IL 61801

USING BMDP WITH SAS

Vicky Dingler

BMDP is now available for SAS users under the CMS operating system. The modules needed to run SAS with BMDP are accessible via the LINKTO exec. At the CMS ready message (R;), issue the command:

```
LINKTO SASBMDP
```

This exec will link the necessary BMDP files to the user's minidisk configuration. A SAS program containing BMDP programming statements can be processed by invoking the SASBMDP EXEC. For example, if the SAS program has a fileid of TESTBMDP SAS A, the following command should be issued at the CMS ready message (R;):

```
SASBMDP TESTBMDP
```

The SAS program will include BMDP programming statements. The following program is an example of using BMDP programming statements in a SAS program:

```
DATA ONE;
INPUT A B;
CARDS;
3 3
2 4
1 5
;
PROC BMDP PROG=BMDP1D DATA=ONE;
PARMCARDS;
/PROBLEM TITLE = 'TESTING BMDP/CMS'.
/INPUT UNIT=3. CODE='ONE'.
/END
/FINISH
```

There are two files that are produced. The first is a Saslog of the SAS program that contains the BMDP statements. The second is a SASBMDP LISTING that contains the output from the BMDP procedure. NOTE: multiple executions of the SASBMDP exec will cause the output to be written after the previous output.

The procedure modules that are currently available are: BMDP1D, BMDP4D, BMDP5D, BMDP4F, BMDPLR, BMDP3S, BMDP1T, BMDP2T, BMDP2V, BMDP4V, and BMDP8V. If there are any BMDP procedures not listed here that are necessary to complete any research projects, the staff at CSO will create modules for those procedures.

Please send requests for additional procedures to:

Victoria W. Dingler
CSO SAS Coordinator
150 DCL
1304 W. Springfield
Urbana, IL 61801

or contact the consultants at the Statistical Consulting Office, 85 Commerce West (333-2170).

OS/MVT STATLIB TO BE REMOVED

Bruce C. Richardson

STATLIB is a collection of user-supplied programs for the OS/MVT system. On October 31, 1985 these programs will be removed from OS/MVT. In order to ease the transition to new routines we present below a listing of the routines and possible alternative sources of programs. Although the exact methods provided in the original STATLIB programs may not be available directly in the alternatives, reasonable analyses are available, as well as ways of generating the original results. For some of the routines in STATLIB, no alternatives are presented, if you know of one or if your work will be greatly hindered by the removal of these programs please contact me. Any comments or questions should be made to Bruce Richardson at either 333-3339, 333-2167, or via computer at UN=3KQQN4H, or userid=RICHARD.

Note: CSO-supported software was given first preference in presenting alternatives, and the most current versions are cited. Thus, some procedures may not be available yet (e.g., SAS CATMOD) whereas others may be available in previous releases (e.g., SPSS(X) BOX-JENKINS).

Program	Description	Alternatives
ACOVS (ACOVSF) (ACOVSM)	Regression analysis in the case of a fairly general variance covariance matrix. These routines seem to be the forerunners of LISREL	LISREL SPSSX: LISREL SPSSX: MANOVA SAS: IML
ALSCAL3	Multidimensional scaling using alternating least squares.	SPSSX: ALSCAL
AUTOECON	OLS and two stage least squares.	SAS: SYSREG SPSS: 3SLS
AVETRAN	Time series-cross sectional nonlinear regression.	SAS: SYSREG
CANON	Multi-set canonical correlation analysis.	SAS: CANCORR SPSSX: CANCORR
CLUSTER	Park's cluster.	SAS: CLUSTER SPSSX: CLUSTER BMDP: 1M, 2M, KM
DIRECT	Direct 0-1 integer programming. Distress preprocessor for scaling. Computes distance scores.	MPOS, MINPACK SPSSX: PROXIMITIES SAS: ALSCAL
ESTFOR (ESTIM) (IDENT)	Box and Jenkins identification and forecasting of autoregressive moving average models.	SAS: ARIMA SPSSX: BOX-JENKINS BMDP: 2T
FIML	Full information maximum likelihood regressions.	SAS: SYSREG SPSS: 3SLS
GASP	Simulation of discrete systems in econometrics.	SAS: SIMLIN, SIMNLIN
GENCAT	Generalized chi-square analysis of categorical data.	SAS: CATMOD SPSSX: LOGLINEAR BMDP: 4F
INDSCAL	Analysis of individual differences in Multidimensional scaling (Carroll-Chang model).	SPSSX: ALSCAL SAS: ALSCAL
INEQUAL	Checks for triangle inequalities from ordered vectors	????
JIFSCA	Preprocessor to arrange data for scaling.	SPSSX: PROXIMITIES
KYST	Scaling.	KYST2A (SHARLIB)
LISREL	Linear structural relations analysis.	LISREL SPSSX: LISREL
LONGLEY	Normalized modified Gram-Schmidt regression. (alternatives may not use this method exactly, but they have been shown to have very stable regression routines.)	BMDP: 1R, 2R, 9R SAS: REG SPSSX: REGRESSION
MANOVA	Multivariate analysis of variance.	BMDP: 4V SAS: GLM, ANOVA SPSSX: MANOVA
MAPREF	Scaling of preference mapping scores.	????
MCRAE	McRae k-means clustering.	BMDP: KM SAS: CLUSTER SPSSX: CLUSTER
MDPREF	Scaling of preference maps.	????

Program	Description	Alternatives
MGLM	Multivariate general linear models analysis.	BMDP: 4V SAS: GLM, REG SPSSX: MANOVA
MINROS	Nonlinear regression using Rosenbocks method.	BMDP: 3R, AR SAS: NLIN SPSS: NONLINEAR
MOCA	Multiple ordered cluster analysis using Johnson's hierarchical method.	BMDP: 1M,2M,3M,KM SAS: CLUSTER SPSSX: CLUSTER
MULV	Multivariate analysis of variance.	BMDP: 4V SAS: ANOVA, GLM SPSSX: MANOVA
NONMET	Continuous/categorical analysis.	SPSS: TETRACHORIC
NORMIX	Aitken iteration normal mixture clustering.	BMDP: 1M, 2M, KM SAS: CLUSTER SPSSX: CLUSTER
ORACLE	Calcomp graphics facility.	DI-3000, BLAZE
PATH	Path analysis regression.	BMDP: 1R, 2R SAS: REG SPSSX: REGRESSION LISREL
PIERCE	Identification and forecasting of Arima models.	BMDP: 2T SAS; ARIMA SPSSX: BOX-JENKINS
POLYCON	Polynomial scaling for conjoint analysis.	SAS: ALSCAL SPSSX: ALSCAL
PROFIT	Property fitting scaling.	????
RANDQP	Linear and quadratic programming.	LINDO SAS: OR PROCs
REARRA	Preprocessor to scaling algorithms.	SPSSX: PROXIMITIES
SIFASP	Simultaneous factor analysis.	BMDP: 4M . SAS: FACTOR SPSSX: FACTOR
SPLOTA	Split plot analysis of variance.	BMDP: 3V, 4V SAS: ANOVA, GLM SPSSX: MANOVA
TMINT	Three mode multidimensional scaling post process.	????
TMMDS	Three mode multidimensional scaling.	????
TORSCA	Nonmetric multidimensional scaling.	SAS, SPSSX: ALSCAL
TPOLY	Chebychev polynomial interpolation.	IMSL
TSP	OLS and 2SLS allowing for autocorrelated errors, distributed and Alman lags. Also, principal component analysis.	SAS: AUTOREG, SYSREG
UMVAC	ANOVA, ANCOVA	BMDP: 2V, 4V SAS: GLM SPSSX: MANOVA
VARCOMP	Provides various methods of analyzing a random effects or variance components models.	BMDP: 4V SAS: ANOVA, GLM SPSSX: MANOVA
WOODSLIN	Arima regression.	SAS: AUTOREG
WOODSNLN	Wood's nonlinear.	SAS: SYSNLIN

TECHNIQUES FOR TRANSFERRING
SAS DATA SETS FROM OS/MVT

Vicky Dingler

There are several techniques for transferring SAS data sets from OS/MVT disks to other types of storage devices and mediums. The data sets can be copied either to tape or to disk. The choice should be made with long term goals and short term goals in mind. These techniques are described in a technical report titled "TECHNIQUES FOR TRANSFERRING SAS DATA SETS FROM OS/MVT." If you have an OS/MVT SAS data set, you should get a copy of this report from the Statistical Consulting Office at 85 Commerce West.

If the data set is to be used only at the University of Illinois, it can be stored on either tape or CMS disk. However, if the data set has been used under OS/MVT and not under CMS, the data set will have to be reformatted before using it under CMS. Examples for reformatting data sets and storing them on tape are shown on pages 3 and 6.

If the data set is to be used here only for a short period of time and then is to be used at another installation, you can write the SAS data set to tape or disk for use under CMS as described above. However, a better technique is to write the SAS data set to tape in 80 column raw data format. This allows maximum use of your data set here and is the best method to use for transferring data to another site. This technique is described on page 9 of the technical report.

Cyber users can use the same techniques if they have userids on the IBM. Two additional statements are necessary to send the OS/MVT batch jobs across the hyperchannel. They are the /JOB and the /NOSEQ statements before the //userid JOB statement.

Any questions concerning these techniques can be directed to Vicky Dingler, the CSO SAS Coordinator, IBM userid DINGLER or Cyber 175 UN DINGLER. The CSO Statistical Consulting Office staff, 85 Commerce West (333-2170), is also available for advice.

MICROCOMPUTER SERVICES

SAS FOR THE IBM-PC

Vicky Dingler

SAS Institute has recently announced SAS Version 5 for the IBM personal computer. There are four products that will be available by the end of the year. The SAS Base product for the PC includes the procedures available in the mainframe version. Additional procedures are available that allow the PC windowing facility to be used to its full extent, as well as mainframe interfacing facilities. SAS STAT for the PC will include several of the statistical procedures available for the mainframe. Included in the list are: GLM, REG, ANOVA, DISCRIM, FACTOR, NPAR1WAY, SCORE, TTEST, RSQUARE, and STEPWISE. Additional procedures will be forthcoming. SAS RTERM is a terminal emulation facility that allows the IBM PC to emulate the Digital Equipment Corporation VT100 terminal for text and the Tektronix 4105 terminal for graphic output. SAS IML for the PC is an interactive data manipulation language that operates on entire matrices of values.

There are two primary configurations for the PC version of SAS. The first configuration is SAS on the IBM XT or IBM AT personal computer with at least 10 megabytes of hard disk storage. The second configuration is the IBM XT/370 or IBM AT/370 with at least 10 megabytes of hard disk storage using

the IBM VM/PC operating system. In the latter configuration, the PC needs a controller that is compatible with the IBM VM/PC operating system.

SAS Version 5 for the IBM XT and IBM AT is called PCDOS SAS to distinguish it from the IBM XT/370 or IBM AT/370 version. The IBM PC DOS operating system that is required is release 2.0 or later. The machines that are supported are the IBM PC AT, PC XT and the 3270 PC. There is a minimum of 512K real memory required for all three machines. The control program required for the 3270 PC is release 1.21 or 1.22 only. The control program will consume about 200K of the available 640K in PC DOS. Since SAS requires at least 512K, the control program should be reconfigured to support only one mainframe session and the PC DOS session.

The IBM PC XT/370 and AT/370 machines will require release 1.1 of the VM/PC operating system and PC DOS 2.0 or later. The XT/370 will require 256K memory on the System Board, a PC/370-P Processor Card, a PC/370-M Memory Card and a 3278/79 Emulation Adaptor. The AT/370 will require 512K of memory on the System Board, a PC/370-P2 Processor Card, a PC/370-M2 Memory Card, and a 3278/79 Emulation Adaptor.

Version 5 will be installed from diskettes onto the hard disk. The SAS Base and STAT products will each use at lease 3 megabytes of hard disk storage. The other products will use at least 1 megabyte each. Hence, 10 megabytes of hard disk will be inadequate if all of the SAS products are needed.

CSO is reviewing the possibility of purchasing the licenses for these SAS PC products. There will be an initial fee for each product as well as a yearly renewal fee for each product.

If you are interested in using SAS on your PC, please fill out the form at the end of this issue and send it to:

Victoria W. Dingler
CSO SAS Coordinator
150 DCL
1304 W. Springfield
Urbana, IL 61801

MAINTENANCE & REPAIR

MAINTENANCE AND REPAIR SERVICE (MARS)
TELEPHONE HOURS TO BE EXTENDED

Larry Crotser

The Maintenance and Repair Service telephone "MARS" (333-0969) is the primary telephone number of the CSO computer maintenance group and should be used for all hardware maintenance problems, hardware questions, and communications requests. The MARS number should be used at all times, as all the calls will be logged, and a proper maintenance form will be filled out for each call. By documenting all calls we will eliminate lost service calls and communications requests, and we will be able to better track the progress of each request.

In keeping with the goals of the CSO Computer Maintenance Group to provide better service to the UIUC campus, the "live" hours of the MARS telephone will be extended from 7:00 am - 3:00 pm

Monday through Friday, to 7:00 am - 10:00 pm Monday through Friday, starting on Monday, August 26, 1985. A dispatcher will be on duty during the above published hours to sort out trouble calls, and dispatch the proper maintenance personnel. Troubles that occur outside the above published hours should still be phoned into the MARS number. They will be recorded on an answering machine, which will be checked at 7:00 am Monday through Friday, and the proper maintenance personnel will be dispatched at that time.

FEATURE ARTICLE

AN INDEX TO STATISTICAL SOFTWARE: INSTAT

Robert Nagel
Bruce Richardson

INSTAT is an index of statistical software constructed by the Graduate College Statistics Program for the University of Illinois at Urbana/Champaign. The index uses the UWRIM database management system and is available, on-line, to Cyber 175 users. The majority of information currently in the index concerns software available on the Cyber 175 system and on the IBM. It will eventually contain information about software available on the VAX, CRAY, PLATO, and minicomputers.

Structure and Usage

INSTAT is an interactive program which operates via a set of six commands:

1. HELP
2. LIST
3. SEARCH
4. DESCRIBE
5. FILE
6. END

The HELP command is designed to assist the unfamiliar user in using INSTAT. When prompted, the user can type HELP or HELP,<command> where <command> is one of the other basic commands, to get assistance using INSTAT.

The LIST command indicates the choices available to the user for many of the prompts in INSTAT. The LIST command in response to a COMMAND? prompt will give a listing of the available commands. This option is also available for the SOURCE? and CODE? prompts described below.

The SEARCH command is the most important command in INSTAT. After issuing a SEARCH command to INSTAT, the user is prompted with NAME?. If the user knows the name of the procedure or program, it should be typed in. Some examples of names are: GGUBS, a subroutine in IMSL, or GLM, a proc in SAS. Next the user is prompted with SOURCE?. The user should respond with the package or library name of the desired software (eg. SAS, SPSS-X, IMSL.) By responding with a LIST command, the user is given the list of all possible sources and is then reprompted for a source.

INSTAT next asks for a CODE. The code word indicates the main statistical classification of the desired software. Again, LIST is available and is very useful for finding the correct code word. (It should be

noted that the user must provide at least one of NAME, SOURCE, or CODE for a SEARCH to continue.)

The last prompt in the SEARCH is a prompt for one or two KEYWORDs. These are subtopics to the CODE. These should be kept as short as possible to allow INSTAT more flexibility in performing a SEARCH.

After the user has entered responses to some or all of these prompts, INSTAT performs a search through its files for items which match and prints them out to the terminal.

The FILE command can be used to print the results from a SEARCH to the local file TAPE7 as well as to the screen.

The DESCRIBE command gives more detailed information on SOURCEs and CODEs. By entering DESCRIBE,SOURCE or DESCRIBE,CODE , the user is given the meanings of these terms. The commands DESCRIBE,SOURCE = <sname> or DESCRIBE,CODE = <cname> give information on the particular source or code requested.

The END command is used to end an INSTAT session.

Access

To use INSTAT, type the following on Cyber 175:

     GET,INSTAT/UN = 3INSTAT
     INSTAT

MISCELLANEOUS

MSCC STATISTICAL HELP

The Mathematical and Statistical Consulting Committee (MSCC) provides assistance to members of the University community, government, and industry on statistical problems in their research work. Aide is available in designing experiments, constructing survey plans, analyzing data, extending theoretical research, and utilizing computers in statistics. The 1985-86 Directors of the MSCC are Professors Robert Bohrer and Stanley Wasserman, the Manager of the MSCC is Bruce Richardson, and they are assisted by graduate statistics students Mei-Ying Fovell, Laurie Hansen, Susan John, Robert Nagel, Todd Piefer, and Susannah Schiller.

Up to two hours of consulting is provided free of charge to members of the University community. Problems that require a considerable amount of time and effort are welcome, but faculty members anticipating the need of substantial statistical help (for themselves or their students) are urged to try to obtain funding for this purpose. Statistical package programming and data coding are available, but there is a charge for these services. Free assistance in the preparation of statistical sections of research proposals is available from the MSCC.

To use the service or to set up an appointment to see a consultant, call 333-2167, or stop by the MSCC

office in 221 Altgeld Hall. The MSCC office is open from 9:00 until 12:00 and 1:00 until 5:00, Monday through Friday all year round, except for University holidays.

HELP WANTED & SALES

RESEARCH PROGRAMMER

The University of Illinois at Urbana-Champaign invites applications for the full-time permanent position of Research Programmer in the Agricultural Engineering Department.

Responsibilities include developing and documenting software and maintaining PDP 11 and IBM PC/A Γ computers, peripheral equipment, and network communications equipment.

Educational background required is a BS or MS in Computer Science with experience in interfacing circuits to computers; or a BS or MS in Electrical or Computer Engineering with extensive programming experience. Applicant must have the ability to communicate and work effectively with staff and students.

Salary range is $24-26,000 per year. It is anticipated that the appointment will start on or before November 1, 1985. All applications received by October 1, 1985 are assured full consideration, but the search will continue until the position is filled. Applicants should send biographical information and names, addresses, and telephone numbers of three references to:

> Dr. Marvin R. Paulsen
> Chair Search Committee
> 360-C Agricultural Engineering Sciences Bldg.
> 1304 W. Pennsylvania Ave.
> Urbana, IL 61801
>
> Telephone: (217) 333-7926

The University of Illinois at Urbana-Champaign is an Affirmative Action/Equal Opportunity employer.

HALF-TIME 8086 ASSEMBLY LANGUAGE/IBM PC BASIC PROGRAMMER(S) NEEDED

8086 ASSEMBLY LANGUAGE

A half-time position is open immediately for an experienced 8086 Assembly language programmer with knowledge of basic data structures (pointers, stacks, queues). Knowledge of hardware interfacing and/or memory mapping valuable.

The programmer will work on an 8086-based system and flight simulator and, under the supervision of a Research Engineer, will:

1. Convert machine language flight simulator program to 8086 assembly language;
2. Document the code;
3. Maintain/modify code to meet needs of experimenters.

The position will last at least until January 1986 (and is very likely to continue for several semesters). Possibility of research assistantship with tuition/fee waiver.

IBM PC BASIC

A part-time position is open immediately for an experienced IBM PC BASIC programmer. Needed to complete programming to use IBM PC-AT to collect, store, and display weather service data for flight information needs.

Prefer to hire one individual with experience in both Assembly and BASIC.

Preference will be given to advanced undergraduate planning graduate studies at the University of Illinois or to beginning graduate student. Send a letter and resume or call:

> Brian Osmond
> Research Engineer
> Institute of Aviation
> Aviation Research Laboratory
> U. of I. - Willard Airport
> Savoy, IL 61874
>
> Telephone: (217) 333-3162

IBM RESEARCH PROGRAMMER POSITION
AVAILABLE IMMEDIATELY

A half-time position for the fall semester only is available for a person experienced with the IBM VM/CMS environment. Tasks would include transferring files from the Cyber 175 to the IBM, writing EXEC files, working with files on tape, and possibly revising Cyber FORTRAN and PASCAL programs to work on the IBM. This position can be arranged to be either an assistantship or a staff position. Apply immediately to:

> Janet Arbise
> Illinois Streams Information System
> Dept. of Landscape Architecture
> 333-0178

CSO STATISTICAL SERVICES RESEARCH PROGRAMMER

The Computing Services Office of the University of Illinois has one full-time or two part-time Research Programmer positions available in the Statistical Services Group. Candidates should have a bachelor's degree or higher, possess good communication skills, and have strong backgrounds in statistics and the use of statistical software packages such as SAS, SPSS, or BMDP. Experience with the University of Illinois IBM (CMS) and Cyber systems is highly desirable. Responsibilities will include consulting, teaching short courses, and maintaining statistical software. Starting date: As soon as possible. Salary: Commensurate with qualifications.

Send a resume, or description of background and qualifications, with names of three references to:

Joan Alster
150 Digital Computer Laboratory
University of Illinois
1304 W. Springfield
Urbana, IL 61801
(Telephone: 333-2172 or 333-2167)

In order to assure full consideration, applications should be received by September 23, 1985.

The University of Illinois is an Affirmative Action/Equal Opportunity Employer.

IBM PC JRAM2 MEMORY CARD FOR SALE

The Survey Research Laboratory is selling a JRAM2 memory card with ½ meg memory for IBM PC's. For more information please contact: John Vidmar, SRL, 312-996-5308 (or 8-996-5308 via university tieline).

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FEATURE ARTICLES

DOCUMENTATION

CMS Logon Accounting Form for Individual Users

DATE: _____   ( ) NEW   ( ) CHANGE

If you checked NEW, complete items 1-7 on the front of this form.

If you checked CHANGE, complete item 3 on the front of this form, AND
items 1 and 2 plus the items you want changed on the back of this form.
-------------------------------- NEW --------------------------------------

1. NEW CMS USERID (logon name): | | | | | | | | |
   (letters and numbers only, 4-8 |__|__|__|__|__|__|__|__|
    characters, no embedded blanks.)

2. NEW CMS PASSWORD: | | | | | | | | |
   (4-8 characters, don't use userid.) |__|__|__|__|__|__|__|__|

3. USER'S NAME: _____   CAMPUS PHONE: _____

        CAMPUS ADDRESS: _____

4. PS NUMBER FOR CMS CHARGES: | | | | | | | | | |
                               |__|__|__|__| |__|__|__|__|
                               Main PS Number   Sub-Allocation
                                                 User Number

   IS THIS A SARA ACCOUNT?   ( ) Yes   ( ) No

5. MINI-DISK STORAGE REQUEST (approximate):
                                   |
   ( )500 KB   ( )1 MB | ( )2 MB   ( )5 MB   ( )Other: _____
                 (default) | Note: Requests above 1 MB require a
                           | hard-money account.
   Note: 1 MB costs 1.63 SU/week.

6. MINI-DISK PASSWORDS: (Optional. Default is no passwords. With
   no passwords, no one can link to your mini-disk. The password ALL
   lets anyone access your mini-disk.)

   READ Password: | | | | | | | | | |
                      |__|__|__|__|__|__|__|__|

   WRITE Password: | | | | | | | | | |
                      |__|__|__|__|__|__|__|__|

7. APPLICATION: ( ) Statistics (SAS, SPSS, SPSSX, SCSS, IDA, etc.)
                    ( ) SPIRES
                    ( ) VS/FORTRAN
                    ( ) Other (Please specify): _____

-------------------------OFFICE USE ONLY---------------------------

   Machine Assigned: ( ) VMD   ( ) VME

If you are interested in using SAS on your PC, please fill out the following form:

_____SAS Base _____SAS STAT _____SAS RTERM _____SAS IML

I will use SAS PC Products for the following:

_____Research _____Class

Other_____

My affiliation with the University is:

_____Faculty _____Staff _____Student

Other:_____

My IBM PC is a:

_____PC XT _____PC AT _____PC 3270 _____XT/370 _____AT/370

Please return form to:

            Victoria Dingler
            CSO SAS Coordinator
            150 DCL
            1304 W. Springfield
            Urbana, IL 61801

Computing Services Office -- UIUC
Short Course Registration Form, Fall 1985

Note: You must have the current short course listing at hand in order to
      register. USE A SEPARATE SHEET FOR EACH COURSE. This form may be
      copied freely as needed. Fill in all blanks down to the "* * *"
      and send completed forms to: CSO Short Courses
                                       150 DCL
                                       1304 West Springfield
                                       Urbana, IL 61801

University ID   Name: (Please print clearly)
(Social Security)   last   first
number (9 digits)

_____   _____ , _____

Telephone: Office _____ Residence _____

Send receipt to: (address)

              _____

              _____

          . _____ CAMPUS MAIL or ZIP _____

Course   Section   Course   Course fee
number   number   title   enclosed

_____   _____   _____ $_____

Paid by:

_____   Check made payable to the University of Illinois.

_____   University account: Attach a signed STORES / SERVICE Voucher (Form
         11-48-8000) credited to CSO, 150 DCL; Account: 1-3-10104-0798,
         Computer Service. The department, account number (11 digits), and
         title to be charged must also be filled in.   NOTE: "Real money"
         accounts only; Research Board, SARA, and class accounts are NOT
         acceptable.
- -
         This portion will be returned. You MUST take it to class with you.

Computing Services Office -- UIUC
Short Course Registration Receipt and Admission Slip, Fall 1985

Course Number/Section/Title   Last name   Initial

_____   _____ , _____

Date(s) and time: _____
                            *   *   *
Meets in room: _____

Validation by   Date:____/____/_____
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If you wish to be placed on our mailing list for future issues of *OFF-LINE*, if you wish to be removed from the list, or if you wish to enter an address correction, please complete and return this page. **(Current subscribers are kept on the mailing list until a specific request for removal is received, or until a mailing is returned as undeliverable.)**

Check one: □ Place my name on mailing list
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First name -- Initial -- Last Name

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Room - Building

_____

Department

Off-campus Address:

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Organization or Company (if applicable)

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If address correction, give old address and zip code below.

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7/85

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                  University of Illinois at Urbana-Champaign
                  1304 West Springfield Avenue
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Off-Line

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CSO DIRECTORY - STAFF AND SERVICES

Administrative

Director	George Badger	150 DCL	333-4103
Business Manager	Stanley Rankin	150 DCL	333-6530
Secretary	Joyce McCabe	150 DCL	333-1637

User Services and Hardware/Software Support

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Documentation Center		1208 W Springfield	333-9230
Systems Consulting		1208 W Springfield	333-6133
Statistical Services Consulting		85 Comm West	333-2170
PC Consulting		91 Comm West	244-0608
Text Processing Consulting		118 DCL	333-7318
Maintenace & Repair Service		194 DCL	333-0969
Tape Service, Special Plots, Xerox Laser Printer		123 DCL	333-8640

Dial-up Numbers	CYBER 175 (NOSA)	300 baud	333-4000
	CYBER 174 (NOSB)	300 baud	333-4004
	IBM 3081 GX (VMD)	300 baud	333-4006
	Switch	1200 baud	333-4008
	TELENET (local no.)		384-6428

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Site Operations	Sylvia Hansen Chuck Harnsberger	65 ME	333-6285

CSO Sites (see Reference Guide RF-0.3 for operating hours)

Agriculture	N-120 Turner Hall	333-8170
Chemistry	153 Noyes Lab	333-1728
Commerce West	70 Comm West	333-4500
CRH Snack Bar	120 Snack Bar	333-1851
DCL Routing Room	14 DCL	333-6203
Electrical Engineering	146 EEB	333-4936
Florida Ave Res Hall	FAR	333-2695
Illinois St Res Hall	ISR	333-0307
Mechanical Engineering	65 MEB	333-1430
Psychology	453 Psych Bldg.	333-7815
Social Science	202 Lincoln Hall	333-0309

Academic and research computing is done on the following machines: CDC Cyber 175 running NOS 1; CDC Cyber 174 running NOS 2; IBM 3081 running VM; IBM 4341 running VM; VAX 11/780 running UNIX and driving a GSI CAT-8 phototypesetter; three Pyramids a dn a Sequent running UNIX. In addition CSO serves as Facility Manager for various departmental machines (e.g., other IBMs) and for the National Center for Supercomputing Application's CRAY X/MP.

Operating Hours (see HEARYE,SCHEDUL for exceptions):

	CYBERS 174/175	IBM
M-F	8 am - 6 am	8 am - 6 am
SAT	8 am - Midnight	8 am - 6 am
SUN	Noon - 6 am	Noon - 6 am

POLICY

PC CONSULTING

Scott Lathrop

CSO is opening a personal computer consulting office in room 91 Commerce West the week of November 11, 1985.

The PC Consulting Office will be available for people to walk in, or call with questions at 244-0608, from 10-12 AM and from 1-5 PM, Monday through Friday. The service will be available to all members of the user community. The office will be staffed by students.

The students are available to help with questions about the use of the IBM PC family of machines with particular emphasis on the following topics:

    Lotus 1-2-3
    dBASE III
    Volkswriter
    Turbo Pascal
    Fortran
    PC to mainframe communications
        (including Kermit, Cyber interface, Crosstalk)

Other software packages that will be supported, based upon the knowledge of the student on duty, will include:

    Framework
    Graphical Kernel System
    Microsoft Word
    Multimate
    Multiplan
    Rbase 5000
    Xenix

Support for non-IBM equipment will be based upon the personal experience of the students, but is not being offered as a service at this time.

The student consulting group will have the full-time EXCEL staff at their disposal to tackle more difficult problems or questions.

We will expand the support of software packages as the needs of the campus are better understood. You input as to the variety of packages that we need to support would be quite welcome. Please address your questions and comments to:

    Scott Lathrop
    150 DCL
    Campus
    333-8931

USER TRAINING PROGRAM

A brief reminder of the short courses being offered during the month of November:

G18.   Data Communications and Networking

This class will discuss: connecting a terminal to a computer both locally and remotely; long distance communication media; EIA RS232 standard interface wiring; modems; multiplexing; file transfer between computers and the software available for accomplishing this. Assumes M15 or equivalent knowledge of computer fundamentals. Fee: $10.

November 11,13,15   3pm-4pm   [Krol]

M41.   Using a Word Processing Package

How to use a microcomputer (the IBM PC) and word processing package to produce (create, revise and print) publication-ready manuscripts. Prerequisite: Quick PC (course M21) or consent of instructor. Enrollment limited to 10 per section. Fee: $25 (includes one diskette).

2.   PC-Write.
November 5,7,8   3pm-5pm   [Dewan]

3.   Microsoft Word.
November 19,21,22   3pm-5pm   [Dewan]

C12.   Introduction to the Cyber System: NOS Version 2

This course is intended both for new users who wish to learn about the new NOS Version 2 system on the Cyber 174, and for old Cyber users familiar with the NOS Version 1 system as it continues to run on the Cyber 175. Main features of the course are: use of terminals, Cyber files, the ICE text editor, accounting restrictions, and software presently available on NOS 2. If time permits, new features of CCL (Cyber Control Language) will also be discussed. Prerequisite: G10. Fee: $15. Enrollment limited to 15 per section. Three sections will be offered.

3.   November 11,12,13,14   7pm-8:30pm   [Pommert]

123.   Introduction to IBM Timesharing: CMS and XEDIT

This course presents an introduction to general CMS (Conversational Monitor System) virtual machine and XEDIT concepts. The CMS portion covers standard and locally-written CMS commands and utilities, sending files between the Cyber 175 and CMS, guidelines for utilizing the available documentation, how to use the full-screen simulator (SIM3278). The XEDIT portion introduces the text editor used under CMS. The presentation covers useful commands for both "ASCII typewriter" and "full-screen" or "simulated full-screen" terminals. Useful locally-written XEDIT commands are also discussed. Required reference and recommended prior reading: *CMS Primer*, available at the CSO Distribution Office, 1208 W. Springfield. Prerequisite: course G10 or equivalent knowledge. Fee: $15. Five sections will be offered.

4.   November 7,12,14   4pm-6pm   [Alster]
Lab: November 16   9am-11am

5.   November 18,19,20,21,22   8am-9am   [Mills]
Lab: November 23   8am-10am

184   Update on SAS Version 5 (1985)

SAS Institute, Inc., has recently released Version 5 of the CMS SAS system. A preliminary introduction to newly released products will be given, along with a description of the full-screen interactive editor called Display Manager. This course will be offered only ONCE this semester. Prerequisite: 123, 183, or equivalent. Fee: $5.

> November 13   4pm-6pm   [Dingler]

U11.   Introduction to the UNIX System

This course introduces the new user to the UNIX timesharing system. It covers terminal setup, logging in and out, file commands, and useful utility programs. It also discusses how to set up a file directory, how to communicate with others through the mesg and mail facilities, and how to use the on-line help programs. Prerequisite: G10. Fee: $10. Two sections will be offered.

> 2.   November 18   7pm-9pm   [Edwards-Iwe]

U13.   Introduction to the UNIX Editors: ex and vi

This course covers the "command mode" and "insert mode" for both the line-oriented "ex" editor and the screen-oriented "vi" editor. In ex, command structure and addressing along with the most useful editing commands are presented. The basics of vi are discussed along with learning how to physically move through files and around the terminal screen. Prerequisite: U11 or equivalent. Fee: $10.

> 2.   November 19   7pm-9pm   [Edwards-Iwe]

U15.   Introduction to the UNIX Shells

An explanation of shell concepts is given: pipelines, filters, tees, background processing, subshells, and redirecting input-output. Features specific to the C and Bourne shells are covered. The UNIX "make" utility will also be discussed. Prerequisite: U13 or equivalent. Fee: $5.

> 2.   November 20   7pm-8pm   [Edwards-Iwe]

U19.   The UNIX Package

You can register for short courses U11, U13, and U15 as a combined package for a reduced fee. Fee: $20. Two sections will be offered.

> 2.   November 18,19,20   [Edwards-Iwe]

CYBER SERVICES

SUBMITTING VMBATCH JOBS FROM THE CYBER 175

Stan Kerr

As noted in previous issues of *OFF-LINE*, the MVT batch system on the IBM is due to be removed at the end of this year; its successor is the VMBATCH facility which was described in the September *OFF-LINE*. It is now possible to submit a VMBATCH job from the Cyber 175. This is done with the command

```
SENDJOB,jobfile/DEST=VMBATCH
```

where *jobfile* is the name of the batch job file you are submitting.

The VMBATCH job file must be set up as described below. It begins with a header card, and continues with the commands you wish the job to perform; these commands are written in one of the three command languages presently available on CMS: EXEC, EXEC2, and REXX.

Although REXX is the newest and most modern command language, its use in VMBATCH presents certain problems, so the discussion below is oriented to the use of the EXEC2 language. (The EXEC, or CMS EXEC language, is the oldest and its use is strongly discouraged.) For examples of setting up a job in REXX, see the consultants.

1. The first line of the file is a header card, which MUST be set up as follows:

columns	content
1 - 8	*BATRJE.
9 - 16	A user ID; this is arbitrary.
17 - 22	A job ID; your name for the job being submitted.
41 - 44	hhmm -- job run window (open)
45 - 48	hhmm -- job run window (close)
	(The above two fields are used to specify when you want the job run.)
49 - 52	nnnn -- maximum printed lines, in thousands
53 - 56	nnnn -- maximum punched records, in thousands
57 - 64	nnnnnnnn -- maximum CPU seconds

    (Other fields not described here are covered in the *VM Batch Subsystem Program Description/Operations Manual.*)

2. The second line of the job file is used to indicate which CMS command language you intend to use in writing the job. To indicate you are writing the commands in the EXEC2 language, use the following line:

    ```
    &TRACE ON
    ```

3. The next two lines of the job file should appear as follows:

    ```
    CP SPOOL CONSOLE * START
    ```

This command instructs the "batch machine" running your job to save up the "console output" from all the commands being performed, so it can later be processed, e.g., for printing. You must have at least one space between each of the words in the command line given above.

4. The succeeding lines constitute the commands to be performed by the job. These commands, following the notes above, would be written using EXEC2.

5. To print the job output, you must include several explicit commands at the end of the job; there is NO AUTOMATIC PRINTING of VMBATCH jobs, you must provide for it. Printing is accomplished with the CMS NPRINT command. If, for example, you want to send output back to the Cyber fetch queue, you must include three commands like the following at the end of the job:

```
CP CLOSE CONSOLE
READ CONSOLE FILE
EXEC NPRINT CONSOLE FILE A (DEST usernum NODE UIUCNOSA
```

In the above commands, *usernum* represents your 7-letter Cyber user number, NOT the 9-digit ID number. To find out your user number on the Cyber, log on to the Cyber 175 and enter the command: WHO,ME. You will get a response like this

```
STAN KERR   UN=3XXXXXX ID=999999999
```

The user number in this case is 3XXXXXX.

If you want the output printed, say, at DCL, you would alter the commands given above as follows:

```
CP CLOSE CONSOLE
READ CONSOLE FILE
EXEC NPRINT CONSOLE FILE A (DEST DCL
```

If you have a CMS userid of your own, and want the output sent to your reader on CMS, use the following:

```
CP CLOSE CONSOLE
READ CONSOLE FILE
EXEC NPRINT CONSOLE FILE A ( DEST userid
```

In this particular special case (sending the output to your reader on CMS) you can avoid the three instructions given above, and instead, change the CP SPOOL CONSOLE command at the start of the job, to read like this:

```
CP SPOOL CONSOLE userid START
```

where *userid* is your CMS userid.

Following are some examples of VMBATCH jobs.

Example 1: (the first line below is a guide only, not part of the file)

```
123456789012345678901234567890123456789012345678901234567890
*BATRJE.JOANNE  THISJOB
&TRACE ON
CP SPOOL CONSOLE * START
QUERY DISK
```

```
CP CLOSE CONSOLE
READ CONSOLE FILE
EXEC NPRINT CONSOLE FILE A ( DEST 3K9NYTD NODE UIUCNOSA
```

The user ID (from the header) is JOANNE, and the job ID is THISJOB. If this job is in the Cyber file JOBFILE, then the command

```
SENDJOB,JOBFILE/DEST=VMBATCH
```

submits it to VMBATCH. The output will return the FETCH queue of user number 3K9NYTD on the Cyber 175; this is caused by the NPRINT command at the end of the job.

Example 2: running a Fortran program with data

```
*BATRJE.STAN       JOBABCD
&TRACE ON
VMDATA &2
EXEC FORTVS MYPROG (TERM
TYPE MYPROG LISTING
FILEDEF 5 DISK MYDATA FILE A
LOAD MYPROG ( START
&EXIT
.DATA MYPROG FORTRAN
        PRINT *,'THIS IS A PROGRAM'
        READ(5,*) N
        PRINT *,'THE VALUE OF N IS', N
        STOP
        END
 END
.DATA MYDATA FILE
12345
.DATA
```

In this example, the VMDATA command at the beginning causes two files to be be set up on CMS disks, from the lines in the job file: file MYPROG FORTRAN A and file MYDATA FILE A. Notice that these files are named in three parts; the parts of the name are called the *filename*, the *filetype* and the *filemode*. To avoid confusion, the whole name is called the *file identifier*. The filename and filetype may be up to 8 letters and digits, while the filemode must always be a single letter. The filemode indicates which disk the file is on; the VMBATCH job is running under the CMS system, and may have a number of disks attached to it. These disks are each identified by a letter, called the mode of the disk. Additional disks may be attached and assigned mode letters using special commands. Your job normally will use the A disk for any scratch files it needs, but if this space is insufficient there is a means of requesting additional disk space, called "temporary disk."

After VMDATA has set up the program and data file for this job, the FORTVS command calls Fortran to compile the program file; the filetype of this program file must be Fortran (notice it is not mentionned on the FORTVS command, only the file name is given). After FORTVS has compiled the program -- it creates a file called MYPROG TEXT A in this case -- the TYPE command is used to display the contents of the compilation listing file in the job output file; this listing file is called MYPROG LISTING (the filename is the same as that of the program, but the filetype is LISTING). Then the FILEDEF command is used to tell Fortran that logical unit 5 is a disk file called MYDATA FILE, and the LOAD command requests that the machine binary for the program be loaded into memory and run. The &EXIT signals the end of the commands and the end of the job.

Charging for VMBATCH Jobs

A VMBATCH job will be charged to the PS number you are using at the moment you do the SENDJOB command to submit the job. VMBATCH has no facility, as did MVT, to specify the account within the job itself. Thus, if you wish to set up a special account for running IBM jobs under VMBATCH, you can BILL to that account before you do the SENDJOB command, and BILL to your previous account again after doing the SENDJOB. (Please note that this assumes your Cyber signon is good under both accounts.) If this is a frequently performed operation, you may wish to set up a procedure file to make it more convenient. For example, if you are logged in under BILL,DEPT1,PS1111 and wish to submit a VMBATCH job under PS2222, you might enter the commands

```
BILL,DEPT2,PS2222
SENDJOB,jobfile/DEST=VMBATCH
BILL,DEPT1,PS1111
```

You might alternatively have a procedure file called VMBATCH which would permit you to enter a single command, such as

```
VMBATCH,jobfile
```

This procedure file might be set up as follows:

```
.PROC,VMBATCH,JOB.
BILL,DEPT2,PS2222.
SENDJOB,JOB/DEST=VMBATCH.
BILL,DEPT1,PS1111.
REVERT.
```

This demonstrates one possible way of handling this problem; the example VMBATCH procedure above is not intended to handle all the problems you might have in submitting VMBATCH jobs.

Problems with VMBATCH Submission

There are still some imperfections in the use of VMBATCH, some of which should be corrected over the course of time. For now, users should be aware of the following problems and peculiarities:

1. If you make an error in the "job card" (the first line of the job), the job is rejected by the system, but you get back no message whatever that it was rejected. The first line must be absolutely correct in format.

2. As noted earlier, there is NO AUTOMATIC PRINTING of VMBATCH jobs. If you do not provide for it with appropriate commands, or if for some reason your printing commands are not performed, the job output is lost. Consultants do have facilities to trace lost jobs, so a call to one of the consulting offices can help in such cases.

3. There is presently no way for a Cyber user to inquire as to the status of a VMBATCH job. If a job has not returned after a long time, you can call the consulting office and have it traced. This tracing is limited to jobs which arrived successfully on the IBM system; if, for some reason, the job was never received by VMBATCH, we can do nothing.

4. As noted above, there are no longer separate accounts for running IBM jobs; a VMBATCH job is charged to the account you are using when you do the SENDJOB command to submit it.

5. In a VMBATCH job, as distinguished from MVT, the output for a command appears immediately following the command in your output file. This may complicate reading the output, for those used to running MVT jobs.

6. If you wish to save programs or data permanently on the CMS system itself, you must get a CMS logon and disk allocation. The disk allocation is subject to the current accounting limitations on CMS disk space, viz., that you may charge only 1 megabyte (2 cylinders) of permanent disk space to a research board account, and that allocations above this limit must be paid for by hard money. This represents a considerable restriction; you may not be able to cheaply store the same volume of data you were permitted to store on the MVT disks.

IBM SERVICES

MVT CONVERSION POLICIES

Stan Kerr

As we announced in May, the MVT batch system on the IBM is scheduled to be removed at the end of December. To date, very few people have come to us to discuss their problems of converting to MVT. This article will set forth our policies in helping users to convert their programs and data to CMS (or to the Cyber if that is the most appropriate thing to do).

Conversion Accounts

Conversion accounts are available to assist people in this process. For example, if you are converting MVT programs to be run under the VMBATCH system, your Cyber signon can be put on a conversion account, and you can be given access to such an account for any MVT runs which are necessary in the process. In some cases, it may be more practical to grant additional money to a PS number already in use, rather than create a new account. If you need to set up a CMS userid to store permanent programs and data on the IBM, this userid can be put on a conversion account for this period. Conversion accounts will be allocated about 500 service units per person, or less, depending on the size of the conversion. CSO will not, however, fund massive program rewriting efforts.

Responsibility for Conversion

We must stress that, during this conversion period, CSO staff will act as consultants, not as private programmers. That is, we will assist you in converting, and provide such advice and wisdom as we can (such as demonstrating the proper setup of VMBATCH jobs), but the final responsibility for getting programs converted and running under VMBATCH (or under whatever system is appropriate), rests with you. For some users who are running programs they know little about, this will be a hardship, but no other policy is possible, given our limited staff and the demands of our other work.

Conversion Consultants

If you wish assistance in the conversion of programs, contact one of the following consultants:

For Statistical Programs:
    Joan Alster
    Vicky Dingler
    Joan Mills
    Bruce Richardson

For Other Programs:
    Stan Kerr
    Bruce Gletty
    Becky Wetzel
    Dan Pommert
    Esther Edwards-Iwe

The consultant you talk to may have to refer you to another consultant with special knowledge if you have unusual problems.

There is no guarantee that all the facilities you are using on MVT are or will be duplicated on CMS or the Cyber. For example, CMS does not have the COBOL language; if you are running COBOL programs on MVT, you will have to convert them to the Cyber or re-write them in another language. (However, be warned that the Cyber systems are due to both be on the NOS2 system next summer, at which time we will have no COBOL on the Cyber systems, due to the excessive cost of the language.)

Permanent Storage on CMS

If you need to store data or programs permanently on CMS for use in VMBATCH jobs, you will be subject to the same disk space restrictions as all CMS users, i.e., you can get 1 million bytes (characters) of disk storage "free" on a research board account, but storage above that limit must be funded by hard money. If you were accustomed to storing large amounts of data on the MVT disks, on research board money, this will necessitate a change of funding.

MVT Datasets

We will help in the conversion of existing datasets on MVT. If these datasets were created using SAS or SPSS, you must talk to the statistical consultants for instructions on converting them to another form for use under CMS.

MVT datasets still on-line at the end of December will be backed up in some reasonable form, and the tapes will be kept for at least one year.

NOTE: some datasets, particularly those with a "data set organization" of DA (direct access), present insuperable problems to backup. It may not be possible to back these up in any reasonable way. We believe that most of the datasets in question are SAS datasets, but there may be some not in this category. The consultants can help you find out if any of your MVT datasets are of this kind. After MVT goes, we will not be able to read old MVT backup tapes, only the final backup made in December, i.e., it will not be possible to recover an MVT dataset which existed, say, in October, but was not on the system at the end of December. The datasets backed up in December will include datasets which are migrated off disk at the time; they will be restored to disk before the backup is made.

INTRODUCING CMS SHARED

Bruce Richardson

In order to provide you with a better computing environment on VMD we introduce a facility for sharing software and ideas. In creating this facility, SHARED, our goals are to improve computing by preventing duplication of programming efforts, by aiding you in introducing and learning new techniques (numerical, mathematical, statistical, etc) and by improving communication among all users (especially between you and CSO). These goals can be achieved only if you participate.

How do you get involved? There are two main areas which need your immediate attention: the donation of software and the sharing of ideas and comments on the SHARED facility and on VMD in general. Donating software is by far the most important contribution you can make to this facility. Your immediate benefits from donation include reduced disk storage and easier access for others to your software. In the long run you will be helping to fulfill our previously stated goals. Your comments will help in constructing SHARED; you can comment on its good points as well as its flaws or give suggestions for inclusion into the facility.

Who can donate? Any member of the University faculty, staff or student body who has written or acquired the rights to distribute software can donate. The product donated should be of a somewhat general nature, i.e., useful to more than a handful of people. Possible products for donation include complete programs or systems, subroutine libraries, SAS macros, SPSSX userprocs, or system execs and profiles.

How do you donate? If you want to donate, you must first contact me to discuss your proposed contribution. Once your donation been reviewed (as needed) and we agree that your product should be shared, you need to help me fulfill the requirements for donation listed below.

1. The usable product, i.e., the load module, MACRO or EXEC file.

2. Documentation of the product. On-line documentation is preferred to printed documents. If an extensive printed manual exists, but no on-line document exists, then a brief on-line summary must accompany 4 copies of the printed manual. The documentation must describe:

    a. What the product does.
    b. How to use the product.
    c. Who to contact with questions or when a problem arises.
    d. Where to obtain complete printed manuals, if they exist.

3. The name and phone number of the person who will be able and willing to lend aid to those who wish to know more about your product.

4. A brief (1 line) description of the product.

5. Information on the origin of the product or the original source if possible. (NOTE: This information will not be publicly available but will aid in making SHARED products still useful after you or I are no longer here.)

How will SHARED software be made available? All products in SHARED including BULBOARD, the location of notes sent to me concerning SHARED, will be accessed via LINKTO. Thus you will be able to get to a product, softw for example, by issuing the command "LINKTO softw (SHARED". Your virtual machine will then have been reconfigured to include the disk which contains the product requested.

If you want to link to two or more SHARED products at the same time, use the command "LINKTO ALL (SHARED". Note that you must not be linked to any SHARED products at the time this command is issued. To de-link a product, softw say, type "LINKTO softw OFF (SHARED". Documentation can be obtained by using the HELP facility. For example, the command "HELP SHARED BUL-BOARD" will give you information on the SHARED bulletin board. Finally, if you want to see what is available in SHARED use the command "LINKTO (SHARED".

How do you contact me? The best way to get in touch with me is to send me a note on VMD (my userid is RICHARD). If this is inconvenient, you can call me at 333-2167 or write to the address below.

>   Bruce Richardson
>   Computing Services Office
>   150 Digital Computer Lab.
>   Campus

RATS INSTALLED ON IBM

Leonardo Auslender

The RATS program, Regression Analysis for Time Series, has been installed on both VMD and VME. On-line information on how to use RATS is available and can be accessed by entering

```
LINKTO RATS (SHARED
HELP SHARED RATS
```

If you have any questions, you can contact me at 333-0120, or NOTE LEONARDO on VMD, or NOTE ECCOMMON on VME.

LABELS

Vicky Dingler

The Labels Exec provides a way to produce mailing labels on CSO's label sheets. The form of the Labels command is:

```
LABELS fn ft (option
```

where:

fn	is the filename of the input file containing the names and addresses.
ft	is the filetype of the input file.
option	is the number of copies of each label you want.

Example:

```
LABELS DCL MYMAIL (2
```

The input filename and filetype can each be 1 to 8 characters in length. The format of the input file is quite specialized. Line 1 of the label is taken from columns 1-24 of the input file, and line two is taken from columns 31-54. Line 3 is taken from columns 1-24 of the second line, and line 4 is taken from columns 31-54 of the second line. For example:

```
John Doe                   166 DCL
Urbana, IL                 61801
Mary Smith                 152 DCL
Urbana, IL                 61801
```

After submitting the above input file to the Labels Exec, the output file that is produced looks like:

```
John Doe                   Mary Smith
166 DCL                    152 DCL
Urbana, IL                 Urbana, IL
61801                      61801
```

The filename of the output file will be the same as the filename of the input file. The filetype of the output file will automatically be LABELS. In our example, our input file was called DCL MYMAIL A, so the output file will be called DCL LABELS A. The NPRINT command is used to print the output file:

```
NPRINT DCL LABELS A (BIN 73 FORMS LABELS CC EJ
```

The options used in the NPRINT command have specified the bin in which the labels output will be placed, that the form is labels, that the file has carriage control and that there are page ejects.

The label sheets used by CSO contain 12 rows of labels per sheet, 4 labels per row. When one copy is requested, the labels are printed across the page in groups of 4. When more than one copy is requested, each label is reproduced n times in a vertical column as far as is possible. However, if the number of labels in the source file is not a multiple of 4, the remainder is filled in so as to use up each row of labels with minimal waste.

The command

```
HELP CSO LABELS
```

provides on-line help on the LABELS command.

PACK AND UNPACK EXECS ON CMS

Stan Kerr

Two useful execs, called PACK and UNPACK, have been added to the USEFUL disk on CMS. (Most users are automatically linked to this disk when they log on to CMS.) These execs are used to convert CMS fixed-length record files into "packed" format, which compresses the files, and removes extraneous blanks. If you have a large number of such files (Fortran programs, data files, etc), PACK and UNPACK may save you a great deal of space (and put off the day when you have to request a larger disk, with the associated funding problems).

PACK is used with a file by entering

```
PACK   fn fm ft
```

where **fn, fm, and ft** are the file's name, type, and mode letter. If you omit the mode letter, "A" is assumed.

UNPACK is used the same way.

If you PACK a file, you must be careful to UNPACK it before using it. XEDIT does allow you to edit the file in packed mode, but before you can, say compile it with Fortran, you must use UNPACK.

Both PACK and UNPACK have help files in the CSO category, so you can enter

    HELP CSO PACK

and

    HELP CSO UNPACK

to see a complete description of them.

NEW TD EXEC ON CMS

Stan Kerr

Some changes have been made to the TD EXEC on CMS, which is used to access temporary disks. There is now a help file for TD; it can be viewed with the command

    HELP CSO TD

TD now has a STACK option, so that, for instance, the command

    TD 10 (STACK

allocates a temporary disk of 10 cylinders, and places the mode letter of the disk on the program stack, so that an exec statement such as "pull mode" can be used to read the mode letter.

TD now gives a nonzero condition code if the allocation of the temporary disk failed. This should prove especially useful in writing VMBATCH jobs which require temporary disk.

TD also allows a BLKSIZE option, to specify the block size with which the temporary disk should be formatted. The block sizes allowed are the same as for the CMS FORMAT command. For example,

    TD 10 (BLKSIZE 4096

requests a 10 cylinder temporary disk, formatted with 4096-byte blocks. If you need a temporary disk for a small number of very large files, it is much more efficient to request a block size of 4096. For example, 1 cylinder of disk, formatted into 1024 byte blocks, yields 465 blocks or 465 kilobytes of usable storage. The same cylinder, formatted with 4096 byte blocks, yields 150 blocks, or 600 kilobytes of usable storage. The disadvantage of a large block size is that it reduces the absolute number of files you can have, since each file takes a minimum of one block. In the example just cited, the 1 cylinder could hold 465 small files, with a block size of 1024, but only 150 with a block size of 4096.

VS/FORTRAN RELEASE 4

Stan Kerr

The version of VS/Fortran, which we have been running as the default on CMS timesharing on the IBM systems, is release 1.0, which is behind the current version of the system. We have two more current releases, 3 and 4, now available to users via the commands

```
LINKTO FORTRAN REL3
```

and

```
LINKTO FORTRAN REL4
```

At the end of the Fall semester, release 1 will be accessible only via the command

```
LINKTO FORTRAN (PAST
```

and will remain in this mode until February, at which time release 1 will be permanently removed from the system. At the end of the Fall semester, release 4 will become the default release of Fortran, and will be accessible just as release 1 is now accessible, via the commands

```
LINKTO COMPILER
```

or

```
LINKTO FORTVS
```

or

```
LINKTO FORTRAN
```

Release 3 will be discarded when release 4 becomes the default.

STATISTICAL SERVICES

USING VMBATCH WITH SAS: CORRECTION

Vicky Dingler

The September *Off-Line* article "Using VMBATCH with SAS" contains an error that justifies a correction. The examples given in the article are similar in many ways and the correction is applicable to all examples.

The jobfile contains a command line that specifies that VMBATCH's printer files be transferred to the userid specified in the command. The CP TRANSFER command is used in the examples to perform this function. This CP command should be replaced with the CP SPOOL command. The first example reads:

```
&TRACE OFF
CP SPOOL CONSOLE DINGLER
```

```
CP LINK DINGLER 191 299 RR readpassword
ACCESS 299 B
CP TR PRT ALL DINGLER
EXEC LINKTO SAS
SAS BATCH1 (PPRINT LPRINT
```

The command line that should change is the fifth line which reads:

```
CP TR PRT ALL DINGLER
```

NOTE: In subsequent examples the command line reads: CP TRAN PRT ALL DINGLER.

The command line should be corrected to read:

```
CP SPOOL PRT DINGLER
```

With this command, VMBATCH's printer files will be successfully routed to the reader of the userid specified in the command line. Therefore, all of the examples in the September *Off-Line* article on "Using VMBATCH with SAS" will function appropriately with this change.

RUNNING SPSS PROGRAMS IN IBM TIMESHARING

Beth Richardson

The SPSS statistical package is a comprehensive tool for managing, analyzing, and displaying data. To run SPSS under CMS you must create an SPSS program file that has a filetype of SPSS. Note that the program file is the file that contains SPSS program statements like DATA LIST and CONDESCRIP-TIVE. You use the XEDIT editor on CMS to create the program file. You can create a program file with the filename of your choice and with a filetype of SPSS by typing the command:

```
XEDIT filename SPSS
```

Since SPSS program statements have a specification field that begins in column 16, it's convenient to use a tab control character when typing the statements in XEDIT. You can establish the tab column settings by issuing the XEDIT command:

```
TABS 1 16
```

Then when typing SPSS program statements in input mode in XEDIT, type the back slash just before typing the specification field and this will cause the specification field to be tabbed beginning in column 16. The SPSS processor is invoked and the program is run by using the command:

```
SPSS filename
```

where **filename** is the name of the SPSS program file. SPSS will write the program results to a display file that has the same filename as the program file but a filetype of LISTING. Any error messages that are generated while running the program are listed at the terminal as well as being written with the SPSS display file. You can view the display file at your terminal by using the command:

```
TYPE filename LISTING
```

You can get a copy of the file on paper by using the command:

```
NPRINT filename LISTING(DEST site
```

The display file can be redirected by using options on the SPSS command. To use any of the options, specify them after a left parenthesis following the program filename as in:

```
SPSS filename (options
```

If you use several options on the SPSS command they are separated by spaces. The available options are:

ALLTERM	All output is listed at the terminal
NOTERM	Error messages are not listed at the terminal
PRINT	Output from SPSS is written to your virtual printer
SPACE nK	This is the total amount of workspace and transpace available to SPSS. The default is SPACE 80K

Using a FILEDEF

The following section explains necessary control language for running SPSS programs that have various kinds of input and output files. In this section the term **filename** stands for the SPSS program file, **fn** stands for the data file to be read or written, **ft** stands for filetype, and **fm** stands for filemode.

Raw Data Input

It's customary for the data to be in a separate file from the SPSS program statements. Typically you will have many program files that all access the same data file. You may make many changes to the program (e.g., change CONDESCRIPTIVE to FREQUENCIES), but once you get the data cleaned it's usually considered sacred and you won't want to include the data in an XEDIT editing session. The control language for running an SPSS program that has raw data input is as follows.

```
SPSS filename (BCDIN fn
     ...note the filetype of fn must be SPSS...

               ·or·

FILEDEF 8 DISK fn ft fm
SPSS filename
     ...note the filetype of fn need not be SPSS...
```

Raw Data Output

You would generate raw data output from an SPSS program if, for example, you used the WRITE CASES procedure, requested a correlation matrix written out from the PEARSON CORR procedure, or requested factor scores written out from the FACTOR procedure. The control language for running an SPSS program that has raw data output is as follows.

```
SPSS filename (BCDOUT fn
     ...note the calculated output will be stored...
     ...with a file specification "fn SPSS A"....

               ·or·

FILEDEF 9 DISK fn ft fm
SPSS filename
     ...note the filetype of fn need not be SPSS...
```

Use of RAW OUTPUT UNIT Statement

You would use the RAW OUTPUT UNIT program statement if you had several procedures in your SPSS program that generated raw data output. The control language for running an SPSS program that uses the RAW OUTPUT UNIT 15 statement is as follows.

```
FILEDEF 15 DISK fn ft fm
SPSS filename
```

Raw Data Output with Large Record Lengths

Calculated raw data files from SPSS such as correlation matrices or factor score matrices are formatted so as not to exceed 80 characters. If you use the WRITE CASES procedure to create a raw data file that is longer than 80 characters, you need to specify LRECL and BLOCK on the FILEDEF statement as in:

```
FILEDEF 9 DISK fn ft fm (LRECL n BLOCK n
```

where **n** is the record length. There is no advantage to specifying a block size larger than the record length because CMS disk files are pre-blocked. In spite of this, **BLOCK n** must be present on the FILEDEF command.

System File Input

An SPSS system file is a specially formatted file containing both data and a dictionary. SPSS expects a system file as input when you use the GET FILE program statement. The control language for running an SPSS program that has system file input is as follows.

```
FILEDEF 3 DISK fn ft fm
SPSS filename
```

System File Output

SPSS outputs an SPSS system file when you use the SAVE FILE program statement. The control language for running an SPSS program that has system file output is as follows.

```
FILEDEF 4 DISK fn ft fm
SPSS filename
```

Merge Files

The MERGE FILES procedure is used to create a unified SPSS system file by merging all or a subset of the variables from several SPSS system files. The control language for running an SPSS program that merges two files is as follows.

```
FILEDEF FT03F001 DISK fn1 ft fm
FILEDEF FT03F002 DISK fn2 ft fm
SPSS filename
```

One final note about FILEDEFs is that after executing an SPSS program the file definition is no longer in effect and you need to reissue the FILEDEF command if you want to rerun the program. To prevent this from happening use the **PERM** option on the FILEDEF command as in:

```
FILEDEF 8 DISK fn ft fm (PERM
```

Use of the **PERM** option will cause the file definition to be retained for the duration of your terminal session or until you explicitly change it with a new FILEDEF command. The command:

```
Q FILEDEF
```

can be used to get a display of all file definitions that are in effect.

SAS VERSION 5 INSTALLED ON VMD AND VME

Vicky Dingler

SAS Version 5 has been installed on both VMD and VME. SAS Version 5 has many new features, enhancing the current version 82.3. If you are interested in using SAS Version 5, you can link to the disk on which the procedures are stored by issuing the command:

```
LINKTO SAS (FUTURE
```

This command can be executed at the CMS ready message (R;), or put EXEC LINKTO SAS (FUTURE in your profile exec file on your A disk. The LINKTO command will link SAS Version 5 to your virtual machine. Version 5 will be linked higher in your minidisk configuration than the current version of SAS so that Version 5 will be used to execute your programs.

The current version of SAS (82.3) will remain the current version until January 10, 1986. At that time, the default version will become SAS Version 5. Therefore, at that time you will no longer need to use the LINKTO command with the FUTURE option. The command LINKTO SAS will link to Version 5 by default. If you want to continue using SAS 82.3 after January 10, 1986, you will have to use the LINKTO command with the PAST option. For more information on the LINKTO command, you can refer to the on-line help file by issuing the command:

```
HELP CSO LINKTO
```

SAS Version 5 manuals are available at 1208 W. Springfield. If there are any questions regarding SAS Version 5, please refer them to the consultants in the CSO South Consulting Office in 85 Commerce West, 333-2170.

NETWORKING SERVICES

NEW FIBER OPTIC DATA NETWORK BEING DEVELOPED

Judy Melton

A high bandwidth, optic fiber data network is being developed as a facility for the Engineering College and the Urbana Campus by a joint project between CSO and the Engineering College Network Committee. The purpose of the effort is to provide a fast, flexible network that maximizes accessibility to the facilities at CSO. A prototype network will be completed in early 1986.

Planning for the new network has occurred over the past year, during which the campus networking needs were assessed, a set of criteria established, and solutions sought from various vendors. Primary

criteria for the network included low cost to individual departments, reliability of service, and ease of reconfiguration. The system selected is a high performance, token-ring network from Proteon, Inc. A prototype, 10-megabit network will use optic fibers to provide access gateways to several buildings across the Urbana-Champaign campus.

The initial prototype network will interconnect gateway computers at Coordinated Science Lab, English Building, Loomis Lab, Materials Research Lab, Noyes Lab, Talbot Lab, Water Resources Building, several machines and facilities at CSO, including the front-end machine for the CRAY. Services to be provided across the network include mail, limited remote login, and access to one-of-a-kind CSO services. Access to the common file system will be added next year.

Use of optic fibers in creating a backbone network has been a very successful application of the technology. A optic fiber network withstands electromagnetic disturbances, provides security against unauthorized taps, permits large bandwidth transmission, and allows for future expansion. The fiber being used is a standard multimode 62.5 micron. The eventual campus ring network is planned to have a star topology with no arm of the star exceeding two kilometers in length. The network will include five hubs, with each building's internal network connected to one of those hubs via a gateway and optic fibers. The Engineering College will be the first to install a hub connecting all the buildings in which its departments are housed.

Plans for potential expansion include the addition of more buildings to the network and upgrading of the network speed. After experience with the 10-megabit network has been evaluated, an 80-megabit network will be tested and installed on the campus. Thirty buildings in the College of Engineering will be attached to the network late in 1986. At that time, simultaneous with the Telecommunications Office's installation of the new telephone switch, conduit will be put in place for the optic fiber network. At a later date, all facilities on the network will have the option of upgrading to an 80-megabit network. Additional expansion needs can be met with relatively minimal expense and effort once the conduit is installed.

Each building is responsible for providing a building gateway machine, and any intrabuilding network. The cost for a gateway machine should be less than $10,000; in some cases, an existing machine can be used. The network interface cost for a single machine per building will be about $10,000 for the 80-megabit network and about $3,000 for the 10-megabit network. It is yet undetermined what the policy for access and usage charge will be.

For further information regarding the planned optic fiber network, contact Sue Greenberg (333-3723) or Roy Campbell (333-0215).

MICROCOMPUTER SERVICES

MICRO-SHAZAM IS AVAILABLE FOR SALE

Esther Edwards -Iwe

The micro version of SHAZAM (a comprehensive computer program for econometrics) is now available for sale through the University of Illinois at a discount price of $50.00 (regular price $250.00), plus the cost of diskettes and reference manual (call 244-0138 for exact price). The terms of the licensing agreement restrict sale of the software to members of the University of Illinois at Urbana-Champaign campus only. As a result, purchases may be made only through the Computer Center, located at 1609 S. Oak Street, Champaign. All purchases made through this office require a valid Stores/Requisition form with a UIUC account number and title, and stock number. The following stock numbers have been established for micro-SHAZAM:

regular version	stock # 19-80-6100
8087 version	stock # 19-80-6200

The Computer Center is open from 12 noon to 4:00 pm Monday through Friday, and their telephone number is 244-0139.

Please be advised that the micro version of SHAZAM is protected by copyright laws, hence you may be asked to sign a "user copyright agreement form" when you pick up your order.

The micro version of SHAZAM can be operated on any IBM PC-compatible microcomputer with at least one diskette drive, 448K internal memory and DOS 2.0 operating system. Users with fixed-disk drives on their PC, must prepare the disk for DOS and then transfer the SHAZAM program to the fixed-disk before use (see FDISK command in DOS reference manual for more information).

As announced in previous issues of *OFF-LINE*, there are two versions of micro-Shazam, the "regular" and "8087" versions. The "8087" version executes faster if you have an Intel 8087 math co-processor in your system. The "regular" version will work with or without the 8087 co-processor. The micro-SHAZAM language syntax is identical to the version on the mainframes. However, the following options and commands cannot be used on the micro version:

1. Regression with Householder transformations, (HH) are not allowed. The HH subproblem is usually useful for performing an exact Durbin-Watson test for autocorrelation. If this is useful to your work, please call Esther Edwards-Iwe at 333-8629 for assistance (or leave a message at 333-1637).

2. The PAR command used to increase the size of the internal workspace will not work in micro-SHAZAM. The internal workspace is preset at PAR=62 (1 PAR = 1024 bytes), which is the maximum allowed.

3. The USER subroutine and DATA command cannot be used since there is no way to link a Fortran subroutine to the rest of the SHAZAM program. This means all complicated data transformation must be done outside micro-SHAZAM.

4. The FM command will not work. You must use free-format when writing out selected variables to UNIT 7.

SHAZAM commands may be up to 80 characters long and must be typed in lower case.

The micro version of SHAZAM is provided on three double-sided, double-density, 5.25 diskettes. The SHAZAM commands are distributed across the three diskettes so that you can use the basic commands

like SOLOMON, NAME, SMPL, GENR, DATA, OLS, FC, VARS, MERCURY on all the diskettes. Specifically, the commands are distributed in the following manner:

SHAZAM1	SHAZAM2	SHAZAM3
auto	gs	ols...
dl gls	box	
lag pool	lambda	
2sls	nl	probit
system	eq	logit
	coeff	tobit
	pc	
	pc	
	pc	

For more information on how to use micro-SHAZAM see the *SHAZAM Reference Manual*, available at the Computer Center or at the CSO Distribution Center, 1208 W. Springfield.

FEATURE ARTICLE

RADIOIMMUNOASSAY DATA PROCESSING ON SAS

Ming-Che Wu

Department of Animal Science

(Editor's Note: This article was contributed by one of our users in hopes that his program would be of use to others. If you have questions, please contact Mr. Wu.)

Laboratories currently measuring hormones utilize calculations for standard curves analysis and interpolation of unknowns which are often time consuming and less flexible for radioimmunoassay (RIA) or enzyme immunoassay (EIA) data processing and validation. RIAEIA was developed to utilize SAS from either the Cyber or the CMS operating system at the University of Illinois, including:

1. Titration of antiserum

2. Determination of a standard curve and sensitivity of the smallest detectable dose

3. Determination of cross reactivity

4. Modifying the sensitivity of the standard curve

5. Processing a sample for hormone measurement

6. Validation: Parallelism on RIA

7. Validation: Parallelism on EIA

8. Validation: Cold recovery

9. Validation: Hot recovery

10. Validation: Column chromatography

11. Quality control for RIA or EIA

12. Processing a sample measurement with spectrophotometer.

RIAEIA can deal with unequal replication of standards and samples. Data for precision, potency estimation and titration could be stored and re-used for laboratory quality control. Concentration of unknowns from interpolation could be stored and manipulated for further statistical analysis.

The Radioimmunoassay Data Processing on the Statistical Analysis Systems (SAS): RIAEIA User's Guide, 1985 edition, contains information specifically for RIAEIA users working under either the CMS or the Cyber operating system at the University of Illinois. This guide, which is available on-line when you access the program, was designed as a brief outline for the RIAEIA user -- it contains:

Chapter 1.   What is RIAEIA? -- gives an overview of features of the RIAEIA program.

Chapter 2.   Getting started on CMS or Cyber -- guides the new user of the computer system.

CONTRIBUTED ARTICLES

The above article was contributed by one of our users, Mr. Wu, in the hope that his program might be useful to others. We appreciate his sharing of information. Any questions about his program should be directed directly to Mr. Wu.

We welcome articles from our users -- about how they are using computers in their work, programs they have written and would like to share, etc. One note of warning to our users: although we will be more than happy to print articles from users who wish to share programs they have written, the CSO staff does not have the time available to check out all user-contributed programs. Although we assume that the programs do work as described by the contributing author, we cannot guarantee them.

We hope that more people in our user community will contribute articles to *Off-Line.* It is our belief that others enjoy reading about how you are using computers, creating interesting plots or programs, etc. If you are interested in submitting an article or interesting plot, you should send a copy to:

Editor, Off-Line
Computing Services Office
120 DCL
Campus

Publication is at the discretion of CSO.

MISCELLANEOUS

SURPLUS PLOTTER PAPER

CSO has a surplus supply of Graphic Control plotter paper for the CalComp Plotter. CSO will give this paper to anyone who can use it. The stock numbers are 600 TRL and 400 TRANSL. Please contact Terminal Repair at 333-0969 if you are interested.

HELP WANTED --SALES

PART-TIME PROGRAMMER WANTED

A position is available from now until December 31, 1985 (and probably beyond) as programmer for a research project designing software for combinatorial data analysis. Approximately one hundred hours of work will be involved, beginning immediately, and pay will be highly competitive (e.g., in the range of $16/hr). There is also the possibility of a continuing appointment next semester.

The most important criteria are familiarity with C, UNIX operating systems, and Fortran. Other desirable prerequisites include acquaintance with combinatorial optimization, and familiarity with numerical methods and multivariate analysis. Either call 333-8131 and leave a message with your name and phone number, or send inquiries/applications (with a vita and phone number where you can be reached) to:

> Phipps Arabie
> Department of Psychology
> University of Illinois
> 603 E. Daniel
> Champaign, IL 61820

Messages may be sent through campus mail. Please do **not** send computer mail.

HALF-TIME GRADUATE RESEARCH ASSISTANT FOR THE COMPUTER MUSIC PROJECT (SCHOOL OF MUSIC) NEEDED

PERIOD: 11 months starting January, 1986.

BACKGROUND: Experience with UNIX and/or MS-DOS operating systems,
    C language, Fortran, and graphics.
    Interest in music desirable.
    Some computer hardware background desirable.

MAIN TASK: Develop a music notation plotting/printing package.

OTHER POSSIBLE DUTIES: Write and test program for 9-track tape to
    disk transfers. Install hard disk.

Supervise UNIX operating system for small
multiuser computer.

WORK ENVIRONMENT: Laboratory in the School of Music, with LMC
supermicro UNIX computer, PC AT microcomputer,
monochrome and color graphics, dot matrix and
pen plotter hard copy, digital sound system.

APPLY TO:

Sever Tipei, Chairman   -or-   Prof. James Beauchamp
Composition/Theory Division   5004 Music Building
5052 Music Building   1114 W. Nevada
1114 W. Nevada   Urbana, IL 61801
Urbana, IL 61801   Telephone: 333-1089
Telephone: 333-6689

TERMINAL FOR SALE

DEC PDT-11/130 -- VT-100 terminal with built-in LSI-11 and DUAL TU-58 drives. $400.00 or best
offer. Contact:

Mark Sandrock
Box 66 Noyes Lab
Telephone: 244-0560

COMPUTER TAPES FOR SALE

The Survey Research Lab has approximately 100 used computer tapes (9-track, 6250 BPI) available for
purchase ($5.00 per tape; minimum purchase of 10 tapes). Please contact the Survey Research Lab
Data Processing section at 333-1341 for more information.

COMPUTER ROOM AIR CONDITIONER

The Survey Research Lab has one Hiross Spacemaker II computer room air conditioner (Model 015A,
200 volts) available for purchase. For more information, please contact Johnny Blair (333-4273).

OFF-LINE's Mailing List

If you wish to be placed on our mailing list for future issues of *OFF-LINE*, if you wish to be removed from the list, or if you wish to enter an address correction, please complete and return this page. **(Current subscribers are kept on the mailing list until a specific request for removal is received, or until a mailing is returned as undeliverable.)**

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Off-Line

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Director	George Badger	150	DCL	333-4103
Business Manager	Stanley Rankin	150	DCL	333-6530
Secretary	Joyce McCabe	150	DCL	333-1637

User Services and Hardware/Software Support

User Accounting		1208	W Springfield	333-7752
Documentation Center		1208	W Springfield	333-9230
Systems Consulting		1208	W Springfield	333-6133
Statistical Services Consulting		85	Comm West	333-2170
PC Consulting		91	Comm West	244-0608
Text Processing Consulting		118	DCL	333-7318
Maintenace & Repair Service		194	DCL	333-0969
Tape Service, Special Plots, Xerox Laser Printer		123	DCL	333-8640

Dial-up Numbers	CYBER 175 (NOSA)	300 baud	**333-4000**
	CYBER 174 (NOSB)	300 baud	**333-4004**
	IBM 3081 GX (VMD)	300 baud	**333-4006**
	Switch	1200 baud	**333-4008**
	TELENET (local no.)		**384-6428**

Personal Computers/EXCEL	Robert Penka	173	DCL	333-4709
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Microcomputer Laboratory	Jack Knott	86	Comm West	333-6562
User Training (Short Courses, Videotapes)	Ron Szoke	131D	DCL	333-8630
Documentation	Lynn Bilger	120	DCL	333-6236
CYBER-IBM-VAX Operations	Myra Williams	168	DCL	244-0186
Site Operations	Sylvia Hansen Chuck Harnsberger	65	ME	333-6285

CSO Sites (see Reference Guide RF-0.3 for operating hours)

Agriculture	N-120	Turner Hall	333-8170
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Illinois St Res Hall		ISR	333-0307
Mechanical Engineering	65	MEB	333-1430
Psychology	453	Psych Bldg.	333-7815
Social Science	202	Lincoln Hall	333-0309

Academic and research computing is done on the following machines: CDC Cyber 175 running NOS 1; CDC Cyber 174 running NOS 2; IBM 3081 running VM; IBM 4341 running VM; VAX 11/780 running UNIX and driving a GSI CAT-8 phototypesetter; three Pyramids a dn a Sequent running UNIX. In addition CSO serves as Facility Manager for various departmental machines (e.g., other IBMs) and for the National Center for Supercomputing Application's CRAY X/MP.

Operating Hours (see HEARYE.SCHEDUL for exceptions):

	CYBERS 174/175	IBM
M-F	8 am - 6 am	8 am - 6 am
SAT	8 am - Midnight	8 am - 6 am
SUN	Noon - 6 am	Noon - 6 am

POLICY

USER TRAINING PROGRAM

Ron Szoke

The Spring 1986 user training announcement will be available by January 20, 1986. Questions, comments, or suggestions concerning any aspect of user training (short courses, audio and video cassettes, etc.) should be communicated to Ron Szoke, 150 DCL, 333-8630. Or send a message via:

TELL.COURSES from a NOSA terminal
NOTE SZOKE @ UIUCVMD from a CMS terminal
mail szoke @ uiucuxc from a UNIX terminal.

CYBER SERVICES

NOS 2 SERVICES FOR SPRING

Stan Kerr

CSO is upgrading the memory of the Cyber 174, to improve service on the NOS 2 system, and to prepare for eventual migration of both Cybers to NOS 2 next summer. This memory should be installed by the beginning of the Spring semester, and will enable us to offer several new services. We will be able to offer larger memory limits than we do now, although we still will not be able to support the same limits we maintain on the Cyber 175; future announcements in *OFF-LINE* and HEARYE will specify what memory limits for user programs we will have.

Beginning in the Spring semester, CSO will begin reinstating the old policy of putting classes on the Cyber 174. Class requests for computing time will be placed on the Cyber 174 unless we have a good reason for not doing so; instructors submitting class requests should be prepared to specify what software packages their classes require, so we can assess whether the Cyber 174 will be able to support the class. Once more of the class load is shifted back to the 174, the performance of the Cyber 175 system should improve.

Professors should be warned that NOS 2 is different from NOS 1, and therefore, they should try NOS 2 before the class is expected to use it, change course handouts, etc. The *NOS 2 Primer* (similar to the NOS 1 Primer) and *NOS 2, An Introductory Manual* are both available free at 1208 W. Springfield. Another manual, *Differences Between NOS 1 and NOS 2*, which may be helpful to professors, is also available free.

STATISTICAL SERVICES

SPSS ON CMS TO REQUIRE LINKTO

Joan Mills

SPSS under CMS on the VMD machine has until now been available to users by just entering

```
SPSS fn
```

where **fn** is your program filename.

In an effort to standardize program access techniques, it is now possible to use

```
LINKTO SPSS
SPSS fn
```

A message is now generated at run time to state this. Starting on **February 2, 1986**, SPSS fn without a prior LINKTO SPSS command during the terminal session, or in the profile, will produce a message saying "PLEASE USE LINKTO SPSS," and no SPSS run will be made.

NOTE OF WARNING: Since SPSS must always be accessed at mode B, LINKTO SPSS will move a disk accessed at B to another available mode.

SPSSX VERSION 2.1 FOR CMS

Joan Mills

SPSSX Version 2.1 has been available to users of the IBM timesharing system on the VMD machine via the command

```
SPSSX21 fn
```

The preferred method of accessing SPSSX Version 2.1 has now been changed to the following:

```
LINKTO SPSSX(F
SPSSX fn
```

where F means future.

The previous version (SPSSX Version 2.0) that until now has been accessed by the command

```
SPSSX fn
```

can now be accessed by the two commands

```
LINKTO SPSSX
SPSSX fn
```

The methods described above using the LINKTO commands will persist until **February 2, 1986**. Beginning February 2, the LINKTO command **must** be used to access SPSSX. Use of SPSSX21 or using SPSSX without LINKTO will result in a message telling you to use LINKTO. Also, at that time

Version 2.0 will be moved to "past" and will have to be accessed by

```
LINKTO SPSSX(P
SPSSX fn
```

where P stands for past; Version 2.1 will become the "current" version to be accessed by the commands:

```
LINKTO SPSSX
SPSSX fn
```

Using the LINKTO command, it will **not** be possible to link to both versions (SPSSX Version 2.0 and SPSSX Version 2.1) at the same time. This is to avoid possible confusion of similarly named modules. Note also that under LINKTO both versions will be called SPSSX. The version accessed will depend entirely on the most recent LINKTO statement issued by the user (so users should be sure to enter the correct LINKTO statement for the version they wish to use). Starting immediately, uses of

```
SPSSX21 fn
```

will generate a message to use LINKTO SPSSX(F instead. (Remember that after February 2, SPSSX21 fn will no longer work.) On February 2, EXEC LINKTO SPSSX will be added to the default statistical user's profile. If you maintain your own profile on your A disk, you may want to include the statement

```
EXEC LINKTO SPSSX
```

in your profile.

The enhanced features of SPSSX Version 2.1 are described in detail in an update manual, available at the CSO Statistical Consulting Office (85 Commerce West), and also in the second edition of the *SPSSX Users Guide* recently released by McGraw-Hill publishers. This manual is sold at the CSO Distribution Office, 1208 W. Springfield, Urbana. Changes for Version 2.1 are summarized briefly in this users guide, starting on page 962.

Notable among the new features: better handling of date-time data, and column binary data; changes to file handling and value labels; the ability to read OSIRIS and SAS datasets; changes to the programs for MANOVA, Pearson correlations and regression; and the addition of the well-known alternating scaling technique, ALSCAL, which includes INDSCAL, for multidimensional scaling and unfolding. PROX-IMITIES prepares data for ALSCAL. ALSCAL joins the program LISREL (Linear Structural Relations), which was added at Version 2.0.

Summary of changes to SPSSX access:

Version	Present Access	Access Beginning Feb. 2
2.0	SPSSX fn	LINKTO SPSSX(P SPSSX fn
	LINKTO SPSSX SPSSX fn	LINKTO SPSSX(P SPSSX fn
2.1	SPSSX21 fn	LINKTO SPSSX SPSSX fn
	LINKTO SPSSX(F SPSSX fn	LINKTO SPSSX SPSSX fn

USING VMBATCH WITH SAS FROM THE CYBER

Vicky Dingler

SAS users can use the newly installed batch machine under CMS called VMBATCH for their batch processing. VMBATCH will serve as an alternative for batch processing commonly done on OS/MVT.

VMBATCH is a virtual machine running under the CMS operating system that functions as a supervisory machine. The VMBATCH supervisor machine will send jobs to several batch server machines for processing.

Several machines have been defined for VMBATCH so that multiple jobs can be processed simultaneously. Each machine has been assigned at least one class for efficient processing. Class A has been defined for quick-turn-around jobs that use less than 2 seconds of CPU time and 1600K of memory. Class G has been defined for jobs that will use more than an hour of CPU time and up to 16 megabytes of memory. There are several classes between A and G that will process varying types of jobs. Please refer to the reference guide (RF. 20.6) for more information on VMBATCH class specifications.

Submitting a job to VMBATCH can be done by issuing the SENDJOB command at the CYBER sysem prompt. For example:

```
/SENDJOB,jobfile/DEST=VMBATCH
```

where jobfile is the file that is submitted to VMBATCH for processing.

The jobfile must contain all of the SAS programming statements and data lines to be processed by VMBATCH. The filename can be a combination of 1 to 7 characters, but it must not start with a number. Any valid CYBER filename will do. The file must contain EXEC2 or REXX control statements that define the minidisk configuration of the batch machine to which the job is sent. For example:

```
'BATRJE.DINGLER JOB1             B
&TRACE ON
CP SPOOL CONSOLE * START
VMDATA &FILENAME
EXEC LINKTO SAS
SAS DATA1 (LTYPE PTYPE
CP CLOSE CONSOLE
READ CONSOLE FILE A
EXEC NPRINT CONSOLE FILE A (DEST 3KZOT4J NODE UIUCNOSA
&EXIT
.DATA DATA1 SAS A
DATA ONE;
INPUT A 1 B 3 C 5-6;
CARDS;
2 3 43
3 4 52
4 5 68
6 7 83
3 4 55
;;;
PROC PRINT;
PROC PLOT: PLOT A * B,
 END
```

In this example, the first line of the file must begin with the statement: *BATRJE. in columns 1-8. Columns 9-16 should have a user ID. The job ID must appear in columns 17-22. The default class of

any job is A. If you want to specify another class for the job, the class specification should be in column 33. In this example, the class specified is B. Other optional specifi- cations follow.

column	required or optional	content
1 - 8	R	*BATRJE.
9 - 16	R	A user ID, up to 8 characters.
17 - 22	R	A job ID, up to 6 characters.
33 - 33	O	The job class. The default is A.
41 - 44	O	hhmm -- job run window (open)
45 - 48	O	hhmm -- job run window (close)
		These two fields specify when the job should run. The default is an immediate execution of the job. The hh specification is a number between 1 and 24. The mm specification is a number between 1 an 59.
49 - 52	O	nnnn -- maximum printed lines, in thousands.
53 - 56	O	nnnn -- maximum punched lines, in thousands.
57 - 64	O	nnnnnnnn -- maximum CPU seconds. The default is class dependent.

For a complete list of default settings, please refer to the reference guide titled "VMBATCH Class Specification" (RF. 20.6).

The second line is an EXEC2 control statement. Other exec languages are available for use, such as EXEC or REXX. For more information on exec languages, refer to the CMS User's Guide. Note that all of the examples in this handout are written in EXEC2. EXEC2 statements must be written in upper-case only.

The next line spools the console to VMBATCH'S reader. This is useful for a complete diagnosis of the job and it's progress. All of the messages displayed on the server machine's console will be put in a file on VMBATCH's reader.

The next command executes a program called VMDATA. This command should be typed exactly as it appears in this example. VMDATA writes the SAS program (and the data) to the CMS minidisk specified in the .DATA command. The .DATA command will be explained later.

The next command links the SAS disks to VMBATCH. The next line invokes SAS and executes the program file called DATA1 SAS. The options on the SAS command line will cause the procedure out- put (listing) and the saslog to be printed on VMBATCH's console.

The next command will close the file being spooled to VMBATCH's reader. The READ command will take the file off of the reader and write it to VMBATCH's A disk. The name of the file will be CON- SOLE FILE A.

The NPRINT command will print CONSOLE FILE A to your CYBER fetch queue. The DEST specification should be your user number, not your social security number. The NODE specification is UIUCNOSA. If you do not know your user number, you can issue the command: WHO,ME. You will get a response similar to:

```
DINGLER V   UN=3KZOT4J
```

The character string following "UN=" is your user number.

The &EXIT command is an EXEC2 command and must be printed as shown in the example.

The next line is the .DATA statement. The .DATA command defines a three part CMS file identifier (filename, filetype and filemode) to VMBATCH. The file will contain the SAS programming statements that follow the .DATA command line. The filename can be any combination of 1-8 characters. The filetype of a SAS program must be SAS. The filemode is disk location in CMS that is associated with your account. By default the filemode part of the file identifier is A. If you specify a file mode other than A, you will first have to define that disk to VMBATCH. See the example below on defining temporary disks to VMBATCH.

The SAS programming statements follow the .DATA command line. The SAS program can invoke any procedure that is available in CMS SAS. This example invoked the print procedure and the plot procedure. The input statement uses column input specifying the columns in which the data can be found.

The .END statement informs VMDATA that there are no more programming statements.

There will be times when a temporary disk will be necessary to complete a programming task. The jobfile can include a request for temporary disk space. The next example uses the TD exec to request temporary disk space in the batch server machine:

```
*BATRJE.DINGLER JOB1               B
&TRACE ON
CP SPOOL CONSOLE * START
VMDATA &FILENAME
EXEC TD 10
EXEC LINKTO SAS
SAS DATA1 (LTYPE PTYPE SIODISK B
CP CLOSE CONSOLE
READ CONSOLE FILE A
EXEC NPRINT CONSOLE FILE A (DEST 3KZOT4J NODE UIUCNOSA
&EXIT
.DATA DATA1 SAS B
DATA ONE;
INPUT A B C;
CARDS;
2 3 4
3 4 5
4 5 6
6 7 8
3 4 5
;;;
PROC PRINT;
PROC PLOT; PLOT A * B;
.END
```

The TD exec will request temporary disk space for the batch server machine and issue the LINK and ACCESS commands for the first available free minidisk in the batch server's minidisk configuration. In this case, the first free minidisk will be the B disk. Therefore, using this method, the temp disk will always be the B disk. This extra disk space can be used for the input/output functions of the SAS program. The extra option on the SAS command, that is the SIODISK B option, directs SAS to use the B disk for its work data sets.

If a tape is needed to store the data generated from a SAS job, the MOUNT command can be issued from within the jobfile. The next example demonstrates the use of the MOUNT command:

```
*BATRJE.DINGLER JOB1               T
&TRACE ON
CP SPOOL CONSOLE * START
VMDATA &FILENAME
EXEC LINKTO SAS
EXEC MOUNT IBMSCH TEMP RING IN AS 181 DEN 1600 (WAIT
&IF &RC NE 0 &EXIT
SAS DATA1 (LTYPE PTYPE
CP CLOSE CONSOLE
READ CONSOLE FILE A
EXEC NPRINT CONSOLE FILE A (DEST 3KZOT4J NODE UIUCNOSA
&EXIT
.DATA DATA1 SAS A
CMS FI SAVE TAP1 NL (LRECL 32760 BLOCK 800 RECFM VBA;
DATA SAVE.ONE;
INPUT A B C;
CARDS;
2 3 4
3 4 5
4 5 6
6 7 8
3 4 5
; ; ;
PROC PRINT;
PROC PLOT; PLOT A * B;
.END
```

Notice that the class specification is no longer B but T for tape usage. The SAS program must contain a file definition (filedef) that associates tape (tap1) with the SAS data set that will be written to tape (save.one).

The MOUNT command will mount a tape on a CMS tape drive. The tape name and the rack number (or the TEMP rack) are stated on the MOUNT command. Other parameters on the MOUNT command specify RING IN (write on the tape), a a device specification (AS 181, in this case), the density capabilities of the tape drive (DEN 1600), and a WAIT function. The WAIT function will cause the jobfile to wait until the tape is mounted. The &IF statement checks to see if the tape is mounted. If the &RC, or the return code, is 0, then the program will continue to the next statements, in this case: SAS DATA1 (LTYPE PTYPE.

If there are any questions pertaining to SAS use with VMBATCH, please direct them to the consultants at 85 Commerce West.

USING VMBATCH WITH BMDP

Joan Mills

The CMS version of BMDP may be run in the VMBATCH system starting under a CMS signon on VMD or starting on the Cyber 175 (NOSA). Since the CMS version of BMDP is the 1983 version and the Cyber version is the 1981 version, users may want to run the CMS version from the Cyber. The user is referred to the September and October/November issues of *OFF-LINE* for more information about VMBATCH.

VMBATCH from a VMD Logon

To begin the VMBATCH submission process, issue the following command at a CMS ready message (R;):

```
LINKTO VMBATCH
```

This command makes available a SUBMIT EXEC file that can receive your batch job and route it to one of the waiting batch virtual machines. The default VMBATCH machine (Class B) has two megabytes of memory, five cylinders of disk space, and will run for two minutes. The machine chosen for you depends on the values you assign these parameters and some others. To see a list of the batch submission options type:

```
SUBMIT ?
```

Assuming you have created a batch submission file (see below for an example), you may be prompted for required class parameters by entering:

```
SUBMIT
```

You will be asked for filename, time limit, etc.

To submit a prepared setup, with parameters specified, prepare a file with a filetype of EXEC, as in fn EXEC A then use:

```
SUBMIT fn
```

or

```
SUBMIT fn (CL B
```

Both these forms of the SUBMIT command will get you the default class B (see above) without answering any further questions. Note the use of CL B for class B. Other parameters may be entered similarly. (NOTE: A forthcoming Reference Guide RF-20.6 will describe VMBATCH classes.)

Example 1:

Suppose you have the following BMDP program in a file called PROGA BMDP A:

```
/PROBLEM
/INPUT      FORMAT IS '(F2.0)'.
            VARIABLES = 1.
/VARIABLES  NAMES = SCORE.
/END
38
37
36
36
36
35
```

To submit this BMDP program for batch processing, put these components in a batch submission file with filetype EXEC, called, for example, RUNA EXEC A.

General form of such a file is:

```
&TRACE OFF
CP SPOOL CONSOLE userid START
CP LINK userid 191 vaddr RR rpass
ACCESS vaddr fm
EXEC LINKTO BMDP
CP SPOOL PRT userid
EXEC BMDP progfile (prog PRINT
```

A specific example, which runs program BMDP2D, would be:

```
&TRACE OFF
CP SPOOL CONSOLE MILLS START
CP LINK MILLS 191 333 RR SECRET
ACCESS 333 C
EXEC LINKTO BMDP
CP SPOOL PRT MILLS
EXEC BMDP PROGA (2D PRINT
```

The seven statements above have the following meaning, in order:

1) The first statement introduces this as an EXEC2 command language file. Note: EXEC2 commands must be typed in upper-case characters only.

2) The second statement specifies that statements intended for the terminal screen of the batch machine be returned to the user instead (userid), where userid is your logon name.

3) The third statement specifies that the user's own 191 (A) disk is to be linked to the batch machine. This requires that batch users get a read password for that A disk (rpass). This statement also assigns a virtual address (vaddr) for use by the batch machine (VMBATCH machines have their own 191 disks, so choose another number. Do *Q DISK* to see which numbers are not in common use.)

4) The fourth statement assigns a mode letter for temporary use by the batch machine.

5) The fifth statement calls up the BMDP processor.

6) The sixth statement specifies that output designated for the batch machine's virtual printer be returned to the user instead.

7) The seventh statement says to run the BMDP program (prog) on the program file (progfile). VMBATCH will find this program file on the user's A disk linked at line 3.

Use SUBMIT RUNA to submit this job to a default sized batch machine. Messages about the progress of your batch job appear on your terminal screen if you stay logged on. VMBATCH returns a console file, a print file (and a punch file if your program generated one and it was spooled back to your userid -- use a command for SPOOL PUNCH similar to the SPOOL PRT given above). When these files arrive, use

```
QUERY RDR ALL
```

to note their file numbers (no. on left side of info line). You may receive a file using

```
ORDER RDR no.
DEPRINT fn ft fm
```

See the September and October/November issues of *OFF-LINE* for other ways to retrieve batch output. Remember screen messages are in the CON file (CONSOLE) and printed output is in the PRT file. Note that DEPRINT preserves carriage control information for future printing with proper vetical spacing.

Example 2:

Suppose your BMDP program file called PROGB BMDP A, looks like this:

```
/PROBLEM
/INPUT        FORMAT IS '(F2.0)'.
              VARIABLE = 1.
              UNIT = 7.
/VARIABLES    NAMES = SCORE.
/END
```

and your input data is in a separate file, called PROGB DATA A.

Then your batch setup file, call it RUNB EXEC A, might look like this:

```
&TRACE OFF
CP SPOOL CONSOLE MILLS START
CP LINK MILLS 191 333 RR SECRET
ACCESS 333 C
EXEC LINKTO BMDP
CP SPOOL PRT MILLS
FILEDEF 7 DISK PROGB DATA C
EXEC BMDP PROGB (2D PRINT
```

Other than the program name change in the last line, the only change from Example 1 is the filedef statement to point to the same unit number as in the BMDP program (unit 7 here) and designate our data. Note the data has filemode C because our A disk was accessed at mode C in line 4.

Submit this file as before. (Note: One LINKTO VMBATCH serves for the entire logon session.) To receive new batch results in the same file as previous ones (to save disk space) use:

```
ORDER RDR no.              or           RECEIVE no. fn ft fm (REP
DEPRINT fn ft fm
```

where fn ft fm is the same file as before.

This data-input-from-file method could also be used for computer tape input. The appropriate mount command would be issued before the filedef pointing to it. For example:

```
EXEC MOUNT tname·rack RING OUT AS 181 DEN 1600 (WAIT
&IF &RC NE 0 &EXIT
FILEDEF 7 TAP1 NL (LRECL r BLOCK b RECFM f
```

Note that the mount command specifies tapename (tname) and rack number or TEMP (rack). For more information use

```
HELP CSO MOUNT
```

or

```
MOUNT ?
```

The (WAIT is to allow time for the mount to be made before continuing. The &IF, etc., checks for a successful tape mount. For example, a return code of 2 means that the mount was rejected because of batch machine parameters. (Classes A and B do not allow tape mounts.) The filedef for unit 7 specifies appropriate tape parameters instead of a disk filename. Use SUBMIT RUNB (CL C to run this tape job.

Example 3:

Suppose you want to do file output from your BMDP run. Disk output would go by default to the A disk of the batch machine. Normally you do not specify writing it to the user's A disk because the batch machine does not have write access to the user's A disk. To handle this problem data can be written somewhere temporarily then, "dumped" to the user through a "punch" mechanism. Consider this adjustment:

```
&TRACE OFF
CP SPOOL CONSOLE MILLS START
CP LINK MILLS 191 333 RR SECRET
ACCESS 333 C
EXEC LINKTO BMDP
CP SPOOL PRT MILLS
FILEDEF 7 DISK PROGB DATA C
FILEDEF 90 DISK SAMP BMDPSAVE A
EXEC BMDP PROGC (2D PRINT
CP SPOOL PUNCH MILLS CONT
DISK DUMP SAMP BMDPSAVE A
```

Also add a save paragraph to PROGB to get PROGC:

```
/SAVE UNIT=90.NEW.CODE=SAMP.
```

Here we filedef unit 90 to give this output file a name on the batch machine's A disk (we could also have used the BMDP SAVEOUT fn as a BMDP parameter with the same result, i.e., SAVEOUT SAMP). After BMDP runs and creates the output file direct the punch to go to the user's id, then dump the file. This causes the file to become a PUN file on the user's reader. Note this file can be received with its existing name using

```
RECEIVE no.
```

or, with a new name as the other reader files are. Also, there is no carriage control to preserve on a BMDPSAVE file. It is also possible to DISK LOAD a file that was DISK DUMPed; however, the file must be first on the reader. These commands reorder the reader and load the file:

```
ORDER RDR no.
DISK LOAD
```

where no. is the same type filenumber we have used before. The file comes in with name intact.

VMBATCH from a Cyber 175 (NOSA) Signon

Cyber-created jobs for VMBATCH would contain the same BMDP code as in the previous section. The VMBATCH machines are the same, so many commands in the body of the batch setup would be the same. However, a Cyber-originated VMBATCH job must be self-contained, since the Cyber user does not generally have a CMS logon under which to store data. Program and console output must be sent all the way to the Cyber by the batch machine. Thus, console and printer are spooled to the batch machine's own reader (not to the user) then read and printed (using NPRINT) to the user on the Cyber, or to hard copy. Batch jobs are charged to the account sending the jobs from the Cyber.

To accomplish transfer-in of needed program and data, the commands .DATA ... .END bracket each "file" as it is included in the batch setup file. This is the only file going to VMBATCH from the Cyber so everything must be in it. There is, at the beginning of the setup file, a *BATRJE. statement indicating jobname and submit parameters. Use

```
SENDJOB,FN/DEST=VMBATCH
```

to submit your job. Use FETCH to retrieve the output NPRINTed to you.

Example 4:

Originating in the Cyber example 1 would be setup like this:

```
*BATRJE. USER99 JOB1
&TRACE OFF
CP SPOOL CONSOLE * START
VMDATA &FILENAME
EXEC LINKTO BMDP
EXEC BMDP PROGA (2D TERM
CP SPOOL CONSOLE CLOSE
READ CONSOLE FILE A
EXEC NPRINT CONSOLE FILE A (DEST usernum NODE UIUCNOSA
&EXIT
.DATA PROGA BMDP A
/PROBLEM
/INPUT       FORMAT IS '(F2.0)'.
             VARIABLES = 1.
/VARIABLES   NAMES = SCORE.
/END
38
37
36
36
36
35
.END
```

The lines of the foregoing are as follows:

1) VMBATCH control statement -- has eight column fields for *BATRJE. and user id (could use Cyber user number) and a six column field for jobid which identifies the job to the system. Additional fields would allow for class, time and line estimates, etc. See the handout "Submitting VMBATCH jobs from the Cyber 175" (available at 85 Commerce West or 1208 W. Springfield) or a VMBATCH Subsystem manual.

2) Same as in CMS example (indicates EXEC2 language).

3) SPOOL CONSOLE (terminal screen information) to the VMBATCH machine reader.

4) Control statement to indicate .DATA input files exist.

5) Same as in CMS example (calls BMDP).

6) Same as in CMS example (run BMDP), except output goes to terminal alias console -- thus to VMBATCH's reader.

7) Close the console spooling process. Console must be closed before it can be reread.

8) Read the file on the reader using the filename CONSOLE FILE A.

9) Print this console file back to the user Cyber FETCH queue of the designated user number. The user number is specified following DEST on the NPRINT command.

10) End of the EXEC2 language program (the program proper -- what remains is data to that program).

11) Copy what follows (down to .END) as file PROGA BMDP A.

12 through 21) BMDP program and data being used. Recall EXEC BMDP (line 6) expects this in file PROGA BMDP.

Example 5:

There are minor changes to the analog of example 2: The filedef must point to the A disk, i.e., VMBATCH's A disk, and there must be two .DATA sequences instead of one.

```
*BATRJE. USER99 JOB2
&TRACE OFF
    .
    .
    .
FILEDEF 7 DISK PROGB DATA A
EXEC BMDP PROGB (2D TERM
    .
    .
    .
&EXIT
.DATA PROGB BMDP A
/PROBLEM
/INPUT       FORMAT IS '(F2.0)'.
             VARIABLE = 1.
             UNIT = 7.
/VARIABLES   NAMES = SCORE.
/END
.END
.DATA PROGB DATA A
38
37
36
36
36
35
.END
```

This example is similar to the previous one -- data is to be in a separate file. Use .END to end the BMDP program, followed by .DATA fn ft fm to indicate data. Add a FILEDEF for the generated data file and a "UNIT =" so BMDP will find this data.

Example 3 has no useful analog for Cyber submission. It involved retrieving a binary file, which is not a good practice across computers. Output of usable data would involve preparing a print (readable) file and using NPRINT separately from the console print if it is separate. The BMDP /PRINT paragraph provides a way of embedding such print in the other output which can then be edited out of the console file.

Tape output, analogous to tape input, would be a possibility. Questions regarding VMBATCH submission of BMDP programs should be directed to the Statistical Consultants at 85 Commerce West.

MICROCOMPUTER SERVICES

MICROCOMPUTER HARDWARE

Ron Szoke

What is hardware?

By "hardware" we mean the computer itself, or all of the physical, tangible parts of a computer system: the keyboard, disk drives, monitor screen, connecting cables, etc. Everything that you can see and touch--every mechanical and electronic device, in other words, that enables a computer system to operate--is referred to as hardware.

The principal functional units of any computer may be represented as follows:
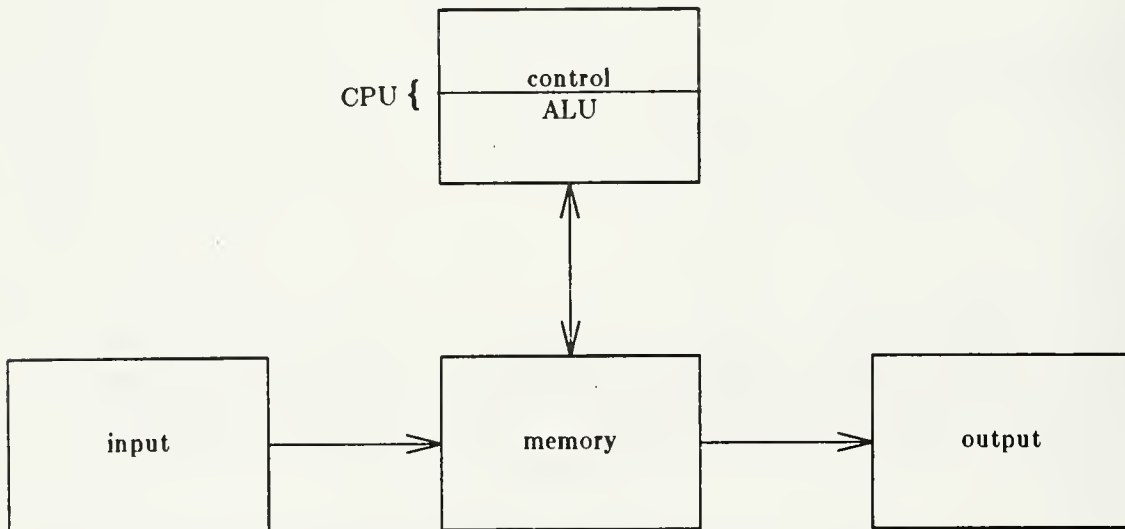
Input devices

Input devices "read" an input medium and convert the information recorded there into the only thing the computer can actually process--patterns of electronic pulses.

The keyboard, for example, generates a different pulse/no-pulse pattern or sequence for each key pressed; this sequence is then sent to the computer for processing (after we press ENTER or RETURN). We may think of the information as consisting of patterns of the binary digits (bits) 1 and 0, corresponding to "pulse" and "no pulse." Most information is handled in 8-bit sequences called

bytes. Some of the newer machines can process two or four bytes at a time if they have 16- or 32-bit microprocessors or "chips" (see below).

If the volume of numeric input is to be high, users should look for a separate numeric (ten-key) keypad. Keys should be of standard typewriter size and have a good, solid "feel." Miniature and "touch-switch" keyboards lead to increased input errors and are to be avoided. A movable keyboard attached to the computer with a cable will permit more flexible and comfortable operation.

Computers can also "read" information encoded as patterns of tiny magnetized spots on a recording medium such as a tape or disk. Files containing data or programs to be input to the computer can thus be created on magnetic tape or disk (usually by another computer), then stored and input to the computer's memory (internal storage) as needed.

Information may be recorded in the tracks of ordinary audio cassette tape, then input to a microcomputer using a compact cassette player of the kind commonly sold for $25-$40. But information transfer from cassette tapes is notoriously slow and unreliable, and generally to be avoided by serious microcomputer users. Diskette drives operate far more reliably and at least 20 times faster than tape cassettes.

Input information is organized on the disks into concentric circular tracks and pie-shaped sectors. The most common type is a flexible ("floppy") plastic disk about 5.25 inches in diameter and coated with magnetic material (containing iron oxide), often called a "mini-floppy" diskette. Floppy disks 8 inches in diameter are also widely available, and may be preferable because of their greater storage capacity. Some computer makers are now using high-density 3.5 inch "hard shell" diskettes, others favor another type only 3.25 inches in diameter. It is too early to say which of these formats will become dominant in the future, or if some new standard will emerge.

Unfortunately, even the widely-used 5.25-inch diskettes vary greatly in their specifications and formats: some are single-sided, others double-sided; some single density, others double density, still others of higher density; some soft-sectored, others hard-sectored; and they are formatted in varying numbers of tracks and sectors. It is hardly ever the case that a diskette created (written) by one make and model of computer can be used by any other make, or even another model of the same make. (An exception is the growing number of "compatibles" or "workalikes" designed to duplicate the most popular brands as closely as is legally possible.)

Applications calling for very large data files, or for access to the same data by two or more users simultaneously, require a **hard disk**, which is a rigid metal disk spinning at high speed. A typical hard disk unit will store one million to twenty or more million bytes (megabytes) of information. A number of small hard-disk units are now available, and have become feasible options for the users of large data files.

Many other types of input devices exist, but are probably of little interest to most individual and small business users. These include magnetic ink character recognition (MICR), used on the preprinted checks obtained through most banks; optical character recognition (OCR), used in the "bar codes" seen on most grocery items in supermarkets; and a variety of analog-to-digital (A/D) converters that transform some physical measurement or motion (such as pressing a joystick or moving a "mouse") into an input signal.

The memory

The computer can process and make use of only that information that is currently contained (represented electronically) in its memory or storage unit. Part of this memory is permanent, part is temporary.

The permanent part is called **read-only memory** (ROM), which, as its name indicates, can be read from but not written to (altered) by action of the computer. ROM usually contains utility software encoded in it that will be needed frequently and permanently by the computer, such as a "bootstrap" routine, or the ability to read in an operating system file from a diskette; sometimes a programming language translator such as a BASIC interpreter is also included in ROM.

The temporary part is called **random-access memory** (RAM), where information can be read from or written to any any time. The information in RAM is volatile, meaning that it disappears when the computer is turned off, while that in ROM is available whenever the computer is turned on.

The size of the computer's memory (the volume of information it can hold) is usually given in multiples of 1,024 bytes, or one kilobyte (Kb or K). Thus a computer with 64K bytes of RAM would have 64 X 1,024 = 65,536 user-accessible memory cells available for holding items of information.

The larger the memory, the more varied, complex and valuable are the applications to which the computer can be put. Small memory capacity severely limits the usefulness of the computer, and is in fact the principal constraint (other than lack of appropriate software) preventing microcomputers from realizing their full potential usefulness in most situations.

Memory is often expandable by 64K plug-in units costing some $50 to $150 each, up to a designed-in maximum for each model of computer.

The central processing unit (CPU)

This unit is contained on the microprocessor or "chip" that is the computer's "brain." It consists of two main subunits:

1. The control unit, which coordinates the operations of all other units of the computer. This component of the CPU contains the system **clock**, which emits electronic pulses through the computer's circuits at rates of some two million to ten million cycles per second, or 2 to 10 megahertz (MHz). These pulses are used to synchronize all other internal operations of the computer. Other things being equal, a higher clock rate means faster processing, up to a point where reliability becomes a problem.

2. The arithmetic-logical unit (ALU), which contains the registers where information is represented electronically while mathematical and logical operations are carried out on it. Registers have various widths, depending on the number of binary "bits" of information they can hold and transform at one time. Other things being equal, a 16-bit CPU should be about twice as powerful as an 8-bit CPU--in other words, it should be able to process twice as much information per second. A wider ALU also allows the computer to store and locate items in a larger "address space," permitting a larger potential memory size.

Examples of some widely used microprocessors:

1. 8-bit chips:

    MCS 6502: Used in the Apple II series , Atari 800, Commodore PET, and others.

    Zilog Z-80: Radio Shack TRS-80 Models I and III, Heath/Zenith, many others.

2. 16-bit chips:

    Intel 8088: IBM PC and many compatibles. (This is actually a "hybrid" chip with 16-bit

registers but only an 8-bit data path, or "bus.")

Intel 8086: A true 16-bit chip with more power than the 8088.

Intel 80286: a hybrid 16/24-bit chip used in the IBM PC AT.

3. 16/32-bit chip:

Motorola MC 68000: Apple Macintosh, Commodore Amiga, and Atari 520 ST.

Output devices

These devices receive patterns of bits from the computer and convert them into something which can be understood by a human user, such as a character on a TV-like screen. This **monitor** screen is sometimes referred to as a "CRT" (cathode ray tube), after its principal component. It echoes the input typed at the keyboard, with previous lines of information scrolling upward off the screen as new lines of information are typed at the bottom. The results of running programs are also displayed here.

Use of the computer for business or professional purposes normally requires a good quality **printer** for producing "hard copy" reports, statements, records of results, and other documents. Printers are generally of two types: impact and non-impact. **Impact** printers operate on the principle of striking the paper through an inked ribbon, much like an ordinary typewriter. The more common (and less expensive) type of impact printer is the **dot-matrix** printer, in which each character is formed at the moment of impact by electronically activating a certain pattern of tiny rods within a grid arrangement. These rods strike through the ribbon, blackening the paper with that pattern of ink dots; then the print head moves on to the next position. A serviceable dot-matrix printer can be purchased for as little as $200, though the more rugged and higher-speed models with such extra features as graphics capability can easily cost over a thousand dollars more. A dot-matrix printer with a fresh ribbon can produce quite acceptable reports for internal use. Some of the newer models are claimed to produce "near letter quality" copy, and thus to be acceptable in certain word processing applications in place of a typewriter.

However, correspondence-quality printing is consistently achieved only by using a **formed-character** printer of the "daisy wheel" or "thimble" type, which works by spinning a character "petal" into place (like a single-element or "ball" typewriter), then striking it from behind with a tiny hammer. Daisy-wheel printers are both slower and much more expensive than dot-matrix printers, but have long been the only choice for those who require reliably high-quality printouts similar in appearance to those produced by an office typewriter.

The high-volume line printers used at large computer installations are usually impact printers of the print-chain or print-wheel type, producing hundreds of lines of output per minute. We are assuming here that the average individual or small business has no need for such high-capacity equipment. Most will find the typical dot-matrix printer, working at about 80 to 100 characters per second (cps), or a daisy-wheel model at some 40 cps, wholly adequate for their operations. Some will, in addition, want to consider whether a further graphics capability (plotting graphs, making charts) may also be worthwhile for them.

Three types of non-impact printers may be mentioned: thermal, ink-jet, and laser. Many thermal printers are inexpensive but produce low-quality printing on special chemically-coated paper that is difficult to handle and store. Ink-jet printers are far faster and produce higher-quality printouts, but they are also much more expensive (usually at least $1,000). High-quality laser printers are also becoming available, but are probably still beyond the price range and capacity needs of the average person or small business. (This will change.)

The magnetic media (diskettes and tapes) used in input units are also useful for recording output from the computer. Cassette tape units cannot be recommended for any serious use; anything beyond the most rudimentary use of the computer will require at least two floppy-disk drives, or perhaps a hard disk (above).

The remaining item of hardware that should be available in even a modest-sized operation is a **modem** (modulator-demodulator), which permits the computer to communicate over long-distance telephone lines with other computers. The most common type of modem is the **acoustic coupler**, which converts sound signals to and from electronic signals when the telephone handset is placed in the coupler (which in turn is connected to the computer). Another type is the "direct-connect" modem, which can be plugged directly into the modular jack of the telephone.

Attached to a modem, the microcomputer can function as a terminal in accessing the programs and on-line data banks of large computer systems in distant locations, and can "download" and retain software made available by other microcomputer users.

Reference

Hoo-min D. Toong and Amar Gupta, "Personal Computers," *Scientific American 247:6 (December 1982).*

Acknowledgements

WARNING TO DEC RAINBOW USERS

(This article first appeared on the ARPANET bulletin board, posted from the University of California at Berkeley on February 11, 1985. It was reprinted in the April 1985 issue of the Kentucky Register and the November 1985 issue of the Computing News from Northern Illinois University.)

I have recently had the following experience with my DEC Rainbow. I received the Rainbow in March 1984 with two floppy drive units (four disks) and began using Verbatim Datafile floppies at that time. I started using Dysan floppies in September 1984 when our purchasing department switched to them.

About two weeks ago I began to have trouble reading from drive d:, which could be overcome by moving the floppy to drive a:. A few days later this trouble reappeared on drive a:. I tried to format a new box of Dysan disks, but was unable to format them on any combination of drives. At this point I called DEC support. The repairman came and replaced all possible electronics -- to no avail. He could not get DEC floppies to format from DEC-furnished CPM sources. In all cases, CPM reported that four drives (two disk units) made DEC floppies work, but did not permit formatting of Dysan disks.

The word from the DEC phone backup support people is the following: Rainbow drives are intended to be used with floppies *without* reinforcement rings in the central hole. The presence of these rings damages the drives, while the drives damage the rings to the extent that eventually *both* are unusable. You must use unreinforced floppies on the DEC Rainbow. There is no statement of this in any DEC literature, but the software which is DEC-supplied is always on unreinforced diskettes.

Apparently, this problem has just begun to surface. Change your floppies as soon as possible to unreinforced, or expect trouble with the drives eventually. Several floppy manufacturers (Memorex, 3M, Inmax) now sell a diskette for the Rainbow with a special format. The same disks are also to be used with the DECmate II (*not* the I) and the PRO 350 series. Apparently, DEC changed their drives at about the time the Rainbow was introduced.

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The Office of the Chancellor at UIUC announces a computer fair where faculty, staff, and students can display innovative projects to their peers on campus, and in the community. If you are interested in participating in this first annual computer fair in early 1986, please send your name, address, and a brief description of your project to:

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During the past few years, use of computers on the campus has grown enormously. Many members of the University community -- faculty, staff, and students -- have developed projects for varied applications of computers, such as word processing, data reduction, design of systems, unusual games, etc.

The Campus Computer Fair will give members of the University an opportunity to demonstrate and see novel applications of computers in education, administration, research, and recreation, so we hope there is high interest in this project.

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