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**Computing  
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University of Illinois  
Urbana-Champaign  
Urbana, Illinois 61801

# Off-Line

Vol. 3, No. 1

September 1974

Editor: Paula Jones  
Phone: (217) 333-2048  
167 DCL Urbana, IL 61801

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AUG 1974

OFF-LINE is the newsletter of the Computing Services Office of the University of Illinois at Urbana-Champaign. CSO operates an IBM System 360 model 75 with 1 million bytes of fast core and 2 million bytes of slow core, under HASP and OS. OFF-LINE is published monthly except July and August. Articles may be reprinted without permission.

New Associate Director for CSO  
 .....

We are pleased to announce that Mr. George P. Badger, Jr., has joined the CSO staff as Associate Director as of July 15, 1974. Mr. Badger had been a member of the professional staff at the University of Pittsburgh Academic Computer Center since 1963, where his activities included teaching, software development and general management concerns. Since 1970 Mr. Badger held the position of Associate Director of the Academic Computer Center and was responsible for software development and liaison with the user community.

We welcome Mr. Badger and his family to Champaign-Urbana and wish him success in his challenging new position.

CSO User Seminars - Fall, 1974  
 .....

During the Fall Semester, 1974, the Computing Services Office is presenting a series of seminars on CSO resources and facilities. The seminars are free and open to all members of the University community. No registration is required. The seminars will meet on Wednesdays from 3:00 p.m. to 3:50 p.m. in Room 115 DCL. Dates and topics are given below.

General Seminars

October 2: Introduction to CSO  
 Speaker: Robert Foster

An overview of CSO resources and facilities, including hardware, programming languages, application programs, and services available to users.

October 4: Using the UOI Medical Center Facility  
 Speaker: Gordon Chace

Usage of the link between CSO's IBM 360/75 and the UOI Medical Center's 370/155, allowing local users to run jobs at the Medical Center.

October 16: Using the UOI Chicago Circle Facility  
 Speaker: Steven Carlson

Usage of the link between CSO's IBM 360/75 and the UOI Chicago Circle's IBM 370/158, allowing local users to run jobs at Chicago Circle.

Mathematical and Numerical Services Seminars

October 23: CSO Math Software  
 Speaker: Mary Ann Berg

A survey of the general-purpose math subroutines and systems made available to CSO users as a service, including IMSL, NATS project programs, ALTRAN, and PORTUOI.

October 30: Symbolic Manipulations  
 Speaker: Stanley Kerr

Discussion of FORMAC (PL/I based) and ALTRAN (FORTRAN based) systems for symbolic manipulation.



## Using Chicago Computers

.....

Although it is still early in the semester, the job load on the 360/75 at CSO is expected to increase sharply in coming weeks. One way to avoid this problem and get better turnaround is to make use of the direct HASP-to-HASP links which have been established between CSO and the computing centers at Chicago Circle and Chicago Medical Center. To route your job to the 370/158 at Chicago Circle, use the card /\*ID SYSTEM=UIC; to use the 370/155 at Chicago Medical Center, use the card /\*ID SYSTEM=UIM. Be sure to check with the system consultants to ensure compatibility between procedures used at the various centers. Tapes may be sent to either center through the operations staff at CSO North. Also, disk data sets may be established at UIC and UIM according to the following rules:

Establishing Data Sets at UIC

The naming convention is MUC3041.Pps#.name, where ps# is any valid PS# and name conforms to standard OS naming conventions. All of UIC's disks are 3330s. Information about 3330 disks is available in the system consulting offices.

## a. Permanent data sets

All permanent data sets at UIC must be catalogued. Specifying UNIT=TPUSER will put the data set on one of the four user disks TS01, TS02, TS03, or TS04. Do not code the VOL=SER information; the system will allocate a specific volume according to its own space requirements. Example:

```
//DD1 DD DSN=MUC3041.P9999.DATA1,DISP=(NEW,CATLG),
// UNIT=TPUSER,SPACE=(TRK,(10,1))
```

## b. Temporary data sets

Do not specify UNIT=DISK for a scratch data set, as you would do at CSO or UIM; instead, use UNIT=BSCRATCH. Example:

```
//DD2 DD DSN=88TEMP,SPACE=(TRK,(5,1)),UNIT=BSCRATCH
```

Establishing Data Sets at UIM

The naming convention is A88ps#.name, where ps# is any valid PS#, and name conforms to standard OS naming conventions. All data sets with illegal names will be scratched immediately.

## a. Semi-permanent data sets

Can be put on PUBLCD, a 3330 on-line disk pack, but will be scratched if not used for 31 days. Example:

```
//DD3 DD DSN=A889999.DATA2,UNIT=3330,VOL=SER=PUBLCD,
// SPACE=(TRK,(20,1)),DISP=(NEW,KEEP)
```

## b. Semi-temporary data sets

Can be put on PUBLCA, a 2314 on-line disk pack, and will be scratched if not used for seven days. Example:

```
//DD4 DD DSN=A889999.DATA3,UNIT=2314,VOL=SER=PUBLCA,
// SPACE=(TRK,(20,1)),DISP=(NEW,KEEP)
```

## c. Temporary data sets

Should be put on MERLIN, a 2314 on-line disk pack, and will be scratched within two calendar days (not 48 hours; i.e., if a data set is created Wednesday night it will be scratched Friday morning). Example:

```
//DDS DD DSW=A889999.DATAS,SPACE=(TRK,(5,1)),UNIT=2314,
// VOL=SER=MERLIN,DISP=(NEW,KEEP)
```

There are no other on-line disks at UIM; however, users may use setup packs. Once a data set is scratched it cannot be restored, since there is no backup except that provided by the user. See the system consultants for further information.

#### New Self-service Remote Job Entry Station

\*\*\*\*\*

A type I self-service remote job entry (RJE) station, RM11, is now in operation in Room 127 DCL. EXPRESS users may read in their own decks and receive their output immediately on a printer in the same room.

HASP jobs may also be submitted and printed at the self-service RJE, but printed output from this terminal is not saved in any orderly fashion. Users should route their print elsewhere if they cannot remain at the RJE while their jobs are being processed.

Jobs not entered at RM11 can be routed there by the ID card parameter PRINT=RM11. Because RM11 does not have a card punch, punched output must be sent elsewhere. Terminals with a card punch are CSO North (PUNCH=LOCAL) and CSO South (PUNCH=CØMM).

RM11 also has a paper tape reader and punch. See the operators or consultants for help in using this facility.

#### CSO Remote Job Entry Stations (Reprint)

\*\*\*\*\*

A CSO remote job entry station features hardware and software for communication with the 360/75 at CSO's central facility, plus peripheral input/output devices, consulting support, and documentation. The hardware for a standard, on-campus CSO RJE station is based on the Digital Equipment Corporation PDP-11 computer, which consists primarily of a central processing unit, 8192 16-bit words of core, an operator's console teletype, and peripheral input/output devices.

The basic hardware configuration features a 300 card-per-minute card reader, a 600 line-per-minute printer, and an interface to a 4800 bit-per-second communications line. This is referred to as a Type I station.

Type II stations feature a 600 cpa card reader, two 600 lpa line printers, a 9600 bps communications line, and a telecommunications multiplexor which allows the attachment of up to 16 keyboard entry devices.

The local software for a CSO remote job entry station is a basic operating package which interfaces with HASP on the 360/75. It features commands for communicating with HASP, PDP-11 commands for local utility operations (list a deck, change logical device assignments, etc.), and a communications diagnostic capability.

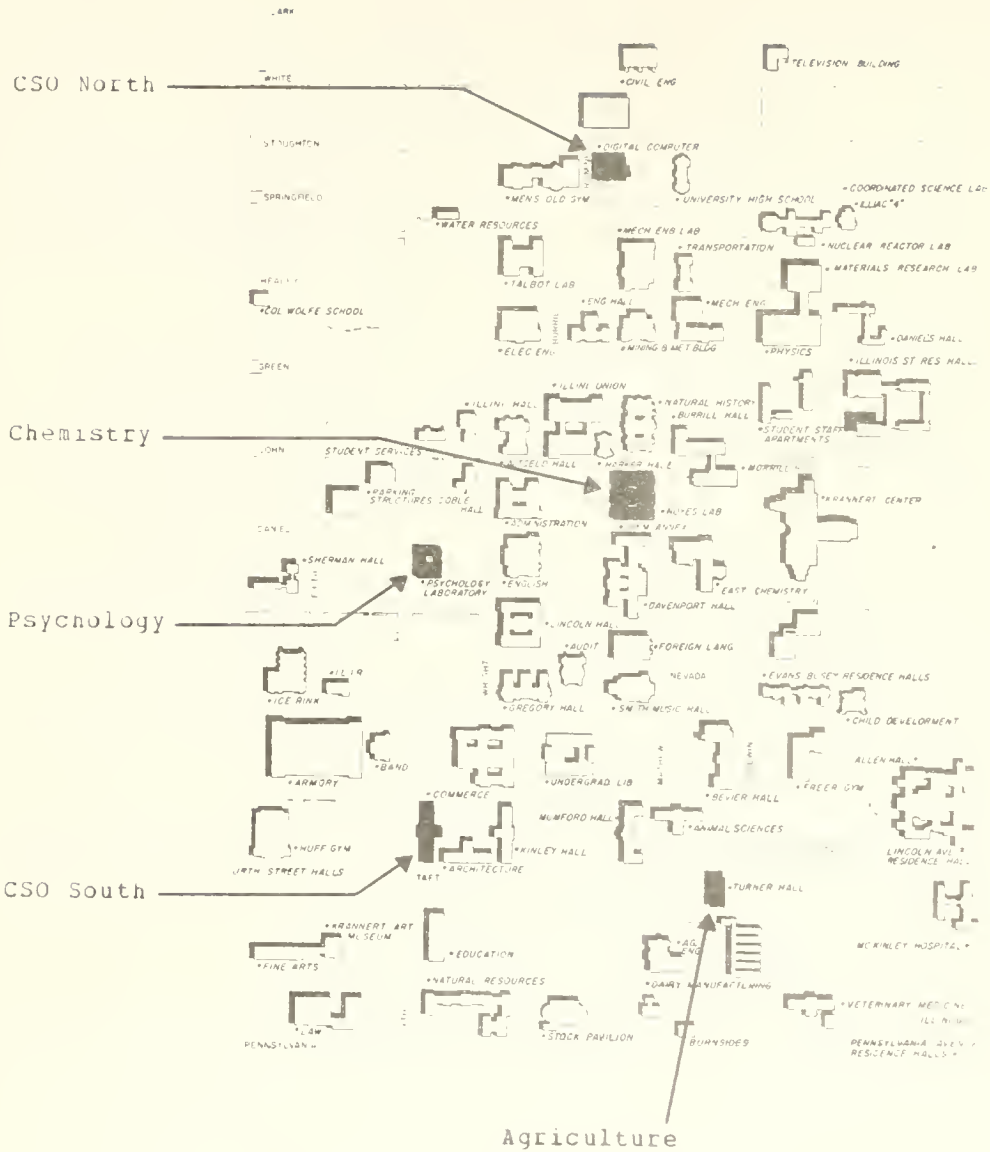
Documentation includes a full description of PDP-11 commands, a partial description of HASP commands, and operating information for the PDP-11 and its peripherals (document # USER.V08B02, "RJE Station User's Guide").

Champaign-Urbana campus Type I and Type II remote job entry stations are available for general use, and are located as follows:

<u>LOCATION</u>	<u>TYPE</u>	<u>HOURS</u>	<u>MANAGER</u>
CSO North (DCL)	II	24 hours Daily	George F. Badger, Jr. (333-4103)
CSO North (DCL)	I	24 hours Daily	Self-service
CSO South (70 Commerce West)	II	0800-2400 Mon.-Fri. 0900-1700 Sat. 1600-2400 Sun.	Stanley W. Steinkamp (333-6876)
Agriculture (W-515 Turner Hall)	I	0830-2400 Mon.-Fri.	Samuel G. Cramer (333-8170)
Chemistry (154 Noyes Lab.)	I	0800-2100 Mon.-Fri.	Donald H. Secrest (333-1728)
Psychology (453 Psych. Bldg.)	I	0830-1700 Mon.-Fri.	Esther Williams (333-7531)
Mechanical Eng. (65 M.E. Bldg.)	I	0800-1800 Mon.-Fri.	Curtis Pedersen (333-2072)

On-campus CSO Type II stations are served by CSO operators and consulting personnel on a regularly scheduled basis, and keypunching equipment is available for general job preparation.

On the next page is a map showing the locations of CSO's Champaign-Urbana campus computing facilities:





Recent PLORTS Modifications  
.....

The following modifications have recently been made to PLORTS:

- a. Some minor modifications have been made to the translate tables, as follows:
  - The character <rubout> is now being translated into XFF (i.e., hexadecimal FF) instead of XBP, to ensure ASCII-EBCDIC compatibility.
  - The PDP-7 and RJE ASCII terminal translate tables now agree with the Microdata translate tables. This only affects five special characters not present on most terminals.

See the system consultants for a copy of the input and output translate tables.
- b. Hexadecimal character specification is now supported, via the command #HEX (#D H to delete). When the hex option is enabled, a cent sign (¢) followed by two hex digits will be converted to the appropriate single hex character internally. For example, A¢P1C¢BFX¥ will be input as the six-character string A1C¢old rubout>XY. This feature is especially useful for those who have file names containing the old rubout hex specification.
- c. The ESC, PREFIX, and ALT MODE keys are no longer recognized as break characters for full-duplex terminals on the Microdata and on RJE's. The problems previously associated with the BREAK key have been resolved.

PLORTS Backup Dumps (Reprint)  
.....

CSO regularly dumps backup copies of PLORTS files. PLORTS users may request that files be restored from these dumps by contacting the consultants in Room 166 DCL or in Room 70-a Commerce West. Files can be restored to a logon other than the one from which they were dumped. The table below indicates when dumps are made, what files are dumped, and how long such dumps are retained:

<u>Time</u>	<u>Files</u>	<u>Retention Period</u>
First Saturday of month.	All.	Indefinite (at least 1 year).
Other Saturdays.	All.	1 month.
Sunday - Friday.	Files accessed in last 2 days.	1 week.
First day of the month.	Files being purged from PLORTS because they have not been accessed in last 6 months or because the PS# used in signon has been cancelled or has become inactive 30 days prior to time of dump.	Indefinite (at least 1 year).

## Computer Science Machine Problems

	M	T	W	T	F
AUG	26	27	28	29	30
SEP	2 HOL.	3 101 -MP0 400A-MP1	4 103 -MP0 400B-MP1	5	6 105 -MP0
	9	10 101 -MP1 400A-MP1	11 103 -MP1 321 -MP1	12	13 105 -MP1 400B-MP2
	16	17 101 -MP2	18 103 -MP2 121 -MP1	19 323 -MP4	20 105 -MP2 400B-MP3
	23 321 -MP2	24 101 -MP3 400A-MP2	25	26	27 105 -MP3
	30 103 -MP3 400B-MP4	1	2	3	4 105 -MP4
OCT	7 321 -MP3	8 101 -MP4	9	10	11 105 -MP5
	14	15	16 103 -MP4 121 -MP3	17	18 105 -MP6
	21	22 101 -MP5 400A-MP3	23 103 -MP5	24	25
	28	29	30 103 -MP6 121 -MP4	31	1 105 -MP7
NOV	4	5 400A-MP4	6	7	8
	11	12	13 103 -MP7	14	15 105 -MP8
	18	19	20	21	22
	25	26 400A-MP5	27 HOL.	28 HOL.	29 HOL.
DEC	2	3	4 103 -MP8	5	6 105 -MP9
	9	10	11 103 -MP9	12	13 ADC.

Approximate course enrollments are:

<u>Course</u>	<u>Enrollment</u>
CS 101	650
103	50
105	950
107	30
121	150
287	125
321	65
323	80
325	34
400a	95
400b	30

Available CSO Documentation  
 .....

Following is a list of currently available CSO user documentation. Provided the prime user has so designated on the PS Form, CSO documents may be charged to a PS# in the Accounting Office (Room 134 DCL). Also, they may be purchased for cash at the Illini Union Bookstore.

<u>Document #</u>	<u>Title</u>	<u>Price</u>
CSO-2000	WATPIV Programmer's Guide	\$1.00
USER.V02B01	EXPRESS User's Guide	\$1.00
USER.V03B02	PLOTS User's Guide	\$1.00
USER.V05B01	Compilers	\$1.25
USER.V05B03	Standard IBM Macros	\$1.00
USER.V06B01	CSO Utilities	\$1.75
USER.V06B02	DEBBY Tape/Disk Utility User's Guide	\$2.00
USER.V07B01	PORTUOI Writeups	\$2.00
USER.V08B02	RJE Station User's Guide	\$1.00
USER.V09B02	SOUPAC Program Descriptions	\$3.50
USER.V10B02	CalComp User's Guide	\$1.00

360 Notices  
 .....

Following is a list of 360 Notices published since the last issue of OFF-LINE:

<u>#</u>	<u>DATE</u>	<u>TITLE</u>
#1861	6/06/74	Free Test Time
#1862	6/12/74	Fourth of July Holiday
#1863	6/17/74	Release 21.7 Testing
#1864	6/18/74	Change in LCS Availability
#1865	6/25/74	Error in User Guide
#1866	7/08/74	Revised Hours During August at Medical Center
#1867	7/16/74	Release 21.7 Testing and Installation
#1868	7/17/74	Change in Class Boundaries
#1869	7/19/74	WATBOL Available on HASP and EXPRESS
#1870	7/31/74	Reduced Hours at Agriculture Terminal
#1871	8/02/74	SOUPAC T-Test
#1872	8/06/74	Labor Day Closing
#1873	8/08/74	Magnetic Tape Prices
#1874	8/13/74	Discontinuance of Touch Tone Enquiry Service
#1875	8/13/74	360 Schedule of Operations
#1876	8/19/74	Revised Hours for Labor Day at Medical Center
#1877	8/12/74	New Operating Schedule for August at Medical Center
#1878	8/21/74	New Online Disk Storage Procedures at Medical Center
#1879	8/21/74	Scheduled Removal of Equipment
#1880	8/30/74	See Consultants About Class Projects on the 360

The Department of Computer Science Library (260 DCL) has recently acquired the following titles:

ACM SIGUCC	THE ADMINISTRATION AND MANAGEMENT OF SMALL-COLLEGE COMPUTING CENTERS
ACM	BIBLIOGRAPHY AND SUBJECT INDEX OF CURRENT COMPUTING LITERATURE
ALLAN, W. B.	FIBRE OPTICS: THEORY AND PRACTICE
AUERBACH GUIDES	COMMUNICATIONS TERMINALS, 1974
	MICROFORM EQUIPMENT, 1974
	TELEPHONE INTERCONNECT EQUIPMENT, 1973
	TIME SHARING SERVICES, 1974
	HANDI GUIDE TO EDP EQUIPMENT, 1974
AWAO, ELIAS M.	AUTOMATIC DATA PROCESSING, 3RD EDITION
BAR-HILLEL, YEHOSHUA	LOGIC, METHODOLOGY AND PHILOSOPHY OF SCIENCE
BASSLER AND LOGAN	THE TECHNOLOGY OF DATA BASE MANAGEMENT SYSTEMS
BATTEN	UNDERSTANDING THE IBM/360 AND 370 COMPUTER WITH MACHINE LANGUAGE PROGRAMMING
BIRTWHISTLE, G. M.	SIMULA BEGINS
BURCH AND STRATER	INFORMATIONS SYSTEMS: THEORY AND PRACTICE
COLLEN, M. F., ED.	HOSPITAL COMPUTER SYSTEMS
	COMPUTERS AND THEIR FUTURE
CONTI & RUBERTI, EDS.	5TH CONFERENCE ON OPTIMIZATION TECHNIQUES, PART I AND II
COXETER, H. S. M.	REGULAR POLYTOPES
CRAWFORD	INTRODUCTION TO DATA PROCESSING, 2ND ED.
DAHLQUIST, ET AL.	NUMERICAL METHODS
DAVIS, GORDON B.	MANAGEMENT INFORMATION SYSTEMS
DONOVAN	SYSTEMS PROGRAMMING
FENVES, ET AL.	NUMERICAL AND COMPUTER METHODS IN STRUCTURAL MECHANICS
FINK	BUSINESS DATA PROCESSING
FLANAGAN & RABINER, EDS.	SPEECH SYNTHESIS
GOLDGELD & QUANDT	NONLINEAR METHODS IN ECONOMETRICS
GRISWOLD & GRISWOLD	SNOBOL 4 PRIMER
GRUENBERGER, F., ED.	EFFECTIVE VS. EFFICIENT COMPUTING
HAUPT, FLOYD E.	ELEMENTARY ASSEMBLER LANGUAGE PROGRAMMING
HEMPHILL, ET AL.	SECURITY PROCEDURES FOR COMPUTER SYSTEMS
HOUSE, WILLIAM G., ED.	DATA BASE MANAGEMENT
ISENHOOR & JURIS	INTRODUCTION TO COMPUTER PROGRAMMING FOR CHEMISTS
JENSEN & WATKINS	NETWORK ANALYSIS: THEORY AND COMPUTER
METHODS	
KATZEN, HARRY, JR.	INFORMATION TECHNOLOGY: THE HUMAN USE OF COMPUTERS
KAZMIER, LIONARD J.	STATISTICAL ANALYSIS FOR BUSINESS AND ECONOMICS, 2ND ED.
KERNIGHAN & PLAUGER	THE ELEMENTS OF PROGRAMMING STYLE
KORFHAGE, R. R.	DISCRETE COMPUTATIONAL STRUCTURES
KUEHNE, ROBERT ET AL.	HANDBOOK OF COMPUTER DOCUMENTATION STANDARDS
LAWSON & HANSON	SOLVING LEAST SQUARES PROBLEMS
LE COMBER, P. G., ED.	ELECTRONIC AND STRUCTURAL PROPERTIES OF AMORPHOUS SEMICONDUCTORS
	PROC. OF THE 13TH SESSION OF THE SCOTTISH UNIV. SUMMER SCHOOL IN PHYSICS, 1973
LEPKOVITZ, DAVID	DATA MANAGEMENT FOR ON-LINE SYSTEMS
LOCKS, MITCHELL O.	RELIABILITY, MAINTAINABILITY, AND AVAILABILITY ASSESSMENT
MAGUIRE	HANDBOOK OF COMPUTER MAINTENANCE AND TROUBLESHOOTING
MANN, RICHARD A.	AN IBM 1130 FORTRAN PRIMER, 2ND ED.



MELSE & SAGE

MORRISON, P. W.

NAVAL INTELLIGENCE SUPPORT  
CENTER

PETERSON, WILLIAM W.  
PHILIPPAKIS & KAZMIER  
PHILLIPS AND TAYLOR

PRINCETON CONFERENCE

RUDE & PAGE  
SANDERS, DONALD H.  
SANDERSON, P. C.  
SCHWARTZ  
SHAW, ALAN  
SMITH, ET AL.  
STERN & STERN

STERN & STERN

STINSON, IAIN  
TSICHRITZIS, D. & BERNSTEIN  
TURSKI, W. H., ED.

WEISS

WOOLRIDGE, SUSAN  
WU  
ZIONTS, STANLEY

INTRODUCTION TO PROBABILITY AND STOCHASTIC  
PROCESSES

ENVIRONMENTAL CONTROL IN ELECTRONICS  
MANUFACTURE

IMAGE INTERPRETATION EQUIPMENT CATALOG

INTRODUCTION TO PROGRAMMING LANGUAGES

INFORMATION SYSTEMS THROUGH COBOL

THEORY AND APPLICATIONS OF NUMERICAL  
ANALYSIS

INFORMATION SCIENCES AND SYSTEMS, 1973

INTRODUCTION TO COMPUTERS

COMPUTERS AND MANAGEMENT, 2ND ED.

INTERACTIVE COMPUTING IN BASIC

NUMERICAL ANALYSIS OF SYMMETRICAL MATRICES

THE LOGICAL DESIGN OF OPERATING SYSTEMS

MAINTAINABILITY ENGINEERING

BASIC, COBOL, FORTRAN AND RPG SUPPLEMENTS TO

ACCOMPANY PRINCIPLES OF DATA PROCESSING

WORKBOOK FOR PRINCIPLES OF DATA PROCESSING

THE STORY OF ATLAS A COMPUTER

OPERATING SYSTEMS

PROGRAMMING TEACHING TECHNIQUES, PROC. OF

THE IFIP WORKING CONFERENCE, 1972

DIGITAL COMPUTERS IN THE BEHAVIORAL

LABORATORY

COMPUTER INPUT DESIGN

COMPUTERS AND PROGRAMMING

LINEAR AND INTEGER PROGRAMMING

## Usage Statistics for the Month of June

	<u>1973</u>	<u>1974</u>
Class:		
HASP Jobs	12219	1173
EXPRESS Jobs	6422	3025
Total CPU Hrs.	78	21
Research:		
HASP Jobs	25317	34254
EXPRESS Jobs	2153	4866
Total CPU Hrs.	298	485

## Usage Statistics for the Month of July

	<u>1973</u>	<u>1974</u>
Class:		
HASP Jobs	2894	3880
EXPRESS Jobs	3367	6550
Total CPU Hrs.	27	27
Research:		
HASP Jobs	19625	21550
EXPRESS Jobs	2259	4194
Total CPU Hrs.	263	257

360 Schedule of Operations  
 .....

In the absence of serious hardware or software difficulties which require a deviation, the System/360 observes the following schedule of operations:

	MON	TUE	WED	THU	FRI	SAT	SUN	
0000	HASP EXPRESS PLOTS	HASP EXPRESS PLOTS	HASP EXPRESS PLOTS	HASP EXPRESS PLOTS	HASP EXPRESS PLOTS	HASP EXPRESS PLOTS	HASP EXPRESS PLOTS	0000
0100								0100
0200								0200
0300								0300
0400	HASP*** EXPRESS		HASP*** EXPRESS		HASP*** EXPRESS	HASP*** EXPRESS		0400
0500	System Prog.	System Prog.	System Prog.	System Prog.	System Prog.			0500
0600	Sched. Engr.		Sched. Engr.		Sched. Engr.*	Sched. Engr.**		0600
0700						System Prog.		0700
0800	HASP EXPRESS PLOTS	HASP EXPRESS PLOTS	HASP EXPRESS PLOTS	HASP EXPRESS PLOTS	HASP EXPRESS PLOTS	HASP EXPRESS PLOTS	System Prog.	0800
0900								0900
1000								1000
.								.
.								.
.								.
1600							HASP EXPRESS PLOTS	1600
1700								1700
1800								1800
.								.
.								.
.								.
2300								2300
2400								2400

\*On the first Friday of each month, Friday morning is changed to:

0600 - 1000 Scheduled Engineering  
 1000 - 2400 HASP, EXPRESS, PLOTS

\*\*Scheduled Ampex Engineering every other Saturday, System Programming otherwise.

\*\*\*Dumping PLOTS disk to tape.

Consulting Schedule and General Hours  
 .....

System Consulting - CSO North (166 DCL) [333-6133]  
 Robert Poster, Mgr. [333-6492]

Monday - Thursday	0800-2200
Friday	0800-1800
Saturday	0900-1300

System Consulting - CSO South (70-a Commerce West) [333-4747]  
 Donna Amado, Mgr. [333-4747]

Monday-Friday	0900-1700
---------------	-----------

Statistical Consulting - CSO South (84 Commerce West) [333-2172]  
 Joe Kolman, Mgr. [333-2172]

Monday - Friday	0800-1700 and by appointment
-----------------	---------------------------------

Mathematical and Numerical Analysis Service - CSO North (120 DCL)  
 Mary Ann Berg, Mgr. [333-7394]

Monday - Friday	1300-1700 and by appointment
-----------------	---------------------------------

Keypunching Service - CSO North (162 DCL) [333-6184]  
 Norma Jenkins, Mgr. [333-2814]

Monday - Friday	0800-2400
-----------------	-----------

Accounting Office - CSO North (134 DCL) [333-6760]  
 Merle Foster, Mgr. [333-6618]

Monday - Friday	0800-1700
-----------------	-----------



OFF-LINE's Mailing List  
\*\*\*\*\*

If you wish to be placed on our mailing list for future issues of OFF-LINE, 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

VOL. 3, NO. 5

DECEMBER 6, 1974

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OFF-LINE is the newsletter of the Computing Services Office at the University of Illinois at Urbana-Champaign. CSO operates an IBM 360 Model 75 with one million bytes of fast core and two million bytes of slow core, under HASP and OS. OFF-LINE is published every two weeks except during student vacation periods. Articles may be reprinted without permission.

## PLORTS TERMINAL SUPPORT CHANGES

Several changes have been made in the Microdata front-end processor for PLORTS in the last month. The PDP7 front-end has not been changed and is scheduled to be taken out of service at the end of December, 1974.

The Microdata front-end has now been made compatible with the CSO-South front-end by implementing the control-S keystroke as an alternative to the linefeed for line editing. The #EDIT mode turns both linefeed and control-S on and off together.

For the Microdata and RJE interfaces, the #COPY and #COPYC modes have been merged with the #EDIT mode. The commands #COPYC, #D C, and #D CC will be eliminated as unnecessary. The #EDIT mode will be on by default. #D E will still be available to cancel all the control characters.

Two other new # commands were added to the Microdata. #TIME sets a mode which is the default (a terminal is automatically logged out after ten minutes without any input). #D TI allows a terminal user to remain logged in past the ten minute deadline without any terminal input. After nine minutes of inactivity, instead of asking you if you wish to continue, the Microdata will just ring your terminal's bell and resume waiting. This is only available if the user is logged in.

Check the PLORTS file OPENMSG TERMNEWS for the latest news about PLORTS changes.

## AEC CALCULATOR TO BE WITHDRAWN FROM SERVICE

CSO intends to withdraw the AEC calculator from service in mid-December. Although the AEC calculator has given sterling service over the past year, (and in fact it was once the only programming language available on PLORTS), many of its functions have been taken over by CALL/OS BASIC and CALL/OS FORTRAN. Use of the AEC calculator has dropped to very low levels, and none of the users interviewed used it for its complex arithmetic capability which was considered to be one of its main strengths.

Thus, as part of the project of streamlining PLORTS and reducing its impact on batch processing, the AEC calculator will be discontinued in mid-December. Users wishing to discuss this further should contact either of the following persons:

- . Greg Eitzen, 187 DCL, Phone: 333-6145
- . Mike Randal, 181 DCL, Phone: 333-9772



## REVISED PLORTS GUIDE AVAILABLE

The PLORTS guide has been revised and reprinted. Users with the proper PS number can obtain copies in room 134 DCL, with no actual dollar charge to their numbers.

## AVOID THE CROWDS -- USE AGRICULTURE TERMINAL

CSO is encouraging users to use the Agriculture Remote Job Entry terminal, located in room W-515 at Turner Hall. During the month of October only 2,183 jobs were run there in comparison to 10,515 jobs at CSO North.

During crush periods the turnaround time on the printer and card reader is much faster for the user. The terminal is underutilized and CSO encourages your use of it. It is especially handy for the students living in the Pennsylvania Avenue and Florida Avenue Residence Halls. Anyone at the southwest end of campus might find it much more satisfactory.

The hours for the AGRIC terminal are 8:30 a.m. - 12:00 p.m., Monday thru Friday.

## NEW DIRECT ACCESS DISK STORAGE SYSTEM COMING IN JANUARY

CSO has arranged to purchase a new direct-access disk storage system from the Memorex Corporation. This new system will include twelve 3670 disk spindles (equivalent to and compatible with IBM 3330 disks) and four 660 disk spindles (equivalent to and compatible with IBM 2314 disks). The present disk storage system, consisting of 24 2314 disk spindles, will be returned to the manufacturer.

CSO will be switching over all direct access user and system datasets to the 3670 packs some time over Christmas vacation. Check the next issue of OFF-LINE for complete details of the conversion procedure and an explanation of how this change will affect the users.

## TELETYPE REPAIR RATES CHANGED

The hourly rate for teletype and terminal repair will be raised to \$12.00 per hour effective January 1, 1975. The Computing Services Office has not had a rate increase for this service for over two years. The service has been operating at a deficit since June, 1974. It must be maintained on a break basis. Cost saving measures have been implemented to keep this service as economical as possible to the users.

### MORE PLORTS HELP FOR THE USER

Last issue we described the OPENMSG files. This issue we would like to describe the HELP files. The HELP files can also be accessed at a PLORTS terminal without logging in. By typing in HELP WORDS followed by a RETURN (or CR or RET) on the PLORTS terminal, an index of files contained in HELP will be presented.

After finding the file that will be useful to you, type in the following:

HELP (special file name, i.e. INDEX, DEST, etc.)

New HELP files are added when they are needed, so the contents could change from time to time. Check HELP WORDS periodically for new HELP files.

### GEOLOGICAL SURVEY DEVELOPS MAPS

The Illinois State Geological Survey has developed several mapping techniques that may be of interest to other computer users.

The Survey has developed programs that will draw base maps of any part, or all, of the State of Illinois, cheaply, quickly, at any scale desired, with a high degree of accuracy.

In addition to plotting a base map, the Survey has programs that can plot data on the maps, do many types of operations between surfaces (such as contouring, trend surface analysis, forrier surfaces and calculations of areas and volumes), and the results of these operations on the data can be displayed on base maps or overlays that will fit on the base maps.

Contact L. H. Van Dyke at the Illinois State Geological Survey, Phone 344-1481, Extension 294, for more information on the use of the programs developed by the survey.

### CSO CHARGES FOR PLORTS AND DATASET RESTORES

As of December 16, 1974, CSO will be charging users for some restores of PLORTS files and user datasets.

For PLORTS restores, the user will pay \$5.00 to have files restored from a daily tape and \$10.00 to have files restored from a Saturday or monthly tape (see OFF-LINE from September, 1974, for PLORTS backup policy). This charge will not be applied when the file is being restored because of non-use within 180 days, the user's sign-on has been changed, or because of an error on CSO's part. The user will pay for the restore if the file was destroyed because of user error or because it was not supported by an active PS number.

For disk dataset restores, the user will be charged \$5.00 to have a dataset restored if it was destroyed because of a user error or it was not being supported by an active PS number. CSO will not charge the user for restoring a dataset which was destroyed because of non-use within 180 days or because of an error on CSO's part. See the systems consultants, who will do the restores, for more information.

## TEST SUNDAY, DECEMBER 8, 1974

A new version of the Operating System will be tested on Sunday, December 8, 1974. CSO will be testing a new system generated to support the 3330 disk packs. No changes or new features will be added at that time. All jobs run between the hours of 12:00 noon and 5:30 PM will be run free of charge. All jobs in the system at 5:30 PM will be lost.

## SEE CONSULTANTS ABOUT CLASS COMPUTER PROJECTS

CSO recommends to all instructors planning to assign class projects on the 360 that they discuss their projects with the system consultants (Room 166 DCL or Room 70a Commerce West). The consultants can often be of assistance in the following areas:

1. Suggesting alternatives which allow the same academic goals to be achieved with less expense or less difficulty (such as making it possible to do a project on EXPRESS instead of HASP).
2. Reviewing proposed information to be given students in order to suggest clarifications or additions which would make it more likely that the assignment can be finished without additional individual assistance.
3. Proofreading written information for technical accuracy.

## JCL FOR AVAILABLE LANGUAGE PROCESSORS AT UOI, UIM AND UIC

The Job Control Language to compile and execute any of these processors will fit into the following format:

```
/*ID <ID cards as explained in reference Guide #S01.N01>
```

```
// EXEC (1) --See list below for the proper processor name.
```

```
<your program>
```

- (2) --Go step JCL, required with some processors if data cards are to be read. May be omitted when using those processors if there is no data. Many of the processors that do not have JCL for the Go step have their own pre-data command. Check the exact usage of these processors if using data.

```
<data, if any>
```

```
/*
```

All of these processors use the loader unless they absolutely have to use the linkage editor. See the system consultants for the JCL to use if a program requires the linkage editor.

LANGUAGE	(1)				(2)
	HASP	UOI EXPRESS	UIM	UIC	
ALGØL					
IBM Version	ALGLDGØ	N	ALGØFCG	ALGØFCLG	//GØ.SYSIN DD *
Stanford	ALGØLW	Y	-----	-----	none
ALPS	ALPS	N	-----	-----	none
ASSEMBLER					
IBM level F	ASMFCG	N	ASMFCG	ASMFCCLG	//GØ.SYSIN DD *
IBM level G	ASMGCG	Y	ASMGCG	ASMGCLG	//GØ.SYSIN DD *
Plot-level G	ASMLDPT	N	-----	-----	//PLØT.SYSIN DD *
SPASM	SPASM	N	-----	-----	none
ASSIST	ASSIST	Y	-----	-----	none
ALTRAN	ALTRAN	N	-----	-----	//GØ.SYSIN DD *
BIØMED	BMD	N	BMDXXX	BMD	none
CØBØL					
IBM ANS	CØBUCC	N	CØBUCC	CØBUCLG	user defined
Waterloo sub-set	WATBØL - see note below				
CSMP	CSMP	N	CSMP	CSMP	none
with plot	PLØTCSMP	N	-----	-----	//PLØT.SYSIN DD *
Electrical Circuit Analysis Packages					
ECAP	ECAP	N	ECAP	ECAP	none
PCAP	PCAP	N	-----	-----	none
NLAP	NLAP	N	-----	-----	none
FØRMAC	FØRMAC	N	-----	-----	//GØ.SYSIN DD *
FØRMAT	FØRMAT	N	FØRMAT	FØRMAT	none
FØRTRAN IV					
IBM level G	FØRTGCC	Y	FØRTGCC	FØRTGCLG	//GØ.SYSIN DD *
IBM level H	FØRTHCG	N	FØRTHCG	FØRTHCLG	//GØ.SYSIN DD *
Plot-level G	FØRTLDP	N	-----	-----	//PLØT.SYSIN DD *
WATFIV	see note below				
GPSS	GPSS	N	GPSS	GPSS	none

(1)

LANGUAGE	UOI		UIM	UIC	(2)
	HASP	EXPRESS			
LISP	LISP	Y	-----	-----	none
MIX	-----	N	-----	MIX	//GØ.SYSIN DD *
MPSX	MPSX	N	-----	MPS	//GØ.SYSIN DD *
ØSIRIS	ØSIRIS	N	ØSIRIS	-----	none
PL/I					
IBM level F	PLIFCG	N	PLIFCG	PLIFCLG	//GØ.SYSIN DD *
IBM optimizer	PLIXCG	Y	-----	-----	//GØ.SYSIN DD *
Plot-level F	PL1LDPT	N	-----	-----	//PLØT.SYSIN DD *
Plot-optimizer	PLIXLDPT	N	-----	-----	//PLØT.SYSIN DD *
Checkout	PLICKCG	N	-----	-----	//GØ.SYSIN DD *
PL/C	See note below				
RPG	RPGLDGØ	N	RPGECLG	RPGECLG	//GØ.SYSIN DD *
SIMSCRIPT	SIMLDGØ	N	-----	SIMSCR	//GØ.SYSIN DD *
SNØBØL					
Bell Telephone version	SNØBØL	N	SNØBØL	SNØBØL	none
IIT version	SPITBØL	Y	SPITBØL	-----	none
SØUPAC	SØUPAC	N	SØUPAC	SØUPAC	none
Syntax scanner	SCANSØUP	Y	-----	-----	none
Express-only	-----	SOUPEX	-----	-----	none
SPSS	SPSS	N	SPSS	SPSS	none

PL/C is available on HASP and EXPRESS at UOI and at UIM and UIC. See reference guide #S05N05 for a description of the control cards to run a PL/C program. Note that when a PL/C program is run at UIM, \*PL/C must be substituted for \$PL/C and \*DATA must be substituted for \$DATA.

WATFIV is available on HASP and EXPRESS at UOI and at UIM. At UIC, the procedure name for WATFIV is ØSWAT. See reference guide #S05.N02 for a description of the control cards for a WATFIV program.

WATBOL is available at UOI on HASP and EXPRESS. See reference guide #S05.N07 for a description of the control cards for a WATBOL program.



UIC NORMAL OPERATIONS SCHEDULE

	MON.	TUES.	WED.	THUR.	FRI.	SAT.	SUN.	
Midnight	UNATTENDED							Midnight
2:00 AM								
6:00 AM								
8:00 AM								
8:00 AM								8:00 AM
Noon								Noon
4:00 PM								4:00 PM
8:00 PM						UNATTENDED		8:00 PM
10:00 PM								10:00 PM
Midnight	LONG JOBS RUN							Midnight

Note: Unattended implies that no operator will be on duty, therefore no jobs requiring setups will be run. Changes in operations schedule will be announced.

UIM NORMAL OPERATIONS SCHEDULE

	MON.	TUES.	WED.	THUR.	FRI.	SAT.	SUN.	
Midnight								Midnight
2:00 AM	CLOSED	UNATTENDED					CLOSED	2:00 AM
6:00 AM			Preventive Maintenance					
8:00 AM								8:00 AM
Noon								Noon
8:00 PM						CLOSED		8:00 PM
Midnight								Midnight

Note: Unattended implies that no operator will be on duty, therefore no jobs requiring setups will be run. Changes in operations schedule will be announced.

## SOUPAC TEST PROC SAVES I/O REQUESTS

A test catalogued procedure, SOUPT, has been developed by Statistical Services. It offers everything that the SOUPAC catalogued procedure has except that the datasets it references have a larger blocksize and fewer buffers, thereby cutting down the necessary I/O requests by approximately two-thirds. This procedure can be used in place of SOUPAC in the EXEC statement of a user's Job Control Language for all SOUPAC jobs run on our local computer. Statistical Services plans to eventually revise the SOUPAC procedure to encompass these features.

## IEHPRØGM AVAILABLE ON EXPRESS

IEHPRØGM, the IBM system utility program that can be used for such things as scratching, renaming, and cataloging datasets, is now available on EXPRESS.

This full version of IEHPRØGM can only be used on datasets that are on the direct access user disk packs UIUSR1, UIUSR2, UIUSR4, UIUSR5, UIUSR6, and UIUSR7. There is a three second cpu time limit and a 15 second real time limitation on the EXPRESS version.

To use this version, use the following Job Control Language:

```
/*ID <ID card information>
/*ID SYSTEM=EXPRESS
// EXEC IEHPRØGM
//SYSIN DD *
]regular IEHPRØGM control cards[
/*
```

Note that the SYSPRINT and volume DD cards are not to be coded. For the format of the IEHPRØGM control cards, see the IBM manual GC28-6586-15, "OS Utilities".

A HASP catalogued procedure similar to the EXPRESS version of IEHPRØGM has been installed for compatibility. Use this to access only the direct access disk datasets. This HASP version will be useful for those operations requiring an operator's response (via a special handling card available in the consulting office), which is not allowed on the EXPRESS version, as well as for operations that exceed the three second EXPRESS time limitation. Use the standard IBM catalogued procedure (documented in the "OS Utilities" manual) to access datasets not on the user packs.

## SLOTNICK COMMITTEE ASSESSES COMPUTING NEEDS

The Slotnick committee was formed at the beginning of last summer to assess the computing configuration at the Urbana campus. This ad hoc committee has made a detailed study that points to a real need for an expanded computing facility for Urbana campus users.

Compared to other university campuses, the Slotnick committee concluded that our facilities are both quantitatively and qualitatively inadequate. The ratio of batch jobs run to the number of students on a campus (one per day for each 20 students) shows that relatively few students are able to utilize our facility. The ratio of PLORTS connect time to the number of students on campus (one hour per day for each 400 students) shows that the students are being deprived of valuable experience in modern computing techniques involving timesharing systems.

Because our IBM 360/75 is already running at peak capacity, the committee concluded that the only solutions to the problems of inadequate facilities include establishing links to other university computing facilities and expanding the facilities we now have. Because of the nature of modern university computing loads, the Slotnick committee recommended immediate purchase and development of a large scale computing network between the Chicago and Urbana campuses to service the computing needs of the Medical Center, Chicago Circle campus, Urbana campus, and ADP (Administrative Data Processing).

CSO has started to improve its facilities by acquiring a medium sized timesharing system (see the November 15, 1974 issue of OFF-LINE) to be installed in early 1975 to help alleviate the problems of over-usage on our computer. The Slotnick committee considers this only an interim step towards its goal of a unified and highly reliable system for all University of Illinois computer users.

## STEPNAME STATISTICS

The following are the ten most used steps on CSO's 360/75 system for the month of October, 1974:

STEPNAME	SYSTEM	USAGE		CPU	
		TOTAL	PERCENT	TOTAL	PERCENT
WATFIV	EXPR	34,174	33.75	3,526,580	4.44
GO	HASP	13,343	13.17	35,134,696	44.32
FORT	HASP	9,103	8.99	7,930,400	10.00
PLC	EXPR	4,960	4.89	983,636	1.24
TEST105	EXPR	4,180	4.12	464,692	.58
FORTGCLD	EXPR	3,061	3.02	786,420	.99
SOUPAC	HASP	2,579	2.54	5,010,468	6.32
LKED	HASP	2,443	2.41	413,440	.52
WAT	HASP	1,878	1.85	1,154,532	1.45
PLOT	HASP	1,391	1.37	1,369,188	1.72

## INDEX DISCONTINUED

Because it is getting quite lengthy, we have decided not to print an index with each publication of OFF-LINE. Instead, a yearly index to OFF-LINE will be printed at the end of the school year.



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Urbana, Illinois 61801

# Off-Line

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UNIVERSITY OF ILLINOIS  
AT URBANA-CHAMPAIGN

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## BEWARE OF WATFIV AT UIC

The catalogued procedure name WATFIV at UIC is an old version designed for exclusive use with their FASTBATCH system. It is so old that it generates UIC accounting errors because it has hard coded accounting information within the version of WATFIV that is invoked. Users should use the catalogued procedure name ØSWAT to run WATFIV programs at UIC. The following JCL can be used to access WATFIV at UIC:

```
/*ID <ID card parameters>
```

```
/*ID SYSTEM=UIC
```

```
// EXEC ØSWAT
```

```
$JØB
```

```
<source program>
```

```
$ENTRY
```

```
<data, if any>
```

```
$STØP
```

```
/*
```

## MAKE BACKUPS OF PRIVATE DISK PACKS

Users with private disk packs should protect their data and their investment in computer time by creating periodic tape backups of their packs. There is a simple procedure for doing this.

CSO recommends that users wishing to make backups obtain two standard labelled 1600 BPI tapes which will be devoted exclusively to this purpose. These tapes should be used alternately so that there will always be one valid backup tape, even if the dumping to the second tape should somehow fail.

To dump a pack, include the usual ID cards and the following four cards:

```
/*ID IØREQ=7000,TIME=(,15),REGIØN=70K
```

```
/*SETUP UNIT=TAPE,ID=name
```

```
/*SETUP UNIT=DISK,DISK=disk
```

```
// EXEC PACKDUMP,TAPE=name,DISK=disk
```

where name is the standard labelled tape to which the dump will be made and disk is the disk which is being dumped. The job will be a Class A job and should cost no

more than \$5.00 to run.

Users should see the systems consultants if a pack needs to be restored. The consultant have established an easy procedure that they can use to restore a disk pack from a tape. The charge for restoring a pack from a backup tape is \$5.00

### EXPRESS GRADING PROGRAMS CHANGES

Starting with the spring semester, 1974-75, EXPRESS will no longer support a version of WATFIV with grading program capabilities. Instead, a more generalized method of using grading programs has been implemented on EXPRESS. This has been done so that all of the processors run on EXPRESS can have grading programs. It also allows CSO to support only one version of WATFIV, instead of two - one for EXPRESS and one for HASP. Anyone teaching a course in which the students are using EXPRESS is welcome to use this grading program facility.

See the system consultants for details on how to use this facility.

### PL/I COMPILER DIFFERENCES

The following statistics were run on a large PL/I program that manipulated large arrays of structures. The programs used for each test were identical except in those instances where the F compiler restrictions made it necessary to program in manipulations when the Optimizer compiler allowed those manipulations.

<u>COMPILER</u>	<u>OPT. LEVEL</u>	<u>USE OF MACROS</u>	<u>COMPILE STEP</u>			<u>EXECUTION</u>		
			<u>REGION</u>	<u>TIME*</u>	<u>IØREQUESTS</u>	<u>REGION</u>	<u>TIME*</u>	<u>IØREQUESTS</u>
PLIX	0	MACRO	116K	55.80	3241	150K	44.65	374
		NOMACRO	116K	49.74	3173	150K	44.65	374
PLIX	2	MACRO	116K	63.90	4054	150K	42.29	370
		NOMACRO	116K	54.94	3977	150K	42.29	370
PLIF	0	MACRO	116K	39.34	1481	150K	74.09	695
		NOMACRO	116K	26.37	633	150K	74.09	695
PLIF	1	MACRO	116K	38.55	1459	150K	73.94	695
		NOMACRO	116K	26.95	650	150K	73.94	695
PLIF	2	MACRO	116K	44.37	1570	150K	68.49	693
		NOMACRO	116K	31.82	804	150K	68.49	693

<u>COMPILER</u>	<u>OPT. LEVEL</u>	<u>USE OF MACROS</u>	<u>TOTAL TIME*</u>	<u>TOTAL IØREQUESTS</u>
PLIX	0	MACRO	100.45	3615
		NOMACRO	94.39	3547
PLIX	2	MACRO	106.19	4424
		NOMACRO	96.23	4347
PLIF	0	MACRO	113.43	2176
		NOMACRO	100.45	1328
PLIF	1	MACRO	112.49	2154
		NOMACRO	100.89	1345
PLIF	2	MACRO	112.86	2263
		NOMACRO	99.31	1497

(\*Time measured  
in seconds)

Note that the Checkout compiler was not compared because it is basically a debug compiler and is not efficient.

These statistics show that a poorly organized program that does a lot of number crunching and array manipulations often does not take advantage of the various PLI optimizing facilities. Where programs with macros save the programmer coding time, those programs will require more time to compile. The PLI Optimizer generally takes longer to compile but uses much less execution time. The optimizing compiler uses more I/O requests than the F compiler.

This guide gives hints for using the PLIF compiler more efficiently: (See pages 214-238 of the PLIF Language Reference Manual, IBM order number GC28-8201-4, for a much more complete description of how to optimize a PLIF program.)

To improve speed of compilation:

1. Minimize the number of BEGIN blocks and procedures.
2. Avoid using the ATR, XREF, LIST, DECK, and CHAR48 compiler options.
3. \*Specify  $\emptyset$ PT=0 or  $\emptyset$ PT=1 rather than  $\emptyset$ PT=2. ( $\emptyset$ PT=1 is fastest but uses more core than  $\emptyset$ PT=0).
4. Specify the N $\emptyset$ S $\emptyset$ URCE option if the program is debugged.
5. Remove all unreferenced labels and data.

To improve speed of execution:

1. Use the  $\emptyset$ PT=2 compiler option and the RE $\emptyset$ RDER block option to allow the compiler to optimize loops and subscripts. (Use of the RE $\emptyset$ RDER option is recommended only for debugged programs).
2. Avoid the SUBSCRIPTRANGE condition.
3. Avoid loops that contain GET DATA statements, procedure calls, procedures, begin blocks, or statements likely to invoke previously defined on-units.

To improve the use of storage:

1. Use  $\emptyset$ PT=0.
2. Use fixed binary variables of precision less than 16 whenever possible rather than decimal variables.



## PLIX

(See pages 249-278 of the PL/I Checkout and Optimizing Compilers: Language Reference Manual, IBM order number GC33-0009-3, for a much more complete description on how to optimize a Plix program.)

To improve speed of compilation:

1. Use the ~~NO~~OPTIMIZE compiler option.
2. Allocate as much storage to the compiler as possible, minimizing time the compiler uses accessing spill files.
3. Minimize the number of BEGIN blocks and procedures.
4. Avoid using the ATR, XREF and LIST compiler options.
5. Remove all unreferenced labels and data.

To improve the speed of execution:

1. Avoid unnecessary program segmentation.
2. Use constants rather than expressions whenever possible.
3. Data required for output should be kept in DECIMAL form; data required for substantial computation or subscripts and internal counters should be declared to be BINARY.
4. Minimize data conversions.
5. Avoid using the SIZE, CHECK, SUBSCRIPTRANGE, and STRINGRANGE ON-conditions except when debugging.

To improve the use of storage:

1. Use binary, rather than decimal, fixed point data.

## NEW RESTIRCTIONS ON LONG JOBS

A two hour CPU limit has been imposed on all jobs run on CSO's IBM 360/75. This limit was imposed because jobs that take over two hours of CPU time often are on themachine for over six real hours. Because of the new equipment at CSO, CSO cannot guarantee that the machine will be up for six straight hours.

## JOBS IN HOLD

Jobs found to have been put in HOLD by users, and that have remained in HOLD in the system for two days or more will be cancelled by the operators unless some prior arrangement has been made.

## NEW DISK SYSTEM

All on-line user disk packs will be converted from 2314 disks to 3330 disks during the weekend of January 11, 1975. This changeover will affect all computer users presently using or planning to use disks in any way. The new system will include three 3330 user disk packs, nine 3330 system packs and four 2314 disk spindles for setups. Users with private disk packs should read the section, "Use of Private Disk Packs".

## CONVERSION SCHEDULE

Friday, January 10, 1975: Last day to put datasets on the permanently mounted 2314 user packs --

UIUSR1, UIUSR2, UIUSR4, UIUSR5, UIUSR6, UIUSR7  
(UIUSR3 will remain available to users as a 2314 setup disk pack.)

Saturday, January 11, 1975 and Sunday, January 12, 1975: Systems programmers will be doing a volume-to-volume copy of all datasets on the 2314 user packs to the new 3330 user packs --

UIPUB1, UIPUB2, and UIPUB3

The system will be down all day Saturday and will resume normal operations schedule at 4:00 PM Sunday. After the conversion, the 2314 user disks will be taken off-line. The old user disks will be available as setup volumes for about one month after the conversion. Backup copies of these disks will be made on tape and available indefinitely.

After Sunday, January 12, 1975 at 4:00 PM: Users can access their datasets on the 3330 disk packs via the system catalog (see following section). USERS SHOULD READ THE SECTION IN THIS ARTICLE ON REBLOCKING AND REALLOCATING SPACE TO SEE IF THEY SHOULD MAKE CHANGES TO THEIR DATASETS TO USE 3330 DISK SPACE MORE EFFICIENTLY. REBLOCKING AND REALLOCATING SPACE WILL RESULT IN MORE SPACE ON THE DISKS FOR ALL USERS AND LESS MONEY SPENT ON STORING DATA WITH WASTED SPACE. It is imperative that users consider reblocking and reallocating to make more disk storage available to all users. See the consultants who are ready to help with reblocking and reallocating.

## CHARGES

Users will be charged 44 cents per track per month on the 3330 disks (as compared to 25 cents per track per month on the 2314 disks). Users may find they are going to be charged more for storing their datasets on the 3330 disks if they do not reblock or reallocate space, as many of the favorable block sizes on 2314 disks waste a lot of space on the 3330 disks.

## USE OF PRIVATE DISK PACKS

The new disk system includes four spindles for 2314 disk setups. Users with private disk packs will only be affected by this change in one way. The UNIT parameter describing a dataset on a private setup disk pack may have to be changed.

Specifying UNIT=2314 or UNIT=SETUP will reserve a 2314 spindle. Note that UNIT=DISK now reserves a 3330 disk; therefore, users with setup packs should not code UNIT=DISK.

## DISK CHARACTERISTICS

	<u>3330</u>	<u>2314</u>
cylinders per track	404	200
tracks per cylinder	19	20
tracks per pack	7676	4000
maximum data bytes per track	13030	7294
maximum data bytes per pack	100018280	29176000
	100 million bytes	29.17 million bytes

Effective use of the 3330 disks can allow CSO to increase the total amount of disk space for our users. CSO is converting from six 2314 user disk packs to three 3330 user disk packs, increasing total user storage from approximately 175 million bytes to 300 million bytes. An extra advantage of the 3330 disk system is the increased access speed.

## ACCESSING DATASETS AFTER CONVERSION

During the conversion, all user datasets will be catalogued by CSO. Where duplicate names exist, it is totally unpredictable which dataset will be moved over to the 3330's. Users encountering problems because of this should see the consultants. There will be listings of the catalog in the consulting offices (166 DCL and 70a Commerce West) for users who want to know where their dataset is and what space the dataset is using up on the new packs.

To access a dataset through the system catalog, the Job Control Language (JCL) describing the dataset may need to be changed. JCL for datasets that are already being accessed via the catalog will not have to be changed. JCL describing datasets that are not now being accessed through the catalog, i.e., the JCL describing the dataset contains full UNIT and VOLume information, will have to be changed. Since the catalog contains the UNIT and VOLume information, the UNIT and VOLume parameters describing the dataset now should not be coded. For example, if a dataset was being referred to as:

```
//DD1 DD DSN=USER.P9999.NAME1,DISP=ØLD
```

it is already using the system catalog for the exact location. But, if a dataset was being referred to as:

```
//DD2 DD DSN=USER.P9999.NAME2,UNIT=DISK,VØL=SER=UIUSR2,DISP=ØLD
```

the JCL will have to be revised to use the catalog. The above coding, revised to use the catalog, would look like this:

```
//DD2 DD DSN=USER.P9999.NAME2,DISP=OLD
```

#### CREATING DATASETS ON THE 3330 DISKS

Datasets can be put on the 3330 disks in much the same manner as they could be put on the 2314 disks. Four major JCL coding rules have changed:

1. UNIT=(device type) have changed. New conventions are:

UNIT=3330	}	Will reference a 3330 disk
UNIT=DISK		
UNIT=SCRATCH		
UNIT=SYSDA		
UNIT=SYSSQ		

UNIT=2314	}	Will reference a 2314 disk
UNIT=SETUP		

2. VOLUME specifications have changed. The three new 3330 user disk packs are named UIPUB1, UIPUB2, UIPUB3.
3. All datasets on the 3330 user disk packs (UIPUB1, UIPUB2, and UIPUB3) must be catalogued. To catalog a dataset, use the DISPOSITION parameter on the JCL describing the dataset. For example, coding:

```
//DD3 DD DSN=USER.P9999.NAME3,UNIT=DISK,VOL=SER=UIPUB2,  
// DISP=(NEW,CATLG),SPACE=(TRK,(10,2))
```

will give all the specifications necessary to create and catalog a sequential dataset. The next time a user wants to reference that dataset he can do it like this (using the catalog):

```
//DD3 DD DSN=USER.P9999.NAME3,DISP=OLD
```

4. Each track on a 3330 disk can hold almost twice as much information as a 2314 track could (see disk characteristics chart). However, block sizes that fit well on the 2314 packs frequently do NOT fit well on the 3330 disk packs. Therefore, a user should choose the SPACE and BLKSIZE parameter specifications corresponding to the new disk characteristics when creating datasets. The following chart can be used to plan effective use of the 3330 disks.

<u>BYTES PER BLOCK</u>		<u>RECORDS PER TRACK</u>
<u>MINIMUM</u>	<u>MAXIMUM</u>	<u>on 3330</u>
6448	13030	1
4254	6447	2
3157	4253	3
2499	3156	4
2060	2498	5
1746	2059	6
1511	1745	7
1328	1510	8
1182	1327	9
1062	1181	10
963	1060	11
878	962	12
806	877	13
743	805	14

This chart can help to determine the effect of block size on the number of records that can be stored on a 3330 disk. For example, if you are thinking of blocking a dataset at 1760 bytes per block, consider lowering the blocksize to 1680 to achieve a more effective utilization of space. The closer you get to the maximum number of bytes per block, the more efficiently you will use your space.

#### REBLOCKING AND REALLOCATING A DATASET THAT WAS MOVED TO A 3330

If an old dataset has a BLKSIZE less than or equal to 3156 bytes, it probably does not need to be reblocked. Even though it might not be using disk space to its utmost, any extra space probably will not amount to all that much.

Users with partitioned datasets containing load modules will probably want to change the SPACE allocation on the 3330 disks. Use the IBM utility IEBCOPY to make a new copy of the dataset with a revised space parameter; follow by the IBM utility IEHPRØGM to scratch and uncatalog the old dataset and rename and catalog the new dataset. SEE THE CONSULTANTS FOR EXACT DETAILS ON HOW TO DO THIS.

Users with sequential datasets might want to make a new copy with revised BLKSIZE and SPACE parameters that effectively utilize the 3330 disk attributed. Use the local utility program, COPY, for this, followed by an IEHPRØGM as described above. Try to compute SPACE to reflect the current dataset need and any firm plans for future expansion for the dataset. If the record format (RECFM) is U, V, VB or F do not change the blocksize. If RECFM is FB, VS or VBS the blocksize can be changed to one that is good for use with 3330's. If RECFM=FB be sure the new BLKSIZE is an even multiple of the LRECL. SEE THE CONSULTANTS FOR EXACT DETAILS ON HOW TO DO THIS.

Many of the standard block sizes used on 2314 disks result in an extremely low utilization of space on 3330 disks. SEE THE CONSULTANTS WHO ARE SPECIALLY TRAINED TO HELP YOU WITH THIS CONVERSION. ONE QUICK TRIP TO THE CONSULTING OFFICE CAN SAVE YOU A LOT OF TIME, MONEY, WORRY AND CONFUSION.



## AMOC JOBS WILL BE CANCELLED

Some users have been using the program called AMOC, which checks the surface of a tape with one I/O request. Unfortunately, while doing so it monopolizes the tape controller with the result that all other mounted tape users are denied the use of the tape units for about 20 minutes or so. Because of this, jobs recognized as AMOC jobs will be cancelled by the operators. A hang-up sheet will be issued explaining the cancellation.

## CRT TERMINALS AVAILABLE THROUGH CSO

The Computing Services Office will soon be getting the first shipment of Infoton Vistar/GT teletype compatible ASCII cathode ray tube (CRT) terminals which will be available for purchase or lease purchase through the Illinois Education Consortium for Computer Services (IECCS).

The Infoton Vistar/GT model has a screen of 24 lines with 80 characters per line. It has a 12-position baud rate switch (75 to 9600) and can operate at full or half duplex with odd, even or no parity. A unit is available for inspection in the CSO-North consulting office, Room 166, DCL.

Infoton's Vistar model and Vistar II model terminals will also become available through CSO at a later date. Both of these terminals offer the extra capability of an 11 key numeric pad and a cursor control cluster which allows extra facilities for visual text editing. The Vistar II, which is not on the market yet, will be an extended Vistar with extra logical and editing functions.

All prices include a 6% addition to set up a revolving inventory of spares to facilitate module replacement servicing. The purchase prices include a 2% addition for IECCS overhead. The lease prices include principal, interest, insurance charges, and IECCS overhead expenses. The prices for the three Vistar models are as follows:

	UNIT	OPTIONS		
		PRINTER INTERFACE	UPPER/LOWER CASE	I/O INTERFACE
VISTAR/GT	\$1,123.20	\$81.00	\$324.00	\$135.00
Monthly Payment	46.00	3.32	13.27	5.53
VISTAR	\$1,404.00	Standard	Not Available	Standard
Monthly Payment	57.50			
VISTAR II	\$1,620.00	Standard	\$226.80	Standard
Monthly Payment	66.35		9.29	



The monthly payment figure is based on a lease/purchase plan for 36 months. There will be no rental arrangements made.

Maintenance and repair options are available. CSO will offer a maintenance program similar to the teletype repair service now being offered.

These terminals are available to all State supported institutions. For more information about these terminals, write or call:

Cliff Carter  
Room 195  
Digital Computer Lab.  
Phone: 333-3723



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# Off - Line

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OFF-LINE is the newsletter of the Computing Services Office at the University of Illinois at Urbana-Champaign. CSO operates: An IBM 360 Model 75 with one million bytes of fast core and two million bytes of slow core, under HASP and OS; A DECsystem-10 with 256K words of core, under TOPS-10, serving up to 80 simultaneously active terminals. OFF-LINE is printed every two weeks except for interruptions due to holiday schedules. Articles may be reprinted provided that the source of the article is noted.

## REDUCED COSTS AT CHICAGO CENTERS

It has been noticed that some jobs run at either the Medical Center or Chicago Circle cost more than if they were run on the 360/75. In order to offset this difference, only 90 per cent of the execution units used by jobs returning from Chicago Circle and only 70 per cent of the execution units used by jobs returning from the Medical Center will be charged to the user. In addition, if a job routed to Chicago Circle requests a region size of more than 512K, it will only be charged for 512K. Lastly, the rate for on-line disk usage will be standardized at 30 cents per track per month for 3330 disks and 20 cents per track per month for 2314 disks for all centers.

These changes should not be interpreted as being a reflection on the relative power of each machine but more an inducement for users to take advantage of each center's "specialty", i.e., Chicago Circle processes SOUPAC, SPSS and large region jobs very effectively; Medical Center gives excellent turnaround for small compile and go and SPSS jobs; and Urbana is very effective where heavy double precision calculations or a wide range of languages and application programs are required. However, it is difficult to predict which center is best for any particular job, and users are encouraged to experiment and find the center which suits them best.

Jobs may be submitted to the Chicago centers from the DEC-10 by submitting them to the 360/75 with the proper ID card parameters, i.e.,

```
/*ID SYSTEM=UIC
```

```
/*ID SYSTEM=UIM
```

Direct links between the DEC-10 and the Chicago centers are being considered. Catalogued procedure names for use at all three centers are listed in Reference Guide S01.N05.

All centers are actively working to improve the reliability and availability of the links between centers, and to standardize software and accounting procedures by which the links are used.

The more the links are used, the better the service to all users in the Urbana computer user community.

## CALL-OS FORTRAN TO BE DISCONTINUED

The CALL-OS FORTRAN compiler will be withdrawn on February 16, 1975, but users will still be able to use load modules created by that compiler until May 23, 1975, when PLORTS will be withdrawn. (Note that the load modules produced by any CALL-OS compiler cannot be run on the DECsystem-10.) CALL-OS BASIC will remain on PLORTS until PLORTS is withdrawn on May 23, 1975.



## PL/I CHECKOUT COMPILER AVAILABLE ON EXPRESS

The PL/I CHECKOUT compiler is now available on EXPRESS. The JCL for using this compiler is:

```
/*ID <necessary ID card parameters>

// EXEC PLICKR[,PARM='parms for compiler']

    <program>

*  DATA;      } optional
   <data>     }

/*
```

There is a seven second CPU time limit for the CHECKOUT compiler on EXPRESS. This compiler is also available on HASP using the same JCL.

## NEW SOUPAC MANUAL AVAILABLE

The new SOUPAC manual no longer contains writeups for the Iterative Factor Analysis program (ITE) or for the Unrestricted Maximum Likelihood Factor writeup (ALP) and the Unrestricted Factor Analysis by Three Methods writeup (UFA). The programs themselves will continue to be maintained for an indefinite period of time, but will be destroyed in a few months. Individual writeups for the two new programs may be obtained at the SOUPAC office in 84 Commerce West.

The new manual also contains matrix program writeups for doing Promax Oblique Rotation of Factors, Harris-Kaiser Class II Rotation of Factors, and Computation of a Type of Congruence Coefficient between Factor Solutions. These writeups appear in the Factor Analysis section of the new manual and are available individually at the SOUPAC office.

Also, the new manual contains a slightly revised Factor Scores writeup. The difference is that methods I and II may be used with oblique solutions and that if an oblique solution is required and method II is used, the factor intercorrelations must be input. The old writeup left the user with the distinct impression that methods I and II could only be used with orthogonal solutions.

The manual is now available to anyone with a proper PS number and can be picked up in 134 DCL, or 84 Commerce West, or 70a Commerce West. The cost of the new SOUPAC manual is \$5.00. The manual also is available at the Bookstore.

## COMPUTER SCIENCE MACHINE PROBLEMS

M T W T F

JAN	20	21	22	23	24 400B-MP1
	27 10X -MP0	28	29 121 -MP0 201 -MP1 400A-MP1	30	31 300 -MP1
FEB	3 10X -MP1 400B-MP2	4	5 201 -MP2	6	7 300 -MP2
	10 10X -MP2 400B-MP3	11	12 121 -MP1 321 -MP1	13	14 105 -MP0
	17 10X -MP3	18	19 201 -MP3 400B-MP4	20	21 105 -MP1
	24	25	26 121 -MP2 400A-MP2 400B-MP5	27	28 105 -MP2
MAR	3 10X -MP4	4	5 201 -MP4	6	7
	10	11	12 121 -MP3	13	14 105 -MP3
	17 10X -MP5	18	19 400A-MP3	20	21 105 -MP4
	24 HOL.	25 HOL.	26 HOL.	27 HOL.	28 HOL.
	31	1	2 121 -MP4 201 -MP5	3	4 105 -MP5
APR	7 10X -MP6	8	9	10	11
	14	15	16 121 -MP5 201 -MP6 400A-MP4	17	18 105 -MP6
	21 10X -MP7	22	23	24	25
	28	29	30 201 -MP7	1	2 105 -MP7
MAY	5 10X -MP8	6	7 121 -MP6 400A-MP5	8	9 ROC.

Here is the first edition of the machine problem calendar for this semester. It is not complete; new editions will be forthcoming as more problems are assigned in CS 287, 300, and 321. See OPENMSG COURSES for an up to date listing.

The notation "10X" refers to CS 101 and 102 together. For about half the semester these two courses will use the same machine problems, so they will be almost like a single course. It is possible that, toward the end of the semester, CS 101 and 102 may have problems due on alternate Mondays.

APPROXIMATE ENROLLMENT IN CS COURSES

<u>Course</u>	<u>Enrollment</u>	<u>Professor</u>
101	440	Lawrie
102	181	Murrell
105	623	Kamper
121	119	Yao
201	176	Hansen
287	93	Saylor
300	115	Friedman
321	77	Garsil
400a	71	C. L. Liu
400b	29	Reingold

## CSO UTILITY REALLOCAT CHANGED FOR 3330 DISKS

The CSO utility program, REALLOCAT, which reallocates the SPACE allocation for partitioned and sequential datasets, has been modified for use with the 3330 disks. To use REALLOCAT with a 3330 disk, use as directed, but remember that SPACE allocations on a 3330 disk refer to much bigger quantities than those same allocations on a 2314 disk. To use REALLOCAT with a dataset on a 2314 disk, use as directed with one change. The EXEC card should read:

```
// EXEC REALLOCAT,UNIT=2134
```

## NOTATION USED IN DEC-10 DOCUMENTATION

Whenever CSO documents the DECsystem-10, we use certain conventions. These conventions are:

1. Underlining is used to denote system output to the user's terminal.
2. Variables are denoted in lower case without underlining.
3. Alternative choices are enclosed in parentheses. When parentheses are to be explicitly coded, we will make a special point of telling our readers.
4. Square brackets are to be coded if the information contained in them is to be coded.
5. A carriage return is used to terminate each input line except where explicitly noted.
6. Control functions are noted as  $\uparrow x$  where x is the character to be depressed while the CONTROL key is also depressed.
7. ALTMODE's are symbolized as  $\$$ . The ALTMODE key on a user's teletype may be labelled as ALTMODE, ALT, ESCAPE, or ESC.
8. To conform to DEC-10 documentation, we will use the custom of slashing the number 0 only in those contexts where misinterpretation could cause the user to generate a program error.
9. Unless explicitly noted, all commands are to be given in monitor mode.

## NEW DECsystem-10 GUIDE

CSO has available a guide for using the DECsystem-10. The topics touched upon are the subject of many relatively bulky DEC manuals. The contents of the CSO DECsystem-10 Guide are:

Introduction

Using a Terminal

File Naming Conventions

Monitor Commands

Editors

LINED

SOS

TECO

DDT

Languages

FORTRAN

BASIC

The manual deals with timesharing use of the CSO DECsystem-10, a general-purpose computing system offering service up to 80 simultaneously active terminals. It is hoped that enough information is presented to help a beginning user start productive work, and that the manual will continue to be useful for reference as the user gains experience.

The manual is available to CSO users with the proper PS numbers in Room 134 DCL and 70a Commerce West.

#### RATES FOR DECsystem-10

The charges for both PLOTS and the DECsystem-10 will average \$5.00 per connect hour after March 1, 1975. The basic rate on the DEC-10 is \$2.40 per connect hour, but charges for system resources will bring that rate up to an average of \$5.00 per connect hour. Rates for the DEC-10 use are:

Timesharing:	<u>Price</u>
Connect Hours	\$ 2.40
CPU Hours	\$60.00
Core Hours	\$ 1.50
Batch Service:	
Cover Charge	\$ .65
CPU Hours	\$60.00
Core Hours	\$ 1.50

Disk Storage:	<u>Price</u>
Blocks/Months	\$ .02
Line Printer:	
1000 Lines	\$ .80

The Research Board and CICU will be given extra money for allocations for the January to June period. Users can request extra money through these boards, and automatic allocations will be made to cover the price increase for timesharing.

The above rates are subject to change. Any charges will be announced in OFF-LINE.

#### HOW TO ACCESS PLORTS FILES ON THE DEC-10

All PLORTS files as of 8:00 AM, February 2, 1975, are now on the DECsystem-10. Users can get their project numbers and programmer numbers (ppns) in the Accounting Office, Room 134 DCL.

In each user's file space there is a file named DIRECT.PCF. This file contains a cross-listing of the file names used on PLORTS and the corresponding file names used on the DEC-10.

Each PLORTS file, when transferred to the DEC-10, will have the PLORTS line numbers as the first eight characters of each line. Because PLORTS line numbers are different than DEC-10 line numbers, these files will appear as though they were unnumbered. CSO has developed a utility program to strip off the line numbers of those files. To use this utility, type:

```
._R RENUM
```

RENUM will prompt with an asterisk. To find out how to use RENUM, type HELP after the asterisk is printed.

#### NEW VERSION OF PLC INSTALLED

Release 7.0 of PLC has been installed and tested and it will replace the current version of PLC on Sunday, February 9, 1975.

Version 7.0 incorporates various corrections and improvements, including faster compile time, improved error message format, and a compile time macro facility.

The user's guide is on the distribution tape and may be retrieved by users. Interested users should contact Kati Rader, Room 183 DCL, Phone 333-6262.

## HOW TO USE THE LINK BETWEEN THE DEC-10 AND THE IBM 360/75

A link between the DEC-10 and the IBM 360/75 has been established. To route a job to the 360 for execution, follow these steps:

1. Create a file, or multiple files, which contain the necessary ID cards, the JCL, and the program. For example, code:

```
/*ID PS=mmmm,NAME='your name'
```

```
/*ID CODE=cccc
```

```
// EXEC xxxx
```

```
<program>
```

```
/*
```

where mmmm is the user's PS number; your name is the identifier for the output; cccc is the user's code word, and xxxx is the catalogued procedure name for the program.

2. Submit the jobs by issuing the following monitor command:

```
._360 filename.ext(,filename.ext(...))
```

The DECsystem-10 monitor will not respond with the job number and 360 queue position. Unfortunately, at this time there is no way to find out the job's status through the DEC-10.

3. Output will default to the DCL Routing Room's IBM printer (LOCAL) unless:
  - a. The following NAME parameter convention, using a file name and the project number and programmer number within parenthesis, is used, in which case the output will be placed in the specified DEC-10 file:

```
/*ID NAME='filename.ext(proj#,prog#)',PRINT=DEC10
```

Note that the entire string within the single quote marks must be no longer than 20 characters. This is similar to PRINT=PLORTS.

- b. An ID card PRINT option is specified to route the print to some other 360 output area.



This link also can be used to run jobs from PLOTS or cards on the 360 and have the output filed on the DEC-10. For example, to file a box of cards into a file on the DEC-10, a user could submit a job to the 360 with the following JCL:

```
/*ID PS=9999,NAME='FIL1.F4(7777,0000)'  
/*ID CODE=CODE,SYSTEM=PRINT,PRINT=DEC10  
    <deck to be filed>  
/*
```

Remember that the entire field within quotes in the NAME parameter must not exceed 20 characters. The default extension for files from the 360 is .D78.

#### CLP STATISTICAL PACKAGE AVAILABLE

The Conversational Linear Programming Package is now available on the DEC-10.

This package permits non-mathematically oriented users to concentrate on the formulation of linear programming problems and on the interpretation of their solutions, and to learn about the power, scope, and limitations of these techniques while treating the underlying methodology as a "black box". The user can in a very easy way interrogate a solution, perform a variety of sensitivity analyses, and examine the manner in which solutions change as some of the parameters are varied. Data can be input under the control of a program which prompts the user and permits him to alter or correct his formulation of the problem. All outputs are labelled so as to have an intelligible economic interpretation; interpretations which depend on an understanding of the mathematics of linear programming are suppressed.

To use this package, type:

```
.R CLP
```

If any professors are interested in using CLP in their classes, please contact the Statistical Services Office (Room 84 Commerce West, Phone 333-2170). The amount of documentation needed must be determined so that the bookstore can order it.

#### AQD STATISTICAL PACKAGE AVAILABLE

The following AQD collection is now available on the DEC-10.

For any data base which can be represented as a set of observations on a set of variables, the AQD (Analysis of Quantitative Data) collection consists

of interactive programs for processing and analyzing the data. The analytical program provide facilities for obtaining various descriptions of the data in the form of cross-tabulations, frequency distributions, and lists for transforming the data; for running regressions, examining residuals, and making probabilistic forecasts based on a regression model; and for factor analyzing a set of data. The data processing programs allow the data bases to be stored in compact form, permit variables to be labelled, missing-value codes to be assigned, and work files to be extracted from the compactly stored data base. The programs are essentially self documented, in the sense that the user may obtain a complete description of what to do at any stage simply by typing a question mark when an input is demanded by the program.

To use this package, type:

.R AQD

The User Guide to ADQ Collection - Third Edition is available in the bookstore for any interested user. Copies are available for users with proper PS numbers in Room 84 Commerce West (Statistical Services Office). A workshop on AQD will be presented Thursday, February 13 at Commerce West from 7:00 PM to 9:00 PM. Interested users should meet in front of Room 84 Commerce West at 7:00 PM.

### LOGGING ON TO THE DECsystem-10

The DEC-10 timesharing system is quite different from PLORTS and has a lot more facilities to offer to the user than PLORTS could ever support. To log on to the system, follow these easy steps:

1. Turn the terminal on-line. If it is a terminal that requires dial-up connection, the phone number to dial is 333-4002.
2. Type a CONTROL-C (CONTROL key and the C key pressed simultaneously). This establishes connection with the monitor. The monitor will respond by printing a period (.).
3. Type:

.LOGIN projectnumber,programmernumber

followed by a carriage return. If you have a valid ppn, the system will respond with information similar to the following:

JOB 10 U. OF I. DEC 507A DAS78 TTYO

where 10 is the job number assigned to you by the system; U. OF I. DEC 507A DAS507A identifies the location and model of the CPU; and TTYO is the line number assigned to the terminal by the system.

4. The system will then ask for your password by typing:

PASSWORD:

Type in your password (notice that for security reasons it is not typed on the teletype) and press the carriage return. The system will respond with any messages as well as a line that includes the time of day (according to a 24-hour clock), date, and day of the week.

5. You are now logged on to the system and are in monitor mode!

### LOGGING OFF THE DECsystem-10

The KJOB monitor command is used for logging off of the DECsystem-10. Code letters, called switches, are associated with this command and are used to determine the disposition of any disk files. The form of the command is:

.KJOB/x

where x is a valid KJOB switch. If KJOB is typed without a switch, the system will respond with:

CONFIRM:

Type in the switch at this time, or type H to get a list of valid switches. The following switches are available:

<u>Switch</u>	<u>Meaning</u>
F	Fast logout; all files are saved, even temporary files.
D	Delete all files. Responds with <u>ARE YOU SURE?</u> Type Y or D for YES, any other character fo NO.
K	Kills all unprotected files (files with 0xx protection codes; unless specially protected through the PROTECT command, this will destroy all the user's files).
P	Protect and save all but temporary files (files with the extensions of .TEM, .TMP, .CRT, and .LST).
S	Save without protecting all but temporary files.
L	List the directory.
B	If the user is under the logged out quota, delete no files. Otherwise, delete enough files to get under the quota in the following order: 1. unprotected files 2. spooled files not previously queued 3. protected files
Q	To learn if you are over the logged out quota.
H	For help; gives this list of switches.
W	Warn by typing list of files that are deleted.
X	Turn off the listing of files that are deleted.
I	Individually determine what to do with all files as follows: After each file name is listed, type - P Protect S Save K Kill

Q To learn if over logged out quota. If not,  
nothing is typed.

E Skip to the next file structure and save this  
file if below logged out quota for this file  
structure.

U As above in I, but for unprotected files only.  
Protected files are preserved.

More than one switch may be entered at one time. Each switch should have a preceding slash. For example, a user may want the B switch, to delete files only if he is over the logged out quota, and may want a listing of the files deleted. He would do it this way:

.KJOB/W/B

DELETED:

MYFILE

JOB 10, USER [7777,000] LOGGED OFF TTY2 1432 7-FEB-75

DELETED 1 FILES (1022. DISK BLOCKS)

SAVED 23 FILES (1455. DISK BLOCKS)

RUNTIME 5 MIN, 02.34 SEC

### SOS DOCUMENTATION AVAILABLE

The SOS User's Guide is now available to users with the proper PS numbers in the Accounting Office, Room 134 DCL, and in the CSO South Consulting Office, Room 70a Commerce West.

SOS is an advanced line-oriented text editor for use on the DECsystem-10. Users should find that the basic features of SOS are relatively easy to learn, yet powerful when implemented.

### STATISTICAL SERVICES CHANGES POLICIES AND OFFICE HOURS

The Statistical Services consultants have made some significant changes in policy, as well as office hours. The new office hours are:

Monday, Tuesday, Thursday, Friday	9:00 AM to 12:00 Noon, and 1:00 PM to 5:00 PM
Wednesday	9:00 AM to 12:00 Noon, and 2:00 PM to 5:00 PM

Due to constraints of staff availability and pressures of project activity, the Statistical Services consultants have found that they have no alternative but to restrict their consulting hours and nature of staff activity. Accordingly, there will be only two consultants on duty at any one time. One of these consultants will be restricted to consulting activity which is not to exceed ten minutes duration - after such time a later appointment will be made to finish the problem. Or, given that the other consultant is not busy or does not have an appointment, a consulting may be continued with the understanding it may be later interrupted. Appointments will be restricted to one hour at a time. Appointments lasting longer than an hour are also subject to interruption. The object is to minimize waiting time for walk-in and quick answer users. In general, a user cannot expect a large stretch of dedicated time without an appointment. Thus, priority will be given to scheduled appointments and a walk-in user may be interrupted if a consultant has an appointment.

Since project activity continues concurrently, individual consultants are available for consulting only during their posted consulting times. These hours are posted on the doors of the Statistical Services area. Consultants will clearly be around the office when they are not posted for consulting doing project work, and will not be available for consulting. Users should also be prepared to accept the fact that a consultant may have to interrupt a consulting session at the end of scheduled consulting to resume project activity. Such an interrupted session will be scheduled for a later appointment.

Users should understand that in this environment consultants will not do programming or design work for users. Consulting activity is restricted to teaching, advising, and debugging activity directly related to programming with statistical packages.

Finally, the statistical systems and programs now being supported are frozen until September, 1975. Exception will be made for correction of errors. Changes, additions, or new systems implementation will be considered only for very exceptional cases.

The project activity in progress and scheduled for completion by August 20, 1975, is a major redesign and rewrite of the SOUPAC system. To the user it will provide a basic statistics package to replace the current Frequency, Standard Scores, T-Test and Matrix programs. The new versions are intended to appear to the user as natural statistical English procedures. Ordinary matrix algebra expressions will be supported. Matrix and variable labels will be provided.





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## CORRECTION -- LINK BETWEEN THE DEC-10 AND THE IBM 360/75

The last OFF-LINE gave a method for using the link between the DEC-10 and the IBM 360/75 that, as many people may have found out, was incorrect. This is the correct way to use the link.

1. Create a file, or multiple files, which contain a JOB card, all the necessary ID cards, the JCL, and the program. The JOB card has the following format:

```
//ANNNNNNNN JOB
```

where ANNNNNNNN is a one to eight character job number, beginning with an alphabetic character, which should end in two digits if the output is routed to a place where output is placed in storage bins according to the last two digits of the job number. For example, a user might code:

```
//ABE12345 JOB
```

```
/*ID PS=9999,NAME='ABE LINCOLN'
```

```
/*ID CODE=AXE
```

```
/*ID REGION=200K,TIME=2
```

```
// EXEC FORTGCG,REGION=200K
```

```
<program>
```

2. Submit the job using the following monitor command:

```
.UOI filename.ext[,filename.ext]. . .
```

where the filenames are the files you have created that contain your program.

3. Notice that the DEC-10 will not respond with the job number and 360 queue position. Unfortunately, at this time, there is no way to find out the job's status through the DEC-10.
4. Output will default to the DCL Routing Room unless:
  - A. An ID card PRINT option is specified to route the print to some other 360 output area, or
  - B. The following NAME and PRINT parameter conventions are used, in which case the output will be placed in the specified DEC-10 file:

```
/*ID NAME='filename.ext(proj#,prog#)',PRINT=DEC10
```

Note that the entire length of the NAME field, excluding the single quotes, cannot exceed 20 characters. This is similar to PRINT=PLORTS.

5. For a reprint of this file from the DEC-10, type "HELP 360". For more information about the UOI monitor command, type "HELP UOI".

6. Because the QUEUE command that submits the job to the IBM 360/75 waits until the actual moment of transfer to the 360 to send over the file(s), users should be careful not to make editing changes until their file(s) have actually been transmitted to the 360. (Note: If a user is in the process of editing a file when it is transferred to the 360, the original version will be sent over. However, if a user finishes editing a file and saves that file with the same name as the file being transferred, the newly edited version will be sent over.) To find out if your files have been transferred to the 360, type:

.UOI

or, for a more concise, shorter version of the queue information, type:

.UOI/F

7. Temporarily, jobs cannot be run at UIC and filed back into DEC-10 files because of the way the link between the 360 and UIC handles ID cards. This problem should be fixed soon; check the RJE bulletin for the latest information.

#### CSO WILL NOT GRANT NEW PLORTS REQUESTS

In order to reduce the deleterious effects of PLORTS on batch processing on the IBM 360/75 and to hasten the day when a PLORTS disk pack can be converted to a user disk pack, CSO will no longer initiate PS numbers which allow access to PLORTS, or honor requests for increased PLORTS space. This applies to all users except those representing classes using PLORTS. CSO will honor requests to reduce PLORTS space allocations, and encourages users to do so.

#### LOCAL DEC-10 SYSTEM REFERENCE CARDS AVAILABLE

CSO has published a local version of the Operating System Commands Reference card. It is available free of charge at the Consulting Office, Room 166 DCL and Room 70a Commerce West, or in the Accounting Office, Room 134 DCL.

#### PSYCHOLOGY TERMINAL ROOM LOCATION CORRECTION

The Psychology Remote Job Entry Station is in Room 453 Psychology Building, not Room 435 Psychology Building as we reported earlier. Our apologies to Professor Birnbaum in Room 435 Psychology Building for all the trouble we've caused him.

## 360/75 AVAILABLE ON SUNDAY AFTERNOONS

Because the system programmers will be working on the DEC-10 and the 360/75, less standalone time will be needed on the 360/75. Therefore, users will be able to use the 360/75 between 1200 and 1600 on Sundays. The line to Chicago Circle will also be up during this time and an operator will be on duty there.

Sunday afternoons will still be used when free user time is required to test new versions of HASP and OS, and for "in-system" system programming. When emergencies dictate, Sunday afternoons may be taken for standalone time in preference to any other time. Users will be notified as soon as possible if the 360/75 will not be available on any given Sunday afternoon through RJE bulletins, posted at all Remote Job Entry stations and available through the PLORTS file "OPENMSG BULLETIN"

The routing rooms at DCL and Commerce West will be open on those Sunday afternoons when the system programmers will not be using the machine.

## HOW TO TRANSFER PLORTS FILES TO THE DEC-10

Individual PLORTS files can be transferred to the DEC-10 by using the link between the DEC-10 and the IBM 360/75. These are the steps that should be taken to transfer a PLORTS file to a DEC-10 file from PLORTS:

1. Create a PLORTS file containing:

```
/*ID SYSTEM=PRINT,PRINT=DEC10
```

```
/*ID NAME='filename.ext(proj#,prog#)'
```

where filename.ext specifies the name of the DEC-10 file that will contain the contents of the PLORTS file. Remember that the entire length of the NAME field, excluding the single quote marks, cannot exceed 20 characters.

2. RUNN the above file followed by the PLORTS file to be copied into the DEC-10 filename.ext. For example, if you name the file created in Step 1 'DEC' and want to move over a PLORTS file named 'DATA', you would run it this way:

```
RUNN DEC,DATA
```

Warning: Be sure that the file being copied does not contain ID card parameters which would override those in the file created by Step 1.

3. Remove extraneous matter (i.e., burst page printouts) from the DEC-10 filename.ext after the copy. If you do not specify an extension for the DEC-10 file, it will default, in this case, to .D78.

Individual PLORTS files can be transferred to the DECsystem-10 from DEC by submitting a TSBATCH job to the 360. The following JCL can be used to do this.



```
//<jobname> JOB
/*ID PS=<your PS#>
/*ID CODE=<your code>
/*ID NAME='filename.ext(proj#,prog#)'
// EXEC TSBATCH
<your PS#>
<your code>
LIST <filename to be transferred>
LOGOUT
/*
```

Submit this DEC-10 file to the IBM 360/75 by using the UOI monitor command. (For an explanation of the use of the link and the UOI monitor command, see the DEC-10 files 'HELP 360' and 'HELP UOI'.)

### EXPERIMENTAL BACKLOG REPORT

As an experiment, CSO is now publishing its "backlog". That is, an approximate list of all the jobs in the system at a given time, along with the job's status, the time it entered the system and other miscellaneous data. The list ends with a summary giving the number of jobs at each stage of processing along with the time the oldest job in the class entered the system. The backlog report will be initiated each time an RJE bulletin is published. However, since for various reasons the Backlog report is generated by an A job and the RJE bulletin is generated by an EXPRESS job, the appearance of the backlog report will lag the appearance of the RJE bulletin by the average A job turnaround time.

An explanation of the various columns (reading left to right) in the backlog report is as follows:

**JOB:**

The HASP job number

**JOB NAME:**

The job name from the green job card

**PS#:**

The problem specification number under which the job was submitted

**SUB ALL:**

If the above problem specification number is suballocated, then the sub-allocation number is printed, otherwise the entry in this column is blank

## PROGRAMMER NAME:

The programmer's name from the ID card

## DEPT:

The department (presented in a standard six character code) to which the problem specification number belongs

## C:

The class of the job when it was submitted. EXPRESS jobs are not shown.

## L:

The center where the job was sent to be executed

C indicates Circle (UIC)

M indicated Medical Center (UIM)

U indicated Urbana (UOI)

## H:

Indicates whether or not the job is in HOLD

U indicates that the job was put in hold by the user

O indicates that the job was put in hold by the operator

Jobs at UIC or UIM are shown to be in user hold. This is their status here, although they are usually not in HOLD at their execution site.

## E:

A 'W' in this column indicates that the job is awaiting execution

## S:

A 'W' in this column indicates that the job is awaiting setup

## P:

A 'W' indicates that the job is awaiting PLOT

An 'S' indicates a "special" plot

## P:

A 'W' indicates that the job is awaiting PUNCH

An 'S' indicates PUNCH FORMS. Jobs at UIC and UIM are always shown awaiting punch. This is a property of the line software.

## P:

A 'W' indicates that the job is awaiting PRINT

An 'S' indicates PRINT FORMS

## SEC:

The time estimate from the ID cards. If the job has executed or returned from UIM or UIC this column is blank.

## IORQ:

The I/O request from the ID cards. If the job has executed or returned from UIM or UIC, this column is blank.

## LINE:

If the job is awaiting execution, it is the line estimate from the ID cards, otherwise it is the number of lines produced by the job

**CARD:**

If the job is awaiting execution, it is the estimate of the cards to be punched (usually the default of 100), otherwise it is the number of cards produced by the job

**PLOT:**

Usually blank. Reserved to tell the number of estimated or actual plotter inches.

**CORE:**

The highspeed core estimate from the ID card, in kilobytes. After the job has executed this column is blank.

**LCS:**

The LCS core estimate from the ID card, in kilobytes. If no estimate was made or the job has executed this column is blank.

**TIME:**

The time of day at which the job was submitted (24 hour clock)

**DATE:**

The date on which the job was submitted

All entries have been sorted in ascending order of submitted time.

The concluding summary shows the number of jobs, the amount of execution time estimated for each class prior to execution, the number of plot, punch and print jobs after execution, and the time at which the oldest job (which is not in hold) in each class was submitted. This gives an estimate of turnaround time for each class.

The backlog report was originally developed to help the production staff schedule the machine and assure turnaround. As such, it may not be in the best form to provide general user information. Direct any comments about this report to Mike Randal, Room 181 DCL.

### AID CALCULATOR AVAILABLE ON DEC-10

Need a calculator on the DEC-10? Try the AID program. AID (Algebraic Interpretive Dialogue) is an interactive system designed to help users solve complex numerical problems. The language is direct and easy to learn. Results are accurate to nine significant digits.

To access AID, a user must be logged on to the DECsystem-10. The monitor level command

.R AID

loads the AID program into core. AID responds with

AID 20A(32) AT YOUR SERVICE. . .

\*

The asterisk (\*) is used to indicate that AID is ready to accept a command from the user.

AID is terminated and control is returned to the monitor by typing a CONTROL-C.

Each AID command occupies a single line and is terminated by a CARRIAGE RETURN. Commands can be entered as direct commands (to be executed immediately) or as indirect commands (to be stored for later execution). This article only explains the use of direct commands; see the DECsystem-10 AID manual for more details.

Variable in commands are represented by single alphabetic letters (A through Z). Values may be organized into arrays with up to ten dimensions. Each subscript may have an integer value in the range -250 to +250.

AID uses the standard operators and precedences of absolute value (!X! represents the absolute value of X), exponentiation, multiplication, division, addition and subtraction. Square brackets and parentheses can be used interchangeably to form complex expressions.

AID can handle Boolean expressions composed of arithmetic statements using the operators = (equal to), # (not equal to), <= (less than or equal to), >= (greater than or equal to), < (less than), and > (greater than) and the negation NOT and connected by the logical operators AND and OR (inclusive). TRUE and FALSE values can be entered.

AID contains many intrinsic functions. Users can also define functions for use in their own programs.

Three of the simple commands are:

DELETE	Deletes the variable and its associated value(s) from immediate storage.
LET	Defines arithmetic functions, Boolean expressions, and user functions. The formula, expression or function with which an identifier is associated is re-evaluated each time that identifier appears during execution.
TYPE	Types out the specified information at the user's teletype.

The following example shows some of the versatility of a relatively simple and direct AID program:

```
.R AID
AID 20A(32) AT YOUR SERVICE. . .
*LET A(B,C) = (B**2) + (2*B*C) + (C**2)
*TYPE A(4,10)
A(4,10)= 196
```

\*D=SQRT(81)\*5

\*TYPE A(5,D)

A(5,D)= 2500

\*TYPE SIN(10)

SIN(10)= -.544021111

\*TYPE ALL

A(B,C) = B(\*\*2)+(2\*B\*C)+(C\*\*2)

D= 45

\*G=4.5\*\*3+D/15

\*H=-1

\*SET H=1 IF G<100

\*A=G\*H

\*TYPE ALL

A= -94.125

D= 45

G= 94.125

H= -1

\*TYPE A(1,3)

EH?



For further information, see the DECsystem-10 AID manual, available for inspection at most Remote Job Entry sites and in the Consulting Office.

### NEW STATISTICAL PROGRAMS AVAILABLE

Writeups for six new statistical packages can be obtained from Statistical Services, Room 84 Commerce West. They are as follows:

The Jacobi (JAC) and Principal Axis (PRI) programs have comparable but faster and more accurate replacements:

EIGEN (EIG)

PRINCIPAL COMPONENTS ANALYSIS (PRC)

SIMPLE COMMON FACTOR ANALYSIS (SCF)

The Iterative Factor Analysis programs (ITE) all have faster and more accurate replacements:

ALPHA (ALP)  
 UFABY3 (UFA)  
 UNRESTRICTED MAXIMUM LIKELIHOOD (UNR)

The new programs should universally replace usage of the old ones which will be removed from service at a future date.

A better version of the Restricted Least Squares program (RES) is available.

A Generalized Inverse Instruction (GIN) has been added to the Matrix program (MAT).

There is now a program to do Post-Hoc Tests (POST). The tests are: SCHEFFE, TUKEY, NEWMAN-KEULS, and BONFERRONI tests.

The T-Test program (T-T) can optionally handle user supplied variable labels.

#### BLOCK USAGE ON THE DEC-10

Each DEC-10 disk file is comprised of blocks. A block contains 128 words. Each file has one or more blocks of data (that the user puts into the file) and two blocks called RIBs, which contain identifying information about the file. Files are allocated in clusters; the current cluster size is five blocks. Hence, the smallest number of blocks a disk file can occupy is five blocks.

Block usage reported at KJOB time and block usage reported by .R QUOLST is the total, true block usage (RIBs and all).

Block usage reported by .DIRECT is data block usage (RIBs and clustering omitted). To get the true, total usage from the DIRECT command, include the /AL switch. The difference between the data block usage and the total usage can be quite large. For example, a .DIR command may show that a user has only the following three files:

DATA	.DAT	2	<057>	31-JAN-75	DSKC: [7777,000]
RUN	.F40	3	<057>	4-FEB-75	
TEST	.F40	2	<057>	8-FEB-75	

TOTAL OF 7 BLOCKS IN 3 FILES ON DSKC: [7777,000]

However, when that command is issued with the /AL switch, a user can find that he is using more blocks than he thought. The above directory, when listed with the /AL switch, looks like this:

DATA	.DAT	5	<057>	31-JAN-75	DSKC: [777,000]
RUN	.F40	5	<057>	4-FEB-75	
TEST	.F40	5	<057>	8-FEB-75	

TOTAL OF 15 BLOCKS IN 3 FILES ON DSKC: [7777,000]



## FILE PROTECTION ON THE DEC-10

The DECsystem-10 has a relatively simple, yet effective method of protecting each user's files from other user's access. Each file has an access protection code indicated by three octal digits. The first digit represents the owner of the file, the second represents users with the same project number as the owner, and the third represents all of the other users on the system. Each number in the three digit code can be one of the following:

<u>NUMBER</u>	<u>ACCESS PROTECTION</u>
7	No access privileges
6	Execute the file
5	Read and execute the file
4	Append, read, and execute the file
3	Update, append, read and execute the file
2	Write, update, append, read and execute the file
1	Rename, write, update, append, read, and execute the file
0	Change protection, rename, write, update, append, read, and execute the file.

The default protection code for a file is 057. This code means that the owner has complete privileges (0), the project members have read and execute privileges (5), and all other users have no access privileges (7). It is therefore often desirable to change the protection code on a file so that certain other users can or cannot access that file.

The PROTECT monitor command can be used by the owner of the file to change a file's protection. The PROTECT command has the following format:

```
PROTECT filename.ext<nnn>,(filename.ext<nnn>. . .)
```

If the protection code <nnn> is omitted, the default protection code <057> is assumed for that file. For example, a user could change the protection on all of his FORTRAN-40 source files by issuing the following command:

```
PROTECT *.F4<055>
```

This would allow any user on the system access to all of the owner's files that have the extension of .F4. Or, a user could protect all of his (her) files from all other users by issuing the following command:

```
PROTECT *.*<077>
```

Later, the user could return one file to the default protection by issuing the following command:

```
PROTECT FORT.F4
```

## TURNAROUND TIME STATISTICS

OFF-LINE regularly publishes turnaround statistics for jobs run at the Urbana campus. Turnaround time is defined as the elapsed time between the first card of a job being read by a reader and the trailer page being printed or filed. For the vast number of jobs, this interval is an accurate assessment of the time it has taken CSO to process the job. However, some jobs have different histories that can significantly affect statistics such as "average turnaround" and "delivery rate". (A delivery rate of (m,n) is defined as being the percentage of jobs turned around within an hour and a day, respectively.)

Three major causes of turnaround time distortion are:

1. A user submits a job and puts it in HOLD. The time spent in the HOLD queue is, of course, included in the turnaround time.
2. A user submits a job from an RJE station just before it is closed down for the night or even the weekend. The turnaround time for the job will include the time spent waiting for the RJE to open again and other jobs preceding that job in the print queue to print at that RJE.
3. A user submits a batch job and tells the production staff that he is leaving town for a while and that the jobs can be run when time allows. The jobs are run after midnight each night so as not to interfere significantly with the turnaround of other jobs. Clearly, that user is not receiving less service, and in fact other users are benefiting because their jobs are being run with precedence over his, yet his turnaround may be nearly as long as his trip.

When all of the above options are exercised, the turnaround time of some jobs may stretch out into weeks, with a consequently devastating effect on turnaround statistics. This sort of thing is most noticeable in the higher classes of jobs (D through G) where there are relatively fewer but more complicated jobs, and the number of jobs in a given class is not enough to average out the effect of one or two long turnaround times. That is why the turnaround times of these jobs are often noted as being unreliable.

The reports showing turnaround time were originally developed so that the production staff (who knew the subtleties of interpreting them) could monitor daily performance. Since then, they have been reported in OFF-LINE and are being applied to more general use. We are working on ways of taking the above kinds of distortion into account so that a more valid measure of this aspect of service is available to all.

The following are statistics for late summer and fall for the last three years.

HASP TOTAL USAGE

<u>Month</u>	<u>FY'73</u>	<u>FY'74</u>	<u>FY'75</u>
July	26,547	28,636	28,356
August	32,405	29,645	30,006
September	14,656	26,192	30,012
October	29,297	33,593	35,437
November	36,177	39,060	44,987
December	48,260	46,204	46,149

EXPRESS TOTAL USAGE

<u>Month</u>	<u>FY'73</u>	<u>FY'74</u>	<u>FY'75</u>
July	9,135	6,668	13,460
August	6,875	7,040	8,438
September	1,334	23,354	33,687
October	38,783	36,108	51,343
November	37,780	42,352	42,295
December	40,247	27,660	27,094

STEPNAME STATISTICS

The following are the ten most used steps on CSO 360/75 system for January:

<u>STEPNAME</u>	<u>SYSTEM</u>	<u>USAGE</u>		<u>CPU</u>	
		<u>TOTAL</u>	<u>PERCENT</u>	<u>TOTAL</u>	<u>PERCENT</u>
GO	HASP	10943	20.91	33,369,136	52.88
FORT	HASP	8261	15.78	8,166,244	12.94
WATFIV	EXPR	4155	7.94	269,384	.42
LKED	HASP	3145	6.01	573,768	.90
PLC	EXPR	2090	3.99	251,076	.39
SOUP	HASP	1765	3.37	4,205,408	6.66
FORTGCLD	EXPR	1284	2.45	327,392	.51
WAT	HASP	1137	2.17	1,168,060	1.85
PLOT	HASP	1118	2.13	1,195,944	1.89
PL1	HASP	1095	2.09	1,268,012	2.00

## SITBOL SNOBOL4 COMPILER DEMO AVAILABLE

A demonstration version of the SITBOL SNOBOL4 compiler developed at the Stevens Institute of Technology has been added to the DEC-10 system library. The SITBOL demonstration version will self-destruct on March 1, 1975, but we hope to have the permanent version installed and manuals available at that time. See "HELP SNOBOL" for instructions on how to run the SITBOL compiler.

## INTRODUCING MERLIN

Over the past few years, the number of setups requested by users has steadily increased. During December, 1974, it was not uncommon to process nearly 300 setups a day, most of them in the prime shift. Many of these setups were requested by users with relatively large datasets of one or two hundred tracks, who find it uneconomical to use the user disk packs because, although they may access the dataset heavily for a week or so, they also have long periods while they analyze their results, when the dataset lies idle.

In order to avoid the shortcomings of slower turnaround time for setups and the difficulty in finding enough space on the permanently mounted user disks, CSO has introduced the MERLIN disk pack similar (but not identical) to its namesake at the Medical Center.

The rules of the MERLIN pack are as follows:

1. Every dataset on the pack will be scratched at 1200 hours each Sunday morning.
2. The pack will not be backed up. That is, it will not be copied to tape by CSO. If for any reason you lose your dataset during the week, it is irrevocably gone unless you restore it from your master files, or you re-create it.
3. Datasets on MERLIN need not be catalogued. (They should be if they are on the public packs.)
4. All datasets must adhere to the standard naming conventions for user or class datasets. These are:

User datasets: USER.Pnnnn.anything

where "nnnn" is your PS number, and "anything" is a name of your own choosing, complying with OS conventions. For example, a user might code

USER.P9999.STUFF

Class datasets: USER.course name.anything

where "course name" is the name of the course and "anything" is a name of the instructor's choosing. For example, an instructor might code

USER.MATH368.DATA

Datasets not adhering to either of these conventions will be scratched.

5. The name of the pack is MERLIN. It is a 3330 and may be accessed with a

VOL=SER=MERLIN

JCL statement

6. Disk space on the MERLIN pack will be charged at a rate of 20 cents a track month (compared with 30 cents for the user packs). Charges will be accumulated daily, so that if you scratch your own dataset before the Monday scratching you will be saving yourself money. The rate of 20 cents has been chosen to be attractive for users requiring 100 to 200 tracks of on-line space.
7. Datasets of more than 500 tracks may be scratched without prior notice if the pack becomes full during the week. If this happens, no refunds will be given.

See the consultants for more details.

### HOW TO GET THE NEWS ON THE DEC-10

CSO has developed a facility so that users can easily get the latest system developments on the DEC-10. To use the NEWS program, type:

.R NEWS

The NEWS program will prompt with an asterisk (\*). In response to the asterisk you can hit the CARRIAGE RETURN, in which case all the news will be printed in reverse chronological order, in the format:

DD-MMM-YY (topic)   Headline

Body of news item . . .

Or, you can give the NEWS program switches to control what news you get. The following switches are available:

- /FAST           (/F) Print out only the first line (the headline) of each item, in reverse chronological order.
- /HELP           (/H) Print the list of switches.
- /LIST           (/L) A file named NNNNEW.LPT is created containing the requested news. (NNN is the job number of the user's job.) Nothing is typed on the user's terminal.
- /SINCE:D       (/S:D) Print all the news since the date D. The date specified is of the form DD-MMM-YY. The year is optional; if omitted, the current year is assumed.
- /TOPIC:T       (/T:T) Print only the items pertaining to topic T. The topic specified may be up to six characters long, and may contain wild-card ?-marks. A wild-card lookup of topics is performed (using the topic from the first line of each news item) and



all those matching the topic specified are printed in reverse chronological order.

Users can combine the NEWS switches to get exactly what they want. For example, a user could type:

```
._R NEWS
```

```
*/F/S:14-FEB
```

and get the headlines of the news items introduced since February 14, 1975.

### DO NOT USE THE ZD SWITCH IN THE COPY COMMAND

The use of the ZD switch (shown in the CSO DECsystem-10 User's Guide) will attempt to zero the user's disk directory. This is a serious error (obviously) which will be corrected in the document next fall when we republish it, but which is uncorrectable once done in your own disk area.

### PURCHASING RULES FOR DEC MANUALS

Users cannot purchase individual copies of manuals from the Digital Equipment Corporation. Unfortunately, most manuals must be ordered in lots of ten and all reference cards must be ordered in lots of 25.

Most of the DEC manuals are available for inspection in the Consulting Offices, Room 166 DCL and 70a Commerce West, and at the Remote Entry Stations.

### TURNAROUND AT CHICAGO

Job turnaround for all classes of HASP jobs is almost always better at Circle and Medical Center than it is here. The following table of average turnaround times for the last three accounting periods shows this dramatically. All turnaround times are in hours and minutes, and are averaged for all jobs in a class over the whole accounting month.

<u>November, 1974:</u>	<u>UOI</u> <u>Class</u>	<u>UIC</u> <u>Turnaround</u>	<u>UIM</u> <u>Turnaround</u>	<u>UOI</u> <u>Turnaround</u>
	A	0:41	0:41	0:32
	B	1:31	0:30	1:07
	C	2:28	1:02	4:07
	D	3:00	1:02	8:42
	E	4:10	1:42	17:16
	F	6:50	0:50	24:57
	G	12:17	0:33	24:17



<u>December, 1974:</u>	<u>UOI</u> <u>Class</u>	<u>UIC</u> <u>Turnaround</u>	<u>UIM</u> <u>Turnaround</u>	<u>UOI</u> <u>Turnaround</u>
	A	0:40	0:33	1:01
	B	0:55	0:37	2:07
	C	1:01	1:02	7:25
	D	2:39	0:53	15:15
	E	2:48	0:46	20:25
	F	6:09	1:00	24:55
	G	10:15	6:56	47:33

<u>January, 1975:</u>	<u>UOI</u> <u>Class</u>	<u>UIC</u> <u>Turnaround</u>	<u>UIM</u> <u>Turnaround</u>	<u>UOI</u> <u>Turnaround</u>
	A	0:34	0:17	0:43
	B	0:31	0:26	1:14
	C	1:00	0:47	2:31
	D	1:27	0:52	4:31
	E	4:03	1:14	15:11
	F	2:33	0:29	12:37
	G	6:39	0:13	41:40

The tables speak for themselves. Also, bear in mind that you get charged only for the first 512K of core of a job run at Circle.

However, a word of caution: Beware of different PROC names for the same functions. See Reference Guide S01.N05 ("Catalogued Procedures") or check with the consultants before you run at Circle or Medical Center. All concerned are working towards minimizing these differences.



## OFF-LINE's MAILING LIST

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MARCH 7, 1975

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FINANCIAL AFFAIRS

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OFF-LINE is the newsletter of the Computing Services Office at the University of Illinois at Urbana-Champaign. CSO operates: An IBM 360 Model 75 with one million bytes of fast core and two million bytes of slow core, under HASP and OS; a DECsystem-10 with 256K words of core, under TOPS-10, serving up to 80 simultaneously active terminals. OFF-LINE is printed every two weeks except for interruptions due to holiday schedules. Articles may be reprinted provided that the source of the article is noted.

## CSO OFFERS FREE DATASET MOVES TO UIM AND UIC

To encourage use of UIM and UIC, CSO is offering free dataset moves to those computing centers until April 1, 1975. Users are urged to take advantage of this offer. See the consultants, Room 166 DCL and Room 70a Commerce West, for details.

## SETUP CARDS AT UIM HAVE SPECIAL FORMAT

Setup cards at UIM are more than a message to the operator. The SETUP card at UIM is a HASP control card with a specific syntax.

/\*SETUP keywords

Valid keywords are:

DISK=number	Requests the desired disk to be mounted.
TAPE=number	Requests the desired tape to be mounted. It is assumed that the tape has a standard label, is 9-track and is to have the write-ring in.
TAPE=(number,7TRK)	Requests the desired 7-track tape to be mounted. Standard label is assumed with ring.
TAPE=(name,7TRK,NL)	Requests a non-labelled, 7-track tape with ring.
TAPE=(name,NL)	Requests a non-labelled 9-track tape with ring.
TAPE=(number,NØRING)	Requests a standard label, 9-track tape to be mounted without its write-ring.
TAPE=(name,NL,NØRING)	Requests a non-labelled, 9-track tape to be mounted without a ring.
TAPE=(number,7TRK,NØRING)	Labelled, 7-track tape without ring.
TAPE=(name,7TRK,NL,NØRING)	Non-labelled, 7-track tape without a ring.

## DO YOU HAVE A COMPLAINT?

There are two ways of effectively filing a complaint with CSO. One way is to fill out a suggestion-complaint form, available in the Consulting Offices, Room 166 DCL and Room 70a Commerce West. Another way is to write a GRIPE on the DEC-10 (for details, type "HELP GRIPE"). All complaints with return addresses will be promptly answered in writing (within a week) by the person responsible for the thing being complained about. CSO will not put responses to GRIPE complaints in user's files because the file system protection does not allow anyone other than the system operator to do this, and we do not want to extend this privilege to the staff as a whole.



## A USEFUL DEC-10 FUNCTION -- CONTROL-T

CONTROL-T prints one line of information about the status of the job. It can be entered at any time and is particularly useful when entered while a program is running. The format of the information is as follows:

```
DAY:connect  RUN:cpu  RD:reads  WR:writes  name  size  state  PC:location
```

where connect is the amount of connect time used since the last use of the CONTROL-T character or the TIME command or LOGIN; cpu is the amount of CPU time used since the last use of the CONTROL-T character, the TIME command, or LOGIN; reads and writes are the number of disk reads and writes done since the last use of the CONTROL-T character or the DSK command or LOGIN; name is the name of the program being run; size is the amount of core (shown as "lowseg+highseg") being used by the program; state is a code defining the state of the job (these are defined on pages 8-4 and 8-5 of the Monitor Calls manual and are the same codes used in the SYSTAT output) and location is the octal address of the last instruction executed.

## GET AS MUCH AS YOU CAN

To try to insure their accounts against misuse, prime users of PS numbers often put a limit on how much money can be spent on a job. Users faced with this restriction should be careful to change their ID card parameter limits to insure that they can get the most out of each job.

For example, the default CARDS limit is 100 cards punched. When a user submits a job without a CARDS ID parameter, the accounting system assumes that the user will punch 100 cards. The cost of punching 100 cards is figured in with costs from other ID card parameters to see if the job can be run within the current PS number limitations. If a user who didn't want to punch cards used the CARDS=0 ID card parameter, he would have 50 cents more to spend on other computing requirements.

Other ID card parameters, such as LINES, IOREQ, REGION, and TIME, can also be modified to allow the user to get as much as possible out of a job.

## CSO ESTABLISHES DEC TAPE POLICY

CSO has established a policy for the use of DEC tapes. Users with DEC tapes should fill out the form available in the CSO North Consulting Office, Room 166 DCL, and turn in that form with the DEC tape to the CSO North Routing Room. The operators will run the job within a day. Note that with this procedure users cannot interactively use DEC tape.

## HELP!

We're planning to put out an April Fool's issue of OFF-LINE and we need your help. Please write or call Paula Jones, Room 120 DCL, Phone 333-6492, with your ideas. Please try to submit all ideas by March 14, 1975.

## NEW VERSION OF F40 INSTALLED

A new version of DEC-10 FORTRAN-40 has been installed. This new version is upward compatible from the old version, and contains many new features. With this new version, users can use the full FORTRAN language, as documented in the DECsystem-10 FORTRAN-10 manual with one exception: F40 does not allow the use of the ENTRY statement. This version is the version described by the new DECsystem-10 FORTRAN-40 manual.

## HOW TO USE THE PLC FLOW TRACE WITH RELEASE 7.0

With Release 7.0 of PLC, the default options have been changed. Users no longer get a FLOW trace by default; they have to explicitly ask for it. To enable the FLOW trace, users should put (FLOW): before the PROC OPTIONS (MAIN) statement.

## CSO BACKUPS DEC-10 FILES

CSO is taking FAILSAFE dumps of all users' DEC-10 files. Dumps are taken at the following times:

<u>Time Taken</u>	<u>Files Saved</u>	<u>Retention Period</u>
First Sat. of month	All	3 months
Other Saturdays	All	1 month
Sun., Mon.-Fri.	Files created or changed since previous FAILSAFE	1 week

Requests for files to be restored from FAILSAFE tapes should include a list of files (or a specification of all files), the PPN's for those files, and the names of the FAILSAFE tapes the files are on. Tape names will be written on all FAILSAFE dumps, which will be kept by the Consultants, Room 166 DCL, and 70a Commerce West.

Users should submit their requests to the Consultants. Restores will be done once a day. Users will be charged the operational expenses of restoring their files.

If users want a FAILSAFE of their files saved for more than three months, they should submit a request including a tape to be FAILSAFED by the CSO staff. See the Consultants for details.

## USING LOAD MODULES AT UIC

This article describes the use of load modules at the Chicago Circle Campus, and is valid for that system only. The text of this article is reproduced in Reference Guide S01.N11, "Load Modules/UIC".

The linkage editor combines and edits object code from compilers or assemblers into a load module, which is stored, by default, on a temporary dataset for use in the current job only. However, the user can easily create a permanent partitioned dataset in which the load module is stored for immediate use in the same job and for use in future jobs. This is done by inserting a LKED.SYSLMOD DD card immediately following the source deck. To create a permanent load module from a FORTRAN G1 program at UIC, and run the load module in the same job, use the following JCL:

```

/*ID <necessary ID card parameters>

/*ID SYSTEM=UIC

// EXEC FØRTGCEG

//FØRT.SYSIN DD *

<FORTRAN source deck>

//LKED.SYSLMOD DD DSN=MUC3041.Pps#.name(member),

// UNIT=TPUSER,DISP=(NEW,CATLG),SPACE=(TRK,(10,1,2))

//LKED.SYSIN DD *
} <code only if using object decks>
<object decks>

//GØ.SYSIN DD *

<data>

/*

```

ps# is the user's PS number; name and member must conform to the standard OS dataset naming conventions. This creates and catalogs a partitioned dataset named MUC3041.Pps#.name with a member named member. It will be put on one of the four UIC 3330 user disks, TSØ1, TSØ2, TSØ3, or TSØ4, depending on which disk currently has the appropriate space available. The SPACE allocation shown above is sufficient for small datasets and adequate for some larger ones.

The load module created above can be used in subsequent jobs as follows:

```

/*ID <necessary ID card parameters>

/*ID SYSTEM=UIC

// EXEC PGM=member

//STEPLIB DD DSN=MUC3041.Pps#.name,DISP=SHR

//FT06F001 DD SYSØUT=A

//FT05F001 DD *

<data>

/*

```

Now suppose that one of the subroutines included in the load module contains an error. It can be replaced as follows:

```
/*ID <necessary ID card parameters>

/*ID SYSTEM=UIC

// EXEC FØRTGCEG

//FØRT.SYSIN DD *

<subroutine to be recompiled>

//LKED.SYSLMØD DD DSN=MUC3041.Pps#.name(member),

// DISP=ØLD,SPACE=

//LKED.SYSIN DD *

┘ ENTRY MAIN

┘ INCLUDE SYSLMØD

//GØ.SYSIN DD *

<data>

/*
```

The SPACE parameter must be coded as shown to override the default SPACE parameter on the LKED.SYSLMOD DD card in the cataloged procedure. The new load module, created by this alteration, can be used in the same manner as the original module.

Additional members can be added to the partitioned dataset that contains the load module created in the first example as long as the original SPACE allocation is large enough to hold them. If you want to scratch this dataset or one of its members, increase your SPACE allocation, or add a new member to the partitioned dataset, SEE A CONSULTANT!

#### USING LOAD MODULES AT UIM AND UOI

For information on how to use load modules at UIM and UOI, see Reference Guide S01.N12 and S01.N13, respectively.

## WHAT TO DO WITH A DETACHED JOB

Many DEC-10 users have found that, for any of several reasons, there is a detached job with their project, programmer number. A detached job is quite literally a job without a terminal. Detached jobs can be the result of a connection line going down, a broken terminal, or anything that interrupts the natural flow of a job from LOGIN to KJOB. The fact that a user has a detached job under his ppn is announced during a later LOGIN by the message

[LGNJSP OTHER JOBS SAME PPN]

The detached job can be rejoined by using the ATTACH monitor command, which has the format:

.ATTACH job# [proj#,prog#]

where job# is the number of the detached job to which the terminal is to be attached. The project, programmer number may be omitted if it is the same as the job to which the terminal is currently attached.

The following example, with comments in lower case, explains how one user got rid of his detached job.

U. OF I. 507A DAS78/L 13:08:21 TTY13 SYSTEM 691

PLEASE LOGIN OR ATTACH

.LOG 7777,000

JOB 14 U. OF I. 507A DAS78/L TTY13

PASSWORD:

[LGNJSP OTHER JOBS SAME PPN]

1308 7-MAR-75 FRI

Unless someone else is using this user's ppn, there's a detached job. To find the job number of that detached job, the user types:

.SYSTAT [7777,000]

6	[SELF]	114	DET	5+8	SL	11
13	[SELF]	5	SYSTAT	12+SPY	RN	1 \$

The user finds that he has a detached job, and that the detached job's number is 6.

.ATTACH 6

FROM JOB 14

The user attaches to the detached job.

.K/F

OTHER JOBS SAME PPN

JOB 6, USER [7777,000] LOGGED OFF TTY13 1310 7-MAR-75

ANOTHER JOB STILL LOGGED IN UNDER [7777,000]

RUNTIME 0,74 SEC

The user logs off from the previously detached job.

.DIR

?LOGIN PLEASE

The user finds he is no longer logged on to job 14, his original job. He attaches to it this way:

.ATTACH 14[7777,000]

PASSWORD:

and now he is logged in only at one place and has destroyed the detached job.

#### PLEASE SCRATCH OLD DATASETS

CSO's new user disks, UIPUB1, UIPUB2, and UIPUB3, are rapidly filling up. Please scratch any datasets that you do not need. Remember, you are being charged 30 cents per track per month to store your datasets on these disks.

#### WATFIV AVAILABLE AT UIC

An EXPRESS version of WATFIV is available at UIC. Because UIC's EXPRESS is quite different from CSO's EXPRESS, users can use up to 655K and 10 seconds of cpu time on the UIC version. To use WATFIV on EXPRESS at UIC, use the following JCL:

```
/*ID PS=ps#,NAME='your name'  
/*ID CØDE=code,SYSTEM=UICWATFIV  
    <WATFIV program>  
$ENTRY  
    <data>  
$STOP  
/*
```



Do NOT code a \$JOB card or any other JCL than that listed above. EXPRESS WATFIV users cannot change the default processor limits. Users cannot punch cards and are limited to 20 pages of output.

### SIMPAK PACKAGE SIMULATES DECISION PROBLEMS

The SIMPAK package of computer programs and subroutines is designed to facilitate the Monte Carlo simulation of business decision problems, especially those of a "planning" nature, i.e., problems having consequences which range for a number of years into the future. It is now available on the DEC-10.

In order to run the simulation, certain "housekeeping" chores must be performed. These include reading in the data, drawing random numbers, relating these to probability distributions so that appropriate random values are selected, computing the net present value of cash flows, keeping track of results that are to be reported, computing summary measures of resultant probability distributions, and printing out:

- . Details of the probability distributions of a few output variables of great interest, including a complete description of the distribution of the net present value of the project, the so-called "risk profile".
- . Summary measures of a number of variables on a year-by-year basis. These summaries provide additional insight to the decision maker, as well as providing for the analyst a convenient way of checking out the reasonableness of his model.

SIMPAK contains subroutines that perform the simulation and housekeeping chores described above. Its availability allows the user to concentrate his attention on the heart of his problem - the specification of the model and the inputs it requires. Use of SIMPAK reduces the time needed to get a simulation model running, frequently to just a few hours. The package is written in BASIC.

The user must specify his problem in the form of a BASIC computer program, following a few simple conventions in the naming of his variables. The program which the user writes can be made to accomplish the various housekeeping tasks discussed above by having it call appropriate subroutines in the SIMPAK package.

To use this package, type:

.R BASIC

READY

OLD BAS: name of SIMPAK routine

Documentation for SIMPAK can be obtained from the Statistical Services Office, Room 84 Commerce West or by writing to Case Clearing House, Bokeo Library, Harvard Business School, Cambridge, Massachusetts.

A reminder:

- .R CLP - will access the Conversational Linear Programming package. Documentation available from the same sources as for SIMPAK.
- .R AQD - will access the interactive statistical package, AQD, from the Harvard Business School. Documentation available in the Illini Union Bookstore (under CS courses) or from Statistical Services, Room 84 Commerce West.

### CSO ESTABLISHES TERMINAL POLICIES

CSO, in supporting its timesharing services, has two classes of terminals: those which are directly connected to the systems (hard-wired), and those which are connected by the dial-up telephone network. Direct connections are provided only to sites that are open to the public and are available a large number of hours. In each of these sites, as well as others with direct connections, a relatively large number of terminals are clustered and there is usually a Remote Job Entry station associated with it.

Because of the costs of connections and efficiency of utilization, all other terminals are connected by a dial-up network. We expect to continue operating in this manner for the near-term future. It is possible that we may eventually modify this policy to take into account users who make extensive use of this system, where the utilization of a single line approaches the utilization possible on a dedicated hard-wired service.

### NEW RULES FOR CATALOGING DATASETS ON PRIVATE DISK PACKS

If a user wishes to catalog datasets on a privately owned disk, he is no longer free to choose arbitrary names, but must follow one or two dataset naming conventions:

1. USER.Pps#.name            or        USER.class name.name

This is the same naming convention required for datasets on the user disk packs, UIPUB1, UIPUB2, UIPUB3.

2. disk name.anything

where disk name is the name of the private disk. In this case, there should be a catalog on the private disk, connected to the system catalog, so that the actual catalog entries are made on the pack. To set up the catalog on the private disk pack, follow these steps:

- A. Allocate a dataset named SYSCTLG on the private pack with the following JCL:

```

/*ID <necessary ID card parameters>

/*SETUP DISK=disk name

// EXEC DUMMY

//DD1 DD UNIT=SETUP,DSN=SYSCTLG,VOL=SER=disk name,

// DISP=(NEW,KEEP),SPACE=(TRK,(2,1))

/*

```

- B. Connect this catalog to the system catalog using the following JCL:

```

/*ID <necessary ID card information>

/*ID SYSTEM=EXPRESS

// EXEC IEHPRØGM

┌ CØNNECT ┌ INDEX=disk name,VOL=2314=disk name,           X
              CVØL=2301=UIDRM1

┌ CØNNECT ┌ INDEX=disk name,VOL=2314=disk name,           X
              CVØL=3330=UISYSX

/*

```

Note that the continuation character on the control cards (X) must be in column 72 and the continued information must begin in column 16.

### WHERE'S THE DEC-10 OPERATOR?

When the DEC-10 goes down, users get a message from the operator. But if a user tries to communicate with the operator, he does not get a reply. Why? Because there is no DEC-10 operator. Occasionally a systems programmer will have to bring down the DEC-10 to fix a problem, and that programmer will issue a message to the users. However, that programmer usually will not sit at the console teletype for long; he will try to fix the problem. Therefore, no one will be at the console teletype to respond to users' messages.

We do not have an operator for the DEC-10 and we do not anticipate hiring anyone for this position. One of the rewarding features of the DEC-10 is that it can stand alone and needs minimal operator intervention.

## HELP FILES AVAILABLE ON THE DEC-10

CSO has created many HELP files for users on the DEC-10. There are also some HELP files supplied by the Digital Equipment Corporation. To access a HELP file, type

.HELP name

where name is the name of the HELP file. "HELP \*" gives the names of all the HELP files on the system.

"HELP PLORTS" gives a summary of the HELP files that deal with the problems of converting PLORTS files to the DEC-10. These files include: "HELP PLCOPY", for users who obtained a project, programmer number before February 1, 1975; "HELP PLFILE", which describes the format of the PLORTS files that were transferred to the DEC-10; "HELP STRIP", which describes a utility that strips off the PLORTS line numbers from the DEC-10 files; "HELP FORTCV", which describes a program that converts CALL-OS FORTRAN programs to DEC FORTRAN-40 programs; "HELP RE4MAT", which describes a program that convertst DEC FORTRAN-40 continuation lines to a style appropriate for the IBM 360/75; and "HELP RENUM", which converts CALL-OS BASIC files to DEC BASIC files.

"HELP 1FILE" gives a recommended method for transferring individual PLORTS files to the DEC-10.

"HELP AID" gives a rather complete description of how to use the AID program.

"HELP UOI" and "HELP 360" describe the use of the link between the DEC-10 and the IBM 360/75.

We are in the process of adding new HELP files and evaluating the ones that DEC supplied. Whenever we create a new HELP file, we will put the announcement in "NEWS" (Type "HELP NEWS" for a description of the NEWS program.).

To print a copy of a HELP file, type:

.PRINT SYS:name.HLP

The output will be placed in the bins in the CSO North Routing Room.

## OFF-LINE's MAILING LIST

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APRIL 1, 1975

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OFF-LINE is the newsletter of the Computing Services Office at the University of Illinois at Urbana-Champaign. CSO operates: 2 pay toilets, 4 coke machines, 20 preschoolers with abacuses, and an ancient, but revered, card sorter. OFF-LINE is printed whenever we get in the mood to make ourselves look good. Articles may be thrown away without permission.

ADDITIONS TO PROGRAM LIBRARY

The following programs have been added to the libraries on both the IBM 360 and the DECsystem-10. See the Consultants for details on their use:

## ALPHA

A starter program designed to facilitate the structured programming (iterative design) development of other programs which are intended to perform specific tasks. ALPHA is a pre-written outer module which performs the following task-independent functions:

- .Beginning.
- .Ending.
- .Requiring a command to invoke.
- .Using core, cpu and I/O.

Using ALPHA as a string, so to speak, for his pearls, the programmer may proceed to develop task-dependent facilities at once, avoiding the usual startup (inertial) problems. A more sophisticated version of ALPHA, named ALHPA, is also available; ALHPA performs the above functions, and in addition contains one or more task-independent bugs.

## OMEGA

This program is for users at the other end of the spectrum from ALPHA users; those who require a finished program which is certified to possess the following properties:

- .The program has a formal proof of termination and correctness.
- .The program is modular, easy to understand and simple to modify.
- .The program is robust; input errors do not affect the program adversely.

The effect of running OMEGA may be rigorously stated as follows (using Hoare's convention with the exception that assertions, which are by their nature parenthetical, are enclosed in brackets):

$$\left\{ \underline{a} \right\} \text{ OMEGA } \left\{ \underline{a} \right\}$$

where  $\underline{a}$  is any assertion.

The procedure for running OMEGA is exceedingly simple, as it requires no action whatever, but for complete details, see the Consultants.

## EPSILON

Designed for users somewhat midway between ALPHA and OMEGA, EPSILON is a universal optimization program. Acting at either the machine code or source language level (a matter of taste), EPSILON applies language-independent optimization techniques to existing programs so that the execution time or program size (or both) is made smaller than a given value. To overcome the logical difficulties introduced by this approach, the value must be expressed as a percentage of the existing time or size, whereupon EPSILON acts upon the well-established Computer Science principle that all programs may be improved by at least a constant multiplier. As a test of its capabilities, EPSILON was applied to itself iteratively

twelve times, at the end of which it occupied only 3 words of DECSYSTEM-10 storage (approximately 13 bytes of IBM 360 storage) and executed in the microsecond range for the last iteration. At this time, it was felt to be acceptably small and fast, and further optimization was not undertaken.

#### GET GRANTS WHILE COMPUTER IS UP

CSO has acquired PROPOS, a special-purpose text editing system which automates the production of grant proposals. Version 3.5 of PROPOS implements the Advanced Circumlocution facility, so that the author of a tentative proposal need only specify a topic sentence and the amount of output desired, in pounds, to obtain a completely prepared proposal acceptable (in format) to the National Science Foundation or the Advanced Research Projects Agency.

Some examples of successful proposals generated by the system during its initial acceptance test are:

- .Sewage Electrification in Rural Communities
- .Establishing an Independent American Supply of Kinetic Energy
- .SPATULA - A Computer Language for Interactive Recipe Design

A version of PROPOS has been successfully used in-house by PLATO staffers for several years.

#### SOCRATES NEXT?

The other shoe fell Wednesday as the Board of Trustees approved a proposal to admit PLATO to the Faculty Senate for a two-year trial period. Opponents of the plan had argued for further study.

#### PHYSICAL PLANT TAKES OVER COMPUTER MAINTENANCE

Because of union disputes, the U of I Physical Plant has taken over maintenance on the IBM 360/75 and the DECSYSTEM-10. Those system programmers with tenured civil service status have been transferred to Springfield to work on the State of Illinois' new Computerized Crime Incentive Program (CCIP). All other system programmers have been upgraded to Apprentice Hot Roofer positions.

Because of this switch, the two computers will be following a new schedule of operations. Both will be accessible from 8 A.M. to 12 noon and from 1 P.M. to 5 P.M., Monday through Friday, except for holidays. In addition, the machines may or may not be available for 20 minutes at 10 A.M. and at 3 P.M. (the coffee break periods).

CSO expects this change to result in vastly improved reliability. Departments that need new programs installed on the computer, or who have found bugs in existing programs, should submit a standard requisition for those services. Most maintenance will be done within 30 days, unless an advance estimate of the cost is requested. (Departments requesting estimates are reminded to budget for the cost of the estimate.)

CSO PUTS MEAT ON TABLE

Through a clerical mixup, CSO was able to assist the Animal Science department in its experimentation with the Beefalo, a much-discussed new breed of livestock. It seems that instead of a self-service paper output separator an automatic livestock feeder was delivered and installed on the Express printer in Room 127, DCL. This was shortly followed by a herd of 12 Beefalo, routed to DCL by Central Receiving to follow the feeder, which had been ordered for their care.

The Beefalo are large, shaggy creatures with unusually wide hindquarter (for higher meat yield). Opinion is divided on how the animals managed to share the Express facility with hundreds of Computer Science students for seven weeks. The janitors apparently noticed nothing unusual in the quantity or kind of debris left in the room overnight. Persons interviewed after the fact appeared to be about evenly divided in their perceptions, either having noticed the beasts' shaggy heads and large size and believing them to be students, or veiwing their broad posteriors and taking them for CSO staff. Apparently, no one noticed that the two attributes were possessed by a single animal, due to the crowded conditions in the room.

The mixup has led to significant new results relative to the noise tolerance of the Beefalo, and to the olfactory tolerance of the Undergraduate. Tentative plans are being drawn up between CSO, Animal Science, and Psychology for further cooperative experiments.

CSO OFFERS SOLACE TO USERS

The new regulations permitting the sale of alcoholic beverages on University property remain to be spelled out in detail by the Legal Department, but the way appears clear now for the sale of at least beer and wine at all CSO RJE output windows.

There appear to be a few implementation details to be ironed out before the service can be inaugurated, but tentative plans are to permit the ID card option, SYSTEM=SOLACE, by May 23, so as to coincide with the withdrawal of PLORTS. Routing of output to remote sites will be handled by a slight redefinition of the PUNCH= ID card option.

Some of the difficulties with the new service pinpointed during a trial run conducted by staffers last weekend were:

- .After only a few hours, refunds had to be discontinued because of the difficulty of establishing the merit of a claimed lost output. Delivery of an empty glass to the consulting office, it was decided, did not constitute sufficient evidence.
- .Queueing behavior at the Self-Service Tapper was unpredictable, and was the source of many complaints from less assertive users. In six hours, fourteen hundred and twelve requests were made that CSO post a sign roughly stating: "Do not leave books or other personal property at the Tapper; under no circumstances does this reserve the Spigot."



On the other hand, the DCL output pigeonholes were found to be ideal for storage of bottled wine output. An order has been placed with the Physical Plant to incline the wall containing the pigeonholes by 10 degrees, for more ideal cork wetting.

COMPUTER ART PRIZEWINNER

This year's winner in the OFF-LINE Computer Art Contest is Dr. Takashimo Shibata, a visiting lecturer in the Astronomy department. The winning eight-color three feet by three feet Calcomp plot depicts the internal state of a star in the microsecond before entering a so-called nova condition. Thirteen and one-half days of computer time were required, both to simulate the star in four dimensions and to build up the graphic representation.

By the clever use of color, Dr. Shibata has managed to depict the interesting local temporal activity not previously known to be a byproduct of a star's explosion. The plot represents the completion of Dr. Shibata's two-year lectureship here, and in fact his output was delivered to him only minutes before his flight to Japan was scheduled to depart. Dr. Shibata's output is reproduced in full color below:

\$ D9901238	<u>REFUND</u>	April 1	1975
Received from: Shibata			
Fourteen Thousand Twenty and 35/100			Dollars
OPER - LOST PLOT OUTPUT			
No. 2382	Greenberg		

"I REMEMBER PLORTS CLUB" MEETS

The first annual meeting of the "I Remember PLORTS Club" will meet tonight at the second table closest to the door at Murphy's. Guest speaker Susie Sunshine will tell tall tales of speed and quickness on PLORTS. Highlights of her speech include:

- .It takes four more keystrokes to add a line to a DEC-10 file, using SOS, than to add a line to a PLORTS file.
- .EXIT is spelled with three t's.
- .3-4000 is like music to my ears.

New members are cordially invited, and must be prepared to recite, from memory, the first paragraph of the introduction from the PLORTS User's Guide.

THE INSIDE STORY

(An Off-Handed OFF-LINE Exclusive)

CSO is considering installing the latest DEC-supported monitor which includes a virtual memory of paging capability. Recently George Badger went over to see Tom Burtnett of CSL, where the paging monitor has been in use for several months. Unbeknownst to them, your Off-Line reporter was listening just outside the door. The following description of the new monitor was gleaned from their conversation:

1. Each player gets several hundred things. (512)
2. Things are stored either in the workshop or a warehouse. The workshop is almost always too small to hold all the things.
3. There is only one workshop but there may be several warehouses. Everybody shares them.
4. Each thing has its own thing number.
5. What you do with a thing is to zark it. Everybody takes turns zarking.
6. You can only zark your things, not anybody else's.
7. Things can only be zarked when they are in the workshop.
8. Only the Thing King knows whether a thing is in the workshop or in the warehouse.
9. The longer a thing goes without being zarked, the grubbier it is said to become.
10. The way you get things is to ask the Thing King.
11. The way you zark a thing is to give its thing number. If you give the number of a thing that happens to be in the workshop it gets zarked right away. If it is in a warehouse, the Thing King moves it back into the workshop. If there is no room in the workshop, he first finds the grubbiest thing in the workshop, and packs it off to a warehouse. In its place he puts your thing. Your thing then gets zarked and you never knew that it wasn't in the workshop all along.



12. Each player's stock of things has the same numbers as everybody else's. The Thing King always knows who owns what thing and whose turn it is, so you can't ever accidentally zark somebody else's thing even if it has the same thing number as one of yours.
13. Traditionally, the Thing King sits at a large table and is attended to by pages (the so-called "table pages") whose job it is to help the king remember where all the things are and who they belong to.
14. With the given set of rules, oft-zarked things tend to get kept mostly in the workshop while little-zarked things stay mostly in a warehouse. This is efficient stock control.
15. Sometimes even the warehouses get full. The Thing King then has to start piling things on the dump out back. This makes the game slower because it takes a long time to get things off the dump when they are needed in the workshop.
16. With some non-DEC versions of the game, when the Thing King looks for a grubby thing, he will choose it whether it be yours or someone else's. DEC's Thing King chooses only from your grubby things, in order to keep the Royal Responses acceptable to the rest of the kingdom.
17. Of course the Thing King has a few things of his own, but they are all too heavy to move out to the warehouse so they always stay in the workshop. Some other kingdoms have hired stronger table pages to move heavy things, but DEC's Thing King relies on his daemons.

OFF-LINE'S MAILING LIST

If you wish to be placed on our mailing list for future issues of OFF-LINE, or if you wish to enter an address correction, please complete and return this page. (You asked for it!)

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# Off-Line

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THE LIBRARY OF THE  
APRIL 18, 1975

AUG 11 1977

UNIVERSITY OF ILLINOIS  
AT URBANA-CHAMPAIGN

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OFF-LINE is the newsletter of the Computing Services Office at the University of Illinois at Urbana-Champaign. CSO operates: An IBM 360 Model 75 with one million bytes of fast core and two million bytes of slow core, under HASP and OS; a DECsystem-10 with 256K words of core, under TOPS-10, serving up to 80 simultaneously active terminals. OFF-LINE is printed every two weeks except for interruptions due to holiday schedules. Articles may be reprinted provided that the source of the article is noted.

## PLORTS TAKES A DINNER BREAK

We are now approaching the worst part of the semester crunch and the turnaround for Class C and Class D jobs often exceed six and twelve hours, respectively. Since the afternoons are usually devoted to processing Class A and Class B jobs in an effort to keep the job queue short so that the readers can be kept open, some way of getting CPU time for the Class C and Class D jobs near the day shift must be found if Class C and Class D turnaround times are to be kept at reasonable levels.

For this reason, beginning April 14, PLORTS will be unavailable between 5:00 PM and 9:00 PM each weekday. The operators will then run Class C and Class D jobs when or if the Class A and Class B job queues contain less than 60 jobs each.

It should be noted that, during March, CSO logged a total of over 937 CPU hours, about 27% of which were executed at UIM and 37% at UIC. In the face of this demand, strong measures must be taken to ensure reasonable service to all segments of the user community.

Although the optimal time for removing PLORTS would be during our peak job submittal period (from 12:00 Noon to 5:00 PM), it is being used for classes during that time, and the 5:00 PM to 9:00 PM period is the closest outage period that will have any significant effect on turnaround.

Users are also reminded that PLORTS will be discontinued as advertised on May 23, 1975.

## CSO CHANGES REFUND POLICY

Beginning April 28, 1975 CSO will no longer give refunds for timesharing jobs or for batch jobs which cost less than two service units. The actual cost of a portion of a timesharing session is too difficult to calculate and too open to dispute to allow the adoption of a uniform and fair policy, except that of not giving refunds at all.

In the case of batch jobs, three factors have contributed to the two service units limit decision. The first is that it costs more to refund the job than the job itself cost. Thus, it is of greater advantage to the user community to spend CSO's resources on more productive work. Secondly, with the advent of self-service readers, the growing practice of submitting more than one job with the same job card makes the problem of refunding a specific job extremely difficult. Lastly, since the vast majority of small refunds are for class users, and since class allocations are very seldom completely used, it benefits everyone if each class user is allocated a "refund" before he or she has actual need for it. Refunds for amounts exceeding two service units will be made in the usual way, through the consultants.

## NO MORE RELOADS

Beginning April 28, 1975 CSO will no longer offer its "reload" service. One of the main reasons for offering it in the past was the long turnaround times encountered by all job classes. Nowadays, 99% of all jobs are turned around within a day, and 85% within an hour. On the other hand, the difficulties involved in hand scheduling reload jobs defeat efforts to further improve overall turnaround, and is logistically impossible to implement at the Chicago centers.

## NEW VERSION OF DEBBY INSTALLED

A new version of DEBBY, the tape and disk utility, has been installed. The new version has all the documented properties of the old version, and is equipped to handle tape records of up to 32767 bytes (previously it had truncated large records at 10000 bytes) and disk records of up to 13030 bytes (for 3330 disk packs). See the consultants if you have any questions about the DEBBY utility.

## USE MERLIN FOR SHORT-TERM DATASETS

CSO has established MERLIN, a 3330 on-line disk pack, for short-term use. Among the advantages of using MERLIN are that there are no SETUP charges and that disk space is charged at a rate of 20 cents per track per month (compared with 30 cents for the standard user packs).

The following restrictions apply to the use of the MERLIN disk pack:

1. Every dataset on the pack will be scratched at noon each Sunday.
2. The pack will not be backed up. If, for any reason, you lose your dataset during the week, it is irrevocably gone unless you restore it yourself.
3. Datasets on MERLIN need not be cataloged. (They should be if they are on the user packs.)
4. All datasets must adhere to the standard naming conventions for user or class datasets. The naming convention for user datasets is:

USER.Pnnnn.anything

where nnnn is the user's PS number, and anything is a name of your own choosing, complying with OS dataset naming conventions. The naming convention for class datasets is:

USER.course.anything

where course is the name of the course and anything is a name of the instructor's choosing, conforming to OS dataset naming conventions.

Following are examples of proper dataset names:

USER.P9999.JUNK

USER.MATH368.DATA

5. Datasets of more than 500 tracks may be scratched without prior notice if the pack becomes full during the week. If this happens, no refunds will be given.

MERLIN may be accessed with VOL=SER=MERLIN and UNIT=3330 JCL parameters. See the consultants for more details.

### JOBNAME FORMAT ESTABLISHED

Users must follow this convention when making up their own IBM JOB cards:

//axxxxxdd JOB

where a is an alphabetic character, corresponding to the month when the job is submitted (A for January, B for February, C for March, etc.); xxxxx are any letters or digits of the user's choosing; and dd are two digits, used for output filing. These are examples of acceptable JOB cards for April:

//DBOB20 JOB

//D1234567 JOB

//D32 JOB

This convention is similar to the format being used in PLORTS jobname assignments and in the ready-to-use JOB cards available at all CSO input stations.

IBM 360 and 370 output is filed at Remote Job Entry stations operated by CSO according to the following scheme:

1. All output is filed by the last two digits of the jobname.
2. Printed output is kept in bins for two weeks, in backup for two weeks, then thrown away.
3. Punch output is kept for one month, then thrown away. At CSO North the date on the punched output is used to determine when it should be thrown away; at CSO South, the first letter of the jobname is used for this purpose.
4. Plot output is kept for one month, based on the first letter of the jobname.

DECsystem-10 print output is filed by the last two digits of the programmer number, and is kept in the bin for two weeks, in backup for two weeks, then thrown away.

No refunds will be given for lost output with non-standard job names.



## USE EXPRESS TO SCRATCH YOUR DATASETS

The following JCL will scratch any dataset on the user packs (UIPUB1, UIPUB2, and UIPUB3):

```
/*ID PS=pppp,NAME=nnnnnnn
/*ID CODE=cccc,SYSTEM=EXPRESS
// EXEC IEHPRØGM
┌ SCRATCH DSNAME=dddd,VOL=3330=vvvv
/*
```

where pppp is the user's PS number, nnnnnnn is the user's name, cccc is the user's code word, dddd is the name of the dataset the user wants to scratch, and vvvv is the name of the user pack that the dataset is on.

IEHPRØGM can also be used, on EXPRESS, to rename, catalog, and uncatalog datasets that reside on the user disk packs. See the consultants for details.

## OVFL ID CARD PARAMETER INTRODUCED

The OVFL (overflow) ID card parameter allows users to suppress the page-ejects in printed output. This is especially useful for IBM users who want to file output on the DEC-10 and do not want form feeds in their DEC-10 files. OVFL=YES, which allows form feeds, is the default; OVFL=NO suppresses form feeds. LINECT parameters are disregarded when OVFL=NO is coded.

To file output from the IBM 360 to the DEC-10, use these ID card parameters: PRINT=DEC10, OVFL=NO, and NAME='filename.ext(proj#,prog#)'

## DECTAPE SETUPS

In response to a moderate demand from users wishing to transfer files to CSO's DEC-10 from other DEC-10 installations, CSO is now allowing DECTAPE setups.

DECTAPE's destined for setup should be identified and given to the Routing Room operators, Room 129 DCL, in a manner analagous to 360/75 magnetic tapes.

When you want the tape setup, type:

.RESOURCE

If there are free DECTAPE drives they will be indicated by DTA0 or DT11, or DTA0,1 (for both) in the reply. If both DECTAPE drives are in use you should try again later.

If a DECTAPE drive is free, type:

\_MOUNT dev: logical-dev/switches (drives)

command, where the arguments are described in the CSO DECsystem-10 Guide. After a short delay the operator will mount your DECTAPE.

When you have finished with the tape, type:

DISMOUNT dev: switches

command, where the arguments are described in the CSO DECsystem-10 Guide. Please use the DECTAPE drives for as short a time as possible, so that other users can, in their turn, mount DECTAPE's.

A setup charge of one service unit will be charged for each mount.

Each time a drive becomes available, the operators will do setups on a first come, first served basis. After both drives have been allocated further MOUNT commands will be cancelled until a drive becomes available again.

Please remember that DECTAPE setups are different from setups on the 360/75. The latter are used only by batch programs. Each setup is for a relatively short time, and there are relatively more setup devices on the 360/75 than there are on the DEC-10 where the mount period will probably be relatively long, and only two drives are available.

### SERVICE PROFILE FOR MARCH, 1975

The following statistics represent all usage of the IBM 360/75 during March:

<u>JOB CLASS</u>	<u>TOTAL JOBS</u>		<u>TOTAL CPU TIME</u>		<u>AVERAGE TURNAROUND</u>
	<u>#</u>	<u>%</u>	<u>MINUTES</u>	<u>%</u>	<u>(minutes)</u>
EXPRESS	36919	44.8	926	4.1	5
A	26862	32.6	2698	11.8	31
B	10908	13.2	2989	13.1	66
C	4833	5.8	3252	14.3	184
D	1508	1.8	2522	11.1	346
E	301	0.3	1215	5.3	776
F	97	0.1	718	3.1	840
G	109	0.1	843	3.7	732
O	<u>947</u>	1.1	<u>7574</u>	33.3	1025
<u>TOTALS:</u>	82484		22740		

## STEPNAME STATISTICS

The following are the ten most used steps on CSO 360/75 system for March:

<u>STEPNAME</u>	<u>SYSTEM</u>	<u>USAGE</u>		<u>CPU</u>	
		<u>TOTAL</u>	<u>PERCENT</u>	<u>TOTAL</u>	<u>PERCENT</u>
WATFIV	EXPR	21345	21.36	2,158,316	2.48
GO	HASP	16433	16.44	40,042,412	46.01
FORT	HASP	12380	12.38	10,941,436	12.57
PLC	EXPR	4454	4.45	1,037,288	1.19
LKED	HASP	3166	3.16	534,764	.61
FORTGCLD	EXPR	2985	2.98	820,512	.94
WAT	HASP	2370	2.37	1,445,392	1.66
SOUP	HASP	2037	2.03	4,110,688	4.72
PLOT	HASP	1878	1.87	3,608,596	4.14
SPSSV5	HASP	1830	1.83	2,455,508	2.82

## PROBLEMS ENCOUNTERED WITH NEW IBM 1403 RIBBONS

CSO has experienced a few difficulties with the latest shipment of IBM 1403 ribbons. Users with poor quality output from the IBM 1403 printers (located at CSO North) should bring the output to the attention of the Routing Room personnel.

## NEW HELP FILES ADDED

Three new HELP files were added to the DECsystem-10 HELP library. HELP RATES gives the rates for DECsystem-10 and IBM 360 use. HELP DECDOC describes the documentation available in the Accounting Office and in the Illini Union Bookstore for the DEC-10. HELP RJE lists the location of and the equipment at the CSO-supported Remote Job Entry Stations.

## ATTENTION INSTRUCTORS

If you plan to teach a course and need DEC-10 manuals for your students, be sure to place an order for these manuals with the bookstore, just as if the DEC-10 manuals were any other textbook required for classroom use. CSO keeps a small supply of DEC-10 manuals in the bookstore (see HELP DECDOC), but not enough to supply entire classes.

## HOW DEC-10 FORTRAN EVALUATES OCTAL CONSTANTS

A number preceded by a double quote mark represents an octal constant (radix 8) in DEC-10 FORTRAN. Thus, "144 represents decimal 100, "1750 represents decimal 1000, etc. Octal numbers may be used as constants in arithmetic expressions, logical expressions, and DATA statements.

Octal numbers up to 12 digits in length are considered standard octal constants; they are stored right-justified in one processor storage location (one word). When necessary, standard octal constants are padded with leading zeros to fill their storage location.

When an octal constant is used as an operand in an expression, its form (i.e., bit pattern) is not converted to accommodate it to the type of any other operand. (This is similar to the way the IBM 360 handles hexadecimal constants.) If used with a real number, it will be treated as if it has the bit pattern for a real number; if used with a complex number, it will be treated as if it has the bit pattern for a complex number, etc. Because it is not automatically converted, the octal constant cannot be used successfully with real numbers, complex numbers, or logical values.

This example explains the problems you can have mixing octal constants with other types. The bit pattern for "204100000000 is:

```
010 000 100 001 000 000 000 000 000 000 000 000
```

This is the same bit pattern for INTEGER 17733517312. It is also the same bit pattern for REAL 1.0. Therefore, in the following FORTRAN program,

```
DATA A/1./,B/1./,I/1/,J/1/  
A = A + "204100000000  
I = I + "204100000000  
B = B + "10  
J = J + "10
```

A has the final value of 2.0, I has the final value of 17733517313, B has the final value of 1.0 because "10 is the bit pattern for an unnormalized REAL (essentially 0.0), and J has the final value of 9 since "10 is the bit pattern for INTEGER 8.

## ALTRAN AVAILABLE ONLY AT UIM

ALTRAN, a symbolic manipulation system from Bell Labs, is no longer available on CSO's IBM 360/75, but is now available at the Chicago Medical Center computer (SYSTEM=UIM). It was taken off-line here due to insufficient usage. See the Math and Numerical Consultants in Room 166a DCL for details on how to use ALTRAN at UIM.

## IMSL's VXPADD UNRELIABLE

The extended precision routine VXPADD from the IMSL library has been found to give unreliable results. The Math and Numerical Services Consultants are working with IMSL to correct the problem. Meanwhile, neither VXPADD nor ANY ROUTINES CALLING IT should be used.

## UIC REPRESENTATIVES WILL BE HERE

Several representatives from the University of Illinois' Chicago Circle Campus will be here on Friday, May 2, 1975 to answer questions and hear suggestions from our users. Details of the visit will be announced in NEWS and in RJE Bulletins.

## WATERLOO WATFIV LIBRARY AVAILABLE

CSO owns a copy of the University of Waterloo's WATFIV library as it existed in November of 1972. The library has been put on the UIMATH setup disk in a data-set called UIMATH.WATLIB. The Math and Numerical Services Consultants, Room 166a DCL, have a manual on the library which users are welcome to inspect. A program is available from the Math Consultants for converting the library programs into a standard FORTRAN format; the programs in the library make use of the fact that WATFIV allows multiple statements on a single card, which makes the programs unreadable to FORTRAN.

## NEW VERSION OF ASSEMBLER G INSTALLED

Version 2 level 7 of Assembler G has been installed and is available for testing. It may be accessed by using a STEPLIB JCL card as follows:

```
/*ID <ID card parameters>
// EXEC ASMGCG
//STEPLIB DD DSN=SYS9.ASMGLIB,DISP=SHR
<Assembler G program>
```

It will become the standard version of Assembler G on April 25, 1975. Copies of the user's guide may be printed from the tape; please see the consultants for instructions on how to do this.

## DO YOU WANT OFF-LINE OVER THE SUMMER AND NEXT FALL?

The next issue of OFF-LINE, May 2, 1975, is the last regular issue of the school year. OFF-LINE will continue through the summer. If you want to continue to get OFF-LINE during the summer, please send in the attached Mailing List form. Other universities on our exchange list will continue to get OFF-LINE, and do not need to return the form. Also, if your mailing address will be changing in the

fall, please send in the Mailing List form. A special summary issue of OFF-LINE will be available during New Student Week in the fall for those people who do not get OFF-LINE during the summer. Those currently on our mailing list who do not request summer issues will be sent the first fall issue at their present address unless an address correction is made.

#### RESCUE YOUR OLD TAPES

On Friday, April 25, 1975, the consultants will be given a list of tapes that have inactive or improperly assigned PS numbers associated with them. If you have a tape, please see the consultants to make sure that your tape is not on this list. CSO will be installing a new tape inventory system on May 20, 1975 (see the next issue of OFF-LINE for details) that is dependent on properly assigned PS numbers.



## OFF-LINE's MAILING LIST

If you wish to be placed on our mailing list for future issues of OFF-LINE or if you wish to enter an address correction, please complete and return this page. (See article on pages 8-9 about summer and fall subscriptions.)

## Present Address:

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_ ZIP \_\_\_\_\_

## Summer Address (if you wish to continue getting OFF-LINE):

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_ ZIP \_\_\_\_\_

## Fall Address (if different from present address or summer address):

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_ ZIP \_\_\_\_\_

## RETURN TO:

OFF-LINE

120 Digital Computer Lab.

University of Illinois at Urbana-Champaign

Urbana, Illinois 61801



# Off-Line

VOL. 3, NO. 15

MAY 2, 1975

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URBANA, ILLINOIS 61801

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OFF-LINE is the newsletter of the Computing Services Office at the University of Illinois at Urbana-Champaign. CSO operates: An IBM 360 Model 75 with one million bytes of fast core and two million bytes of slow core, under HASP and OS; a DECsystem-10 with 256K words of core, under TOPS-10, serving up to 80 simultaneously active terminals. OFF-LINE is printed every two weeks except for interruptions due to holiday schedules. Articles may be reprinted provided that the source of the article is noted.

## PLORTS WILL BE REMOVED MAY 23

PLORTS users should start to prepare themselves now for the discontinuation of PLORTS at midnight on May 23, 1975. CSO will not keep backups for the PLORTS files after May 23, so users must remember to move their PLORTS files to the DEC-10 or to copy them to cards before PLORTS is discontinued.

The DECsystem-10 was rented specifically to meet the needs of an expanding timesharing community. The additional features available on the DEC-10 more than compensate for the discontinuation of PLORTS. With the link between the DEC-10 and the IBM 360/75, users can easily submit jobs from the DEC-10 to the 360/75, just as they could from PLORTS.

The removal of PLORTS should also vastly improve batch turnaround and capacity on the 360, leaving the 360 as CSO's dedicated batch system.

I. Individual PLORTS files can be transferred to the DEC-10 by using the link between the DEC-10 and the IBM 360/75. These are the steps that should be taken to transfer a PLORTS file to a DEC-10 file from PLORTS:

1. Create a PLORTS file containing:

```
/*ID SYSTEM=PRINT,PRINT=DEC10
/*ID NAME='filename.ext(proj#,prog#)'
/*ID ØVFL=NØ
```

where filename.ext is the name of the DEC-10 file that will contain the contents of the PLORTS file (this file should not already exist) and proj#,prog# is the project, programmer number under which the file is to be stored. Remember that the entire length of the name field, excluding the single quote marks, cannot exceed 20 characters. The ØVFL parameter should be coded so the file on the DEC-10 will not contain form feeds.

2. RUNN the above file, followed by the PLORTS file to be copied to the DEC-10. Be sure that the file being copied does not contain ID card parameters which would override those in the file created by Step 1.
3. Remove extraneous matter (i.e., burst page printouts) from the DEC-10 file after the copy. If you do not specify an extension for the DEC-10 file in the NAME paramter, it will default, in this case, to .D78.

II. To transfer a PLORTS file to the DEC-10 using the DEC-10, submit a TSBATCH job to the 360 containing the following:

```
//jobname JOB
/*ID PS=ps#,NAME='filename.ext(proj#,prog#)'
/*ID CØDE=code,PRINT=DEC10,ØVFL=NØ
// EXEC TSBATCH
ps#,name
```

code

Ø PLORTS filename

LN

/\*

Remove the garbage from the returned output as above. See "HELP 360" and "HELP UOI" for details on how to use the link between the DEC-10 and the 360.

- III. To copy a PLORTS file to cards, create a PLORTS file containing the following JCL:

/\*ID CARDS=nnnn

// EXEC CARDS

//SYSIN DD DATA

PUNCH

RUNN this file with the PLORTS file that is to be copied to cards. This will punch a copy of the PLORTS file until the first /\* card is encountered; therefore, users should remove all ID cards from the PLORTS file that is to be copied, and be sure to put a /\* at the end of the file. nnnn is an estimate of the number of cards to be punched; if nnnn is less than 100, this program can be run on EXPRESS. See Reference Guide S06.NO2 for a brief description of how to use CARDS.

See the system consultants, Room 166 DCL and Room 70a Commerce West, if you have any questions about the PLORTS withdrawal. Be sure to start preparing yourself now; waiting until the last minute could be too late. Remember, there will be NO backups.

### PROC CHANGES SCHEDULED FOR MAY 23

On May 23, 1975 the following utility cataloged procedures will be scratched from PRØCUØI:

ADD	LIST	LISTCTLH
LISTAAPS	LISTVTØC	LISTAAPØ
LISTED	LISTMAC	LISTUSER
LISTCTLG	LCPFØRT	LCPCØB
FASMC	REPRØD	REPRØDPS
CHANGE	UTILITY	

The FTNH cataloged procedures will be scratched (with the exception of FTNHSØUP), along with the PLIX cataloged procedures (however, the PLIX cataloged procedures will remain in PRØCUØI). Also, the following cataloged procedures, along with the language processors associated with them, will be scratched:

PL360	PRØGEØL	EØLLKED	EØLLKGØ
EØL	PLAGØ	WATLISP	

The following miscellaneous cataloged procedures will also be scratched:

ANSCAN	ASMFDECK	PRFØRMAT	SAMPUNCH
NLAP	KJØBLIB	PL1FDECK	FØRTDECK

### 360 CORE LIMITS ESTABLISHED

Users who need 450K or more of fast core or 600K or more of slow core on CSO's IBM 360/75 must contact Jack Knott, 333-6562, for special permission to run the job. Jobs requesting large amounts of core will be cancelled by the operators if prior permission has not been granted.

### RUNF10 TO BE CHANGED

On May 9, 1975 CSO will be scratching the present version of RUNOFF on the DEC-10 and substituting for it the program RUNF10, because the original version of RUNOFF was totally unusable. The method for using RUNF10 will then apply to RUNOFF, and users will no longer be able to use the RUNF10 program under that name. See "HELP RUNF10" or "HELP RUNOFF" (as it will be renamed on May 9) for details on how to use RUNOFF, a DEC-10 text processing system.

### STATISTICAL SYSTEM MANUALS FOR COURSE USE

At present, the bookstores order manuals for statistical systems such as SPSS, OSIRIS III, SAS, and DataText only to meet individual course requirements. The majority of purchasers of such manuals are not enrolled in courses. Thus, manuals are usually in short supply and are difficult to find, since a single manual may be shelved for several different courses.

To remedy this situation, the Social Science Quantitative Lab. will order statistical system manuals for general use. Manuals ordered by the Laboratory will be shelved in the computer manuals section rather than under a course heading.

Instructors who are ordering statistical manuals are requested to inform the Laboratory of the course, enrollment, and manual to be used, in order that we may estimate how many manuals to order for general use. Please send a note to the Social Science Quantitative Lab., 202 Lincoln Hall, or call 333-6751.

### DEC-10 BATCH MANUAL AVAILABLE

CSO's Introduction to Batch on the DECsystem-10 is now available in the Accounting Office, Room 134 DCL, and in the CSO South Consulting Office, Room 70a Commerce West. This document contains introductory material on how to run



a batch job, complete with an example and notes about the peculiarities of CSO's DEC-10 batch system.

### REMEMBER THE "GOOD OLD DAYS"?

What was CSO's service like a year ago? Comparing numbers and turnaround for April 16 (both relatively heavy days), we find:

<u>Class</u>	<u>April 16, 1974</u>		<u>April 16, 1975</u>	
	<u>Number of Jobs</u>	<u>Average Turnaround*</u>	<u>Number of Jobs</u>	<u>Average Turnaround*</u>
X	2434	0:06	1597	0:01
A	1087	3:17	1159	0:31
B	279	7:44	436	1:17
C	103	8:36	255	3:33
D	52	13:52	55	9:56
E	4	14:27	14	11:13
F	6	15:22	6	12:30
G	2	11:22	0	-----
Total HASP	1533	4:54	2007	1:28

\*hh:mm

#### Other Relevant Data:

<u>Billable Item</u>	<u>April 16, 1974</u>	<u>April 16, 1975</u>
HASP CPU min.	471	612
EXPRESS CPU min.	54	57
PLORTS Connect Hours	209	97
CALL/OS Jobs	762	115
CALL/OS CPU min.	25	6

Better HASP, OS, and PLORTS software, rationed PLORTS time, more CPU's and better machine management make a lot of difference!

## MAJOR TAPE POLICY CHANGES ANNOUNCED

A new tape inventory system will be installed this summer. With this new system, CSO will be able to keep track accurately of every tape it is storing, including who it belongs to, how often it is used, and where it is located.

This tape inventory system was devised to deal with the problem of the large number of unused tapes that CSO is currently storing for users. CSO is now storing over 3000 tapes, half of which are now being used.

The exact details of the plan have not been ironed out. However, users will be affected by this plan in several ways:

1. All tapes will be identified by tape name and rack number. The rack number will be assigned by CSO.
2. The SETUP card that the user uses to reference his tape must follow a specific format (to be announced later).
3. There will be a procedure for returning tapes that have not been used within a certain length of time or have inactive PS numbers associated with them.

Exact details of the plan will be announced in a few weeks. CSO wanted to give this early warning about this new system for all tape users who plan to be gone during the summer months. The special summary issue of OFF-LINE that will come out during New Student Week will include full details of this plan.

### IBM 1403 RIBBONS WEREN'T FROM IBM

The shipment of ribbons for the IBM 1403 printer that was causing problems (see the last issue of OFF-LINE) was not from IBM, as was implied in the article. Anyone with smeared output from the IBM 1403 printer, located at CSO North, should show the Routing Room personnel the problem.

### CORRECTION -- OUTPUT FILING POLICY TO CSO NORTH

In the last issue of OFF-LINE, the output filing policy at CSO North was incorrect.

IBM 360 and 370 output is filed at CSO North according to the following scheme:

1. All output is filed by the last two digits of the jobname.
2. Print and punch output is kept in the bins for two weeks, then thrown away.
3. Plot output is kept for one month, based on the first letter of the jobname.

DECsystem-10 print output is filed by the last two digits of the programmer number, and is kept in the bins for two weeks, then thrown away.

### SHORT COURSES OFFERED DURING BREAK

Short courses on the DECsystem-10 may be offered during the break between spring and summer semesters if there is enough interest. Anyone interested in learning more about the DECsystem-10 should contact Donna Amado, Phone 333-4747.

### DO YOU WANT OFF-LINE OVER THE SUMMER AND NEXT FALL?

This will be the last issue of OFF-LINE until the fall semester for all users who have not already sent in their Mailing List form, or who do not send in the attached Mailing List form. Other universities on our exchange list will continue to get OFF-LINE, and do not need to return the form. Also, if your mailing address

will be changing in the fall, please send in the Mailing List form.

A special summary issue of OFF-LINE will be available during New Student Week in the fall for those people who do not get OFF-LINE over the summer. Those currently on our mailing list who do not request summer issues will be sent the first fall issue at their present mailing address unless an address correction is made.

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## BULK-TIME COMPUTING FACILITY AVAILABLE

On May 1, 1975 CSO introduced a bulk-time computing service at a reduced rate. This rate is available for users with contract funds or Research Board funds.

This system was introduced to help solve the problems of a limited number of users who run very large problems which are impractical to mix with the normal workload or have excessive costs. Work done on projects under this bulk rate will receive a 75% rebate on service units charged.

To qualify, work must meet the following criteria:

1. It must be recommended as an academically interesting and well defined problem by the department chairman, and approved by the Research Board.
2. It must require at least 50,000 service units over a one year period and each job submitted must use at least 30 CPU minutes, be able to run without any operator on duty, and be agreed upon in advance to have no turn-around guarantees.
3. It must be possible to present CSO a backlog of jobs to be run when circumstances permit. These will be scheduled so that each approved project gets a share of the available time.
4. CSO must agree that the work is practical to process in bulk, and does not compete for resources with normal work.
5. No more than ten bulk projects will be active at any time. As one project finishes, a new one will be accepted.
6. There must be no identifiable costs to CSO for this work, or these costs must be passed on the user.

At the present time there are relatively large amounts of time available on the UIC system, when no operator is on duty and bulk work can be carried out. A very limited amount of time has been available on the 360/75. The third shift of the DECsystem-10 may also provide additional time for bulk service.

Anyone interested in obtaining an account for such bulk use should send a brief description of the computing service requested to George Badger, Room 179 DCL.



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120 Digital Computer Lab.  
University of Illinois at Urbana-Champaign  
Urbana, Illinois 61801



# Off-Line

VOL. 3, NO. 17

MAY 30, 1975

EDITOR: Paula Jones  
PHONE: (217) 333-6492  
120 DIGITAL COMPUTER LAB.  
URBANA, ILLINOIS 61801

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OFF-LINE is the newsletter of the Computing Services Office at the University of Illinois at Urbana-Champaign. CSO operates: An IBM 360 Model 75 with one million bytes of fast core and two million bytes of slow core, under HASP and OS; a DECsystem-10 with 256K words of core, under TOPS-10, serving up to 80 simultaneously active terminals. OFF-LINE is printed every two weeks except for interruptions due to holiday schedules. Articles may be reprinted provided that the source of the article is noted.





## 360 JOB INQUIRY AVAILABLE ON THE DEC-10

See "HELP DJOB" for an explanation of the way to find out a job's status on the IBM 360/75 through the DECsystem-10.

## NEW KJOB FEATURE INSTALLED

Most DEC-10 users probably have noticed the new message that KJOB prints at their terminal. Now DEC-10 users can get an accurate idea of how many DEC-10 system resources they have used while logged on to the DEC-10.

The message now gives the amount of CPU time used, the amount of connect time used, the amount of core used, and the total charges for that session. The resource quantities used are rounded off to the nearest second or minute. A sample KJOB message is:

.K/F

JOB 23, USER [111,999] LOGGED OFF TTY14 0935 30-MAY-75

SAVED ALL FILES (725 BLOCKS)

CPU TIME: 29.53 SEC CONNECT TIME: 45 MIN KCS: 425

CHARGES: \$2.47

## REMOTE JOB ENTRY STATION AVAILABLE

A Remote Job Entry station will be available July 1, 1975, for any campus user group interested in card reading to and printing from the IBM 360/75 at CSO.

The exact configuration and cost is:

8K CPU (PDP11/10)

600 lpm printer

300 cpm reader

Communications Interface

ASRTTY-33

The monthly lease cost for the items listed above is \$729.25. A maintenance contract for this equipment is \$259.

The RJE will also require an ICC-Milgo modem, which rents for \$87 per month, and a dedicated line which rents for \$7 per month.

The terminal hardware could be purchased for approximately \$25,000.

For further information contact Cliff Carter at 333-3723 or Don Hartman at 333-3587.

## VERSION 6 OF SPSS NOW AVAILABLE

Version 5 of SPSS is now available on the 360/75. Version 6 is upward compatible with Version 5 (the default version). Many new features have been added, and a new SPSS manual is available in the Illini Union Bookstore. To run a Version 6 SPSS program, use the following EXEC JCL statement:

```
// EXEC SPSSV6
```

## NEW FORTRAN SUBROUTINES AVAILABLE

Five queueing subroutines have been added to the DECsystem-10 FORTRAN 40 and FORTRAN 10 libraries. These commands create and build queue command strings so that files can be queued to an input stream, such as UOI or PRINT, during execution of a FORTRAN program. See "HELP SEND" for a complete description of these subroutines.

## MATH SERVICES TO MERGE WITH CONSULTING

The Mathematical and Numerical Services Office will be merged with the System Consulting Office on June 2, 1975. The Math consultants, Mary Ann Berg and Stan Kerr, will continue to be available for specialized consulting. Users who need their services should call or visit the System Consulting Office, Room 166 DCL, Phone 333-6133 to check the consultants' office schedule.

## MAJOR CONSULTING POLICY CHANGES ANNOUNCED

To improve services and provide continuity and a uniform level of service between the north side and the south side of campus, the systems consultants are now rotating between the CSO North Consulting Office, Room 166 DCL, and the CSO South Consulting Office, Room 70a Commerce West.

Hours for the CSO North Consulting Office are:

Monday - Thursday	9:00 AM - 5:00 PM and 7:00 PM - 10:00 PM
Friday	9:00 AM - 5:00 PM
Saturday	9:00 AM - 1:00 PM

Hours for the CSO South Consulting Office are:

Monday - Friday	9:00 AM - 12:00 Noon and 1:00 PM - 5:00 PM
-----------------	--

Consultants working with these two offices are actively working on improving their services to the user community.

Early this fall a student consulting office will open up at the Illinois Street Residence Hall. Another student consulting office will be open at another dormitory RJE (the location has not yet been finalized). These consultants will specialize in the problems that students have with their class assignments.

Because of this new facility, the system consultants at CSO North and South will be specialized in the problems that researchers and faculty encounter with projects on the CSO-operated computers.

#### A USEFUL SOS FEATURE

The SAVE switch in SOS will make a backup file once every n times that editing changes are made in an SOS file. The default for n is 0, which means that the backup is not made until an exit is made from SOS or a W command is issued.

To use this switch, type

```
/SAVE=n
```

when SOS is prompting with an asterisk. For example, if a user codes

```
/SAVE=10
```

a backup file is created once for every 10 changes in the file. This is the equivalent to doing a W command every 10 changes.

Use of this switch is an obvious way to alleviate much of the hassle and frustration encountered when the DECsystem-10 crashes after long period of editing.

#### MPSIII AVAILABLE AT CHICAGO CIRCLE

A new linear and quadratic programming package is available at the Chicago Circle campus (UIC). The package, MPSIII, was developed and licensed by Management Science Systems, Inc. MPSIII is an outgrowth of MPS360, as is IBM's MPSX. Therefore, many MPSX programs can be run with MPSIII.

The LP procedures of both systems use the bounded variable/ product form of the inverse/ revised simplex method.

IBM's basic system, MPSX 1.5, is presently available at Urbana and UIC. Options like MIP, the Mixed Integer Programming ability, are not included with this basic system.

The MPSIII basic system has been leased with the QUAD option. QUAD is the quadratic programming feature of MPSIII. The quadratic programming feature consists of a quadratic objective function with linear constraints. The algorithm employed is a modified simplex method. The QUAD feature is not available in MPSX.

MPSIII may be used at UIC with the following JCL:

```
/*ID PS=ps#
/*ID CODE=code,SYSTEM=UIC
// EXEC MSSMPS
<program>
/*
```

### JUNE 2 IS MAINTENANCE DAY

On Monday, June 2, 1975 the DECsystem-10 will be down all day because of the installation of new communications equipment. All Remote Job Entry Stations connected to the IBM 360/75 will be down until noon on that day for the same reason. CSO North (LOCAL) IBM 360/75 operations will continue as usual on that day.

### IBM 360 ON-LINE DISK POLICY

In January, 1975 CSO doubled the amount of on-line disk space available to users for storing private datasets. However, it is already difficult to find on-line space at short notice, except on the MERLIN pack. This is partly because users tend to keep their data on-line when they no longer need it just in case they need it again or simply forget to scratch their datasets when done with them. The likelihood of sufficient disk space being available to any user would be increased if disk space were "turned over" faster. With this in mind, the following disk policy has been formulated. Items which are new have an asterisk beside them.

Users may store data on-line in the following ways:

1. They may store data which is in constant use more or less permanently on the public packs.
2. They may use the MERLIN pack for temporary storage.
- \*3. They may rent an entire 3330 spindle.
4. They may store data on-line at Medical Center and Chicago Circle. Please see the consultants for details.

#### A. Public Packs

1. All datasets on the public packs must adhere to the standard naming conventions. The name should be of the form

USER.Pnnnn.anything

where nnnn is the user's PS number, and anything is any name of the user's choosing that complies with OS rules. Example:

USER.P1234.BINGO

Class datasets may have names of the form

USER.classname.anything

where classname is the name of the class. Example:

USER.CS101.BINGO

2. Datasets that:

- \*. have not been accessed for 30 days
  - . belong to cancelled PS numbers
  - . belong to PS numbers which have been inactive for 30 days
- \*. have names which do not conform to the conventions in (1) above

will be dumped to tape and scratched on the first Sunday of each month. The tape will be saved for six months. These datasets may be restored by the consultants upon request, at a charge of five service units per dataset.

3. The charge for space on the public packs is 0.01 service units per track per day. Charges are calculated daily at about midnight.
4. All datasets must be catalogued. CS0 reserves the right to move datasets from pack to pack.
5. ISAM and unmovable datasets are not allowed.
6. All public packs are backed up to tape daily at about midnight, at no charge to the user. Daily backup tapes are saved for one week; backup tapes taken on Mondays are saved for one month; backup tapes taken on the first Monday of the month are saved for three months.

B. MERLIN

1. Every dataset on MERLIN is scratched at about 1200 hours each Sunday.
2. MERLIN is not backed up in any way whatsoever. Users must recreate their own data if it is lost on MERLIN for any reason.
3. Datasets on MERLIN need not be catalogued.
4. Datasets on MERLIN must adhere to the naming conventions outlined in A.1.



5. The charge for space on MERLIN is 0.0067 service units per track per day. Charges are calculated daily at about midnight; users who scratch their datasets before Sunday will thus save themselves money.
- \*6. Datasets of more than 700 tracks may be scratched without notice if MERLIN becomes full during the week. No refunds will be given in this case.

#### C. Renting a 3330 Spindle

1. A user or consortium of users may rent a 3330 spindle and one disk pack for a period of not less than 12 months for \$800 per month real money. Users may not use research board funds to rent a spindle.
2. The spindle will not be used as a setup spindle, so the consortium of users must share one disk pack.
3. Normal naming conventions for datasets on private packs must be followed. Please see the consultants for details.
4. CSO will not back up the data on a rented spindle in any way, nor take any responsibility for it. It is up to the user(s) to maintain the pack.
5. CSO will maintain the spindle in good mechanical and electrical order.
6. CSO reserves the right to choose the physical and logical position of the spindle. In the unlikely event of serious mechanical trouble, for instance when an entire channel is out of service, CSO reserves the right to take the rented spindle off-line in order to provide effective service to the bulk of CSO users.

#### RENEW CLASS PS NUMBERS NOW

On June 9, 1975 all class PS numbers from the spring semester will expire. The project, programmer numbers associated with those class PS numbers will also expire on that day.

This means that all protected files on the DECsystem-10 under those ppn's will become unaccessible after June 9. To assist instructors with accessing and copying protected DEC-10 files from old class ppn's, CSO will, upon request, offer the same programmer number to an instructor every semester (the PS numbers and corresponding project numbers for those classes will change every semester). For security reasons, all student programmer numbers will be reassigned every semester.

Class instructors should make sure to renew the class PS number for the summer and retain their old programmer number so they can copy the files to their new file space before June 9.

Instructors with classes that will not meet over the summer should be sure to make backups of any important DEC-10 files. DECTapes, ideal for this purpose, can be bought for hard contract money or cash from CSO; contact Jack Knott, Phone 333-6562, if interested.



## OFF-LINE's MAILING LIST

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# Off-Line

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JUNE 13, 1975

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## CSO OFFERS TI735 SHORT-TERM RENTAL

Portable Texas Instruments terminals (TI-735) will be available for rental July 1, 1975 from the CSO North Routing Room.

CSO will begin the service with two units, add two more sometime in July, and six more in August. The object of the rental service is to provide our customers with a portable keyboard printer unit with an integrated acoustical coupler. The rental period is five days or less and the charge per day is six dollars. In case the terminal is kept for a period greater than five days, the charge is eighteen dollars per day for the days in excess of five days. The thermal-sensitive paper will be supplied with the terminal.

Payment for this rental must be from standard University of Illinois accounts, not from class or research board money.

## UIC'S EXPRESS OFFERS VALUABLE FACILITIES

Chicago Circle's express system is quite different from CSO's EXPRESS, and offers some valuable facilities for CSO users. To avoid confusion, CSO will refer to the UIC express system as "FAST-BATCH". As each FAST-BATCH job enters the UIC system, it joins a queue of similar jobs waiting to be processed. Every ten minutes or so the FAST-BATCH processor wakes up, goes through an "initiation" phase, and then processes the waiting FAST-BATCH jobs by activating each language processor in turn, and completing all the jobs for one language processor before going on to the next. As a result, turnaround from UIC's FAST-BATCH averages about six minutes.

CSO's EXPRESS version, however, is always resident in core. At each warm start, EXPRESS goes through the "initiation" phase and remains in core as an executing job waiting for EXPRESS jobs and processing them without any significant startup time for each job. As a result, turnaround time is seldom more than a minute. Since about half of CSO's jobs are EXPRESS jobs, the investment in core is well worth it.

Each express is the best adaption to its own operating environment. Both contain facilities for class datasets and grading programs, but are significantly different.

FAST-BATCH offers the following processors and limits:

<u>PROCESSOR</u>	<u>CPU SECONDS</u>	<u>CORE</u>	<u>PAGES OF OUTPUT</u>
ASMBLR	5	128K	30
PLC	20	256K	20
SPITBOL	19	128K	50
SPSS	10	192K	60
WATBOL	10	192K	50
WATFIV	18	256K	30

Except for SPSS, these are essentially the same versions of corresponding processors run on EXPRESS and HASP at Urbana. EXPRESS limits for the processors (see Reference Guide S02.N01) are smaller than those for FAST-BATCH, with the exception of ASMBLR (ASSIST).

Jobs submitted to FAST-BATCH from Urbana are charged a 0.35 service units cover charge. EXPRESS only accounts cannot access FAST-BATCH. Please see the consultants for information about class datasets and grading programs.

The following examples show all the ID card parameters and JCL necessary to run a FAST-BATCH job for each of the six language processors. Because there is no EXEC JCL statement and no corresponding \$JOB, \$PLC or similar cards, all parameters passed to these compilers should be passed through the JOBPARM ID card parameter. To use the JOBPARM parameter, code:

```
/*ID JOBPARM='parameters'
```

The parameters are the ones that would be passed if other JCL were allowed. For example, to obtain 16 seconds of CPU time and to suppress the program listing in a WATFIV job, a user would code:

```
/*ID PS=ps#,SYSTEM=UICWATFIV
```

```
/*ID CODE=code,JOBPARM='NOLIST,TIME=16'
```

```
<WATFIV program>
```

```
$ENTRY
```

```
<data>
```

```
/*
```

Punched output is not allowed with these FAST-BATCH processors.

ASMBLR -- a fast assembler:

```
/*ID PS=ps#,SYSTEM=UICASMBLR
```

```
/*ID CODE=code
```

```
<assembler program>
```

```
$ENTRY
```

```
<data>
```

PLC -- a fast PLI compiler:

```
/*ID PS=ps#,SYSTEM=UICPLC
```

```
/*ID CODE=code
```

```
<PLC program>
```

```
$DATA
```

```
<data>
```

```
/*
```

SPITBOL -- a fast version of SNOBOL:

```
/*ID PS=ps#,SYSTEM=UICSPITBOL
```

```
/*ID CODE=code
```

```
<SPITBOL program>
```

```
/*
```

SPSS -- a statistical package:

```
/*ID PS=ps#,SYSTEM=UICSPSS
```

```
/*ID CODE=code
```

```
<SPSS control cards>
```

```
/*
```

WATBOL -- a fast COBOL compiler:

```
/*ID PS=ps#,SYSTEM=UICWATBOL
```

```
/*ID CODE=code
```

```
<WATBOL program>
```

```
$ENTRY
```

```
<data>
```

```
/*
```



WATFIV -- a fast FORTRAN compiler:

```
/*ID PS=ps#,SYSTEM=UICWATFIV
```

```
/*ID CODE=code
```

```
<WATFIV program>
```

```
$ENTRY
```

```
<data>
```

```
/*
```

A \$ENTRY or \$DATA (depending on the processor used) is mandatory, even if the program has no data.

See the consultants for more details about UIC's FAST-BATCH system.

## VARIABLE TABBING INSTALLED ON THE DEC-10

The SETTAB program allows variable tabbing on the DECsystem-10. Instead of inserting a TAB character when the user strikes CONTROL-I, the proper number of blanks are inserted so that it appears that there are TABs. For more information on the SETTAB program, type "HELP SETTAB".

## A REQUIEM FOR PLORTS

Starting on the next page is a reproduction of parts of the IBM 360/75 console log for the last 30 minutes of PLORTS' life. The messages sent to the operator from several TSBATCH jobs are quite humorous.

At its peak, there were 12 people gathered around the table at Murphy's for the second meeting of the "I Remember PLORTS Club" on Friday, May 23. Obviously, most people did not want to remember PLORTS. Was the poor turnout for the meeting because the DECsystem-10 is such a good timesharing replacement? Or could it possibly be that there were many people crying in the background because they forgot to transfer their files to the DEC-10? We'll never know.

\*10.34.12 UPLR23A FR 1002 THIS PLORTS SPEAKING - NO NO NO PLEASE DON'T KILL ME, PLEASE!!!  
 \*10.34.12 UPLR23A FR 1002 DON'T TYPE THAT DEATH SENTENCE, DON'T DO IT.!!!  
 \*10.34.12 UPLR23A FR 1002 TO REMOVE PLORTS DOWN I REPLY 'OFF', LET ME LIVE!!!!  
 \*10.34.12 UPLR23A FR 1002 WAR IN G !!! YOU WILL RECIEVE A LETHAL SHOCK IF YOU TOUCH  
 ANY RUR PACK....  
 \*10.34.12 UPLR23A FR 1002 OHHH OHHHH IT HURTS. PLEASE STOP. IF YOU HAVE ANY DECEICY YOU WILL  
 \*10.34.12 UPLR23A FR 1002 DESIST NOW AND FOREVER.  
 \*10.34.12 UPLR23A FR 1002 BEFORE YOU KILL ME PLEASE LET ME SEE THE FOLLOWING PEOPLE  
 \*10.34.12 UPLR23A FR 1002 TO READ MY LAST WILL AND TESTAMENT:  
 \*10.34.12 UPLR23A FR 1002 AL WHALEY (AND HE SAID LET THERE BE BLAM, AND THERE WAS BLAM).  
 \*10.34.12 UPLR23A FR 1002 GORDON CHACE (HE STAYED WITH ME IN MY HOUR OF NEED, WHEN  
 NO ONE ELSE WOULD HAVE ME - TRUE @LUE.)  
 \*10.34.12 UPLR23A FR 1002 GREG EITZEN (HE KNOWS SECRETS ABOUT ME THAT EVEN I DON'T KNOW).  
 \*10.34.12 UPLR23A FR 1002 FRED A FISCHER (SHE TRIED TO MATE ME WITH O/S, OH WHAT A  
 WONDERFUL INTERFACE.)  
 \*10.34.12 UPLR23A FR 1002 AND ALL THE OTHER WUNNERFUL (SNIF) PEOPLE WHO USED AND ABUSED  
 \*10.34.12 UPLR23A FR 1002 ME. (EVEN FLASH WHO INSULTED ME BY TRYING TO HAVE THE DEC-10  
 DO THAT NOW FAMOUS IMPERSONATION: # W A I T)  
 \*10.34.12 UPLR23A FR 1002 SO LONG CRUEL WORLD , I SHALL RETURN SOMEDAY- SOMEWHERE SO:  
 \*10.34.12 UPLR23A FR 1002 #WAIT  
 \*10.34.12 UPLR23A FR 1002 #WAIT  
 \*10.34.12 UPLR23A FR 1002 #WAIT  
 \*10.34.12 UPLR23A FR 1002 #WAIT  
 \*10.34.12 UPLR23A FR 1002 #WAIT

\*10.38.11 UPLR23A FR 1092 DON'T TURN ME OFF

Ans:='plorts leaves for good at 1700 tonight'





## EISPACK II AVAILABLE ON THE IBM 360/75 AND THE DEC-10

EISPACK II is now available on the IBM 360/75 and the DECsystem-10. This is the final version of the EISPACK system.

Users should contact Mary Ann Berg, Room 166 DCL, Phone 333-6133, if they are interested in getting copies of individual EISPACK routines for the DECsystem-10. The EISPACK II system will be installed on the DEC-10 by fall.

To get documentation for EISPACK II, code the following JCL:

```

/*ID <ID card parameters>
/*SETUP DISK=UIMATH
// EXEC COPY
//SYSUT1 DD DSN=UIMATH.EISPACND(nameDC),DISP=SHR
//SYSUT2 DD SYSOUT=A
/*

```

where name is the name of the subroutine. To get listings of the source of the EISPACK II subroutines, code:

```

/*ID <ID card parameters>
/*SETUP DISK=UIMATH
// EXEC COPY
//SYSUT1 DD DSN=UIMATH.EISPACNS(name),DISP=SHR
//SYSUT2 DD SYSOUT=A
/*

```

If a punched copy of the source deck is desired, code SYSOUT=B instead of SYSOUT=A in the SYSUT2 DD statement.

To use EISPACK II on the IBM 360/75, code:

```

/*ID <ID card parameters>
/*SETUP DISK=UIMATH
// EXEC FORTLDGO,LIBFILE='UIMATH.EISPACOB'
<FORTRAN program with calls to EISPACK subroutines>
//GO.EISPACKLB DD DSN=UIMATH.EISPACOB,DISP=SHR
//GO.SYSIN DD *
<data>
/*

```

By fall EISPACK II will replace the EISPACK I version that is now in FORTUOI.

EISPACK II offers four major new features. These are:

1. EISPACK II handles generalized eigenproblems.
2. EISPACK II does linear least square fitting.
3. EISPACK II handles linear systems of equations in band form.
4. EISPACK II allows for the use of the packed form.

Over 70 subroutines are included in the EISPACK II system. Some of the new ones are described on the next page. All of these call the recommended sequence of subroutines from the eigensystem subroutine package (EISPACK) to perform the required tasks.

1. RG finds the eigenvalues and eigenvectors of a real, general matrix ( $Ax = \lambda x$ ).
2. RGG finds the eigenvalues and eigenvectors of a real, generalized problem ( $Ax = \lambda Bx$ ).
3. RS finds the eigenvalues and eigenvectors for the real, symmetric matrix.
4. RSG finds the eigenvalues and eigenvectors for the real, symmetric generalized case.
5. RSB finds the eigenvalues and eigenvectors for the real, symmetric, band case.
6. RSGAB finds the eigenvalues and eigenvectors of a real, symmetric, generalized eigenproblem ( $ABx = \lambda x$ ).
7. RSGBA finds the eigenvalues and eigenvectors of a real, symmetric, generalized eigenproblem ( $BAX = \lambda x$ ).
8. RSP finds the eigenvalues and eigenvectors of a real, symmetric, packed matrix.
9. RST finds the eigenvalues and eigenvectors of a real, symmetric, tridiagonal matrix.
10. RT finds the eigenvalues and eigenvectors of a special real tridiagonal matrix.

#### GET RACK NUMBERS FOR YOUR TAPES

Users should go to the CSO North Routing Room, 129 DCL, to get their tape rack number assignments. All tapes with assigned rack numbers should be referenced on the SETUP card by both the rack number and the tape name.



## STEPNAME STATISTICS

The following are the ten most used steps on CSO 360/75 system for May:

<u>STEPNAME</u>	<u>SYSTEM</u>	<u>USAGE</u>		<u>CPU</u>	
		<u>TOTAL</u>	<u>PERCENT</u>	<u>TOTAL</u>	<u>PERCENT</u>
GO	HASP	14898	16.84	53,761,908	47.02
FORT	HASP	12131	13.71	11,916,532	10.42
WATFIV	EXPR	7234	8.17	1,086,576	.95
PLC	EXPR	4106	4.64	969,004	.84
SOUP	HASP	3878	4.38	8,461,192	7.20
FORTGCLD	EXPR	3431	3.87	971,952	.85
JOBQUEUE	EXPR	3366	3.80	531,492	.46
LKED	HASP	3249	3.67	527,252	.46
PLOT	HASP	2906	3.28	6,281,604	5.49
WAT	HASP	2809	3.17	4,171,052	3.64

## DEC-10 DISK FILE POLICY ANNOUNCED

CSO has established the following policy for scratching inactive and unused DEC-10 files:

1. All files on the DEC-10 which have not been accessed for 30 days will be scratched on the first Sunday of each month, effective July 6, 1975.
2. All files on the DEC-10 which belong to ppns associated with PS numbers which are cancelled or have been inactive for 30 or more days will be scratched on the first Sunday of each month.

CSO keeps FAILSAFE dumps of DEC-10 files, so users who inadvertently destroy files or whose files are scratched by CSO can get backups. FAILSAFE tapes taken on the first Saturday of each month are kept for three months; FAILSAFES taken on other Saturdays are kept for one month; and daily FAILSAFES are kept for one week.

DEC-10 AND IBM 360/75 SCHEDULE CHANGES

The schedule of operations for the DECsystem-10 and the IBM 360/75 have been changed so that the system programmers can have more time for the development of improved link facilities between the two machines. The new schedules are printed below.

360 Schedule of Operation

	SUN.	MON.	TUES.	WED.	THU.	FRI.	SAT.	
12								12
2am								2am
4am								4am
6am		SYSTEM PROGRAMMERS Sched. Engr	System Programming	System Programming Sched. Engr.	System Programming	System * Programming Sched. Engr	System Programming	6am
8am	System Programming							8am
10am								10am
Noon								Noon
2pm								2pm
4pm								4pm
6pm								6pm
8pm								8pm
10pm								10pm
12								12

\* One the first Friday of each month, the machine does not come up until 10:00 a.m. because of scheduled engineering.





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# Off-Line

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JUNE 27, 1975

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## NEW HOURS FOR ISR RJE

The ISR (Illinois Street Residence Halls) RJE terminal is now open for the summer. New summer hours are 12:00 Noon to 12:00 Midnight, seven days a week. The ISR RJE is located in the Student Government Room, downstairs of the Wardall Tower, in ISR.

## DEC-10 PHONE NUMBER CHANGED

As a result of the work done on the communications equipment the phone number for the DEC-10 has been changed to 333-4000.

## MORE CATALOG PROCEDURES MOVED TO UIM

Users can now use these catalog procedures at UIM, as well as at UOI: LISTPDS, LISTDISK, CARDS, COPY, and IEHPROGM. For instructions on the use of these programs, see the CSO Utilities manual.

## THE DEC-10 - SIX MONTH REVIEW

Seven months ago the DECsystem-10 arrived. Six months ago CSO brought it up for general use. One month ago PLORTS, CSO's old timesharing system, was withdrawn. A few weeks ago another processor for the DEC-10 was delivered.

All of this change would not have been possible if it weren't for the hard work of a small group of people who are invisible to most of our users. These people not only had to learn the DEC-10 system, but also were faced with many problems related to the conversion and link between the DEC-10 and the IBM 360/75.

Listed below are some of the things that the system programmers and consultants did to make the installation and use of the DECsystem-10 as easy as possible for our users:

1. On February 2, 1975, a copy of all PLORTS files was moved to the DEC-10.
2. STRIP was written to remove PLORTS line numbers from the PLORTS files that were transferred over to the DEC-10.
3. FORTCV was written to convert CALL/OS FORTRAN programs to the DEC-10 FORTRAN.
4. RE4MAT, a TECO macro, was written to convert DEC-10 FORTRAN continuation lines to a style acceptable to IBM FORTRAN.

5. The system consultants gave three sets of short courses on various subjects pertaining to the DEC-10, including an Introduction to the DEC-10, PIP, SOS, DDT, and FORTRAN.
6. RENUM was written to renumber CALL/OS BASIC files for DEC-10 BASIC.
7. The DAS78 spooler (the link between the DEC-10 and the IBM 360/75) was installed and many bugs were fixed. Systems programmers are continuing to work on improved reliability and speed.
8. The NEWS program was written so users could keep up-to-date on system developments (see "HELP NEWS").
9. A program was written to sort the output from the FAILSAFE program according to project, programmer numbers.
10. UFLIP, a library-generating program, was installed, several bugs were fixed, and the rename facility was developed (see "HELP UFLIP").
11. SETTAB, which allows users to use variable tabbing instead of the preset tabs on the DEC-10, was developed (see "HELP SETTAB").
12. DJOB, which allows DEC-10 users to check the status of their IBM 360/75 jobs, was developed (see "HELP DJOB").
13. A program to facilitate automatic scheduling was developed. This was essential for the success of such programs as DJOB, which relies on up-to-date information. This also allowed for the automatic setting of the coremax.
14. LIST360 was developed to list DEC-10 files on the IBM 360/75 (see "HELP LST360").
15. Modifications were made to the DEC-10 FORTRAN chaining subroutines so they would work on our system (see "HELP CHAIN").
16. A facility was developed so that users could change their own passwords on the DEC-10 (see "HELP PASSWO").
17. Features were added to LOGOUT so that users could get detailed accounting information when they ran KJOB.
18. 'DISPOSE=UOI' was added as an OPEN or CLOSE parameter in DEC-10 FORTRAN. This allows a user to queue files to the IBM 360/75 through a DEC-10 FORTRAN program.
19. Several modifications were made in PASCAL. Bugs were fixed, subscript checking was installed, numerous compiler options were added, a small core version was installed, and many other changes were made (see "HELP PASBUG" and "HELP PASCAL").

20. Five queueing subroutines were added to the FORTRAN library that allow users to build queue command strings in a DEC-10 FORTRAN program (see "HELP SEND").
21. Among the documentation generated for the news system are several new and revised HELP files, revisions to the SOS manual, Introduction to the DECsystem-10, Introduction to Batch on the DECsystem-10, IBM-DEC FORTRAN Differences, several reference guides, Operating System Commands Reference Card, and many OFF-LINE articles.
22. TELL and MESSAGE were installed so users could send messages to each other (see "HELP TELL").
23. System programmers have been working on streamlining the DC76 asynchronous front end to improve autospeed recognition.
24. System programmers are working on bringing up a dual-processor, virtual memory system. This should be tested out during the summer and debugged by fall.

#### FORTRAN DIFFERENCES MANUAL AVAILABLE

CSO's IBM-DEC FORTRAN Language Differences is now available to users with the proper PS numbers in the Accounting Office, room 134 DCL. This manual gives a complete description of the differences between IBM FORTRAN G and DEC-10 FORTRAN IV. A chapter on extensions available in DEC-10 FORTRAN-10 is also included.

#### FORTRAN G NOW ON UIC FAST-BATCH

FORTRAN G is now available on UIC's FAST-BATCH system. Up to 20 seconds of execution time are available (the default is two seconds), with 448K and 20 printed pages of output.

To use FORTRAN G on UIC's FAST-BATCH, the following JCL should be coded:

```
/*ID PS=ps#
/*ID CODE=code,SYSTEM=UICFORTRAN
<FORTRAN source>
$ENTRY
<data>
/*
```

The JOBPARM ID card parameter can be used to get up to 20 seconds of execution time (TIME=n) or the FORTUOI library (LIBRARY=FORTUOI). For example, to get 16 seconds of execution time and to use FORTUOI, a user would add this ID card to his deck:

```
/*ID JOBPARM='TIME=16,LIBRARY=FORTUOI'
```

During the past months, the speed and efficiency of UIC's FAST-BATCH system have been increased. On the busiest day last quarter, FAST-BATCH jobs had an average turnaround time of six minutes. UIC's FAST-BATCH system was explained in the last issue of OFF-LINE (June 13, 1975).

### BMDP STATISTICAL PROGRAMS

The following article is adapted from an article written by Larry Koranda in UIC's newsletter, "Communication Channel", for June, 1975. This explains a facility now available at UIC. (Use a "SYSTEM=UIC" ID card parameter to use the UIC computer.)

The new P-series of the Biomedical Computer Programs written at the Health Sciences Computing Facility of UCLA is now available to users. BMDP programs provide many new features not found in the older BMDO statistical programs. For example, the fixed format previously used on program control cards has been changed to an English language control system. New statistical techniques include cluster analysis programs, maximum likelihood factor analysis, backward stepping in regression, nonparametric tests, Winsorized estimates of means, and analysis of repeated measures. The graphical output of the P-series programs has been extended to provide histograms, univariate and bivariate plotting, normal probability and residual plots in the regression programs, factor loadings and factor score plots, cluster trees, and canonical variable plots. (NOTE: UOI users cannot plot at UIC -- this facility will be available at UOI when we get the P-version of BMD installed.)

Many of the BMDO-series programs have counterparts in the P-series. Therefore, old BMPO versions will be replaced by new programs in the near future. BMDO programs which have no replacements will be retained until the P versions are completed.

The procedure for invoking new BMD programs is:

```
/*ID PS=ps#
/*ID CODE=code,SYSTEM=UIC,REGION=256K
// EXEC BMDP,NAME=BMDPnn
//SYSIN DD *
<program>
/*
```

where nn is the code number for the requested program, e.g., NAME=BMDP2V. Required region size is 256K.

Users should see the Statistical Services Consultants, room 84 Commerce West, if they have problems with BMD programs.

### SERVICE PROFILE FOR MAY, 1975

The following statistics represent all usage of the IBM 360/75 during May:

<u>JOB CLASS</u>	<u>TOTAL JOBS</u>		<u>TOTAL CPU TIME</u>		<u>AVERAGE TURNAROUND</u>
	<u>NUMBER</u>	<u>PER CENT</u>	<u>MINUTES</u>	<u>PER CENT</u>	<u>(Minutes)</u>
EXPRESS	23068	32.9	723	2.8	22
A	27976	39.9	2831	10.8	58
B	9737	13.9	3486	13.3	118
C	5497	7.8	4152	15.9	298
D	1838	2.6	3334	12.8	509
E	669	0.9	2928	11.2	885
F	153	0.2	1213	4.6	1363
G	150	0.2	2154	8.3	1519
O	979	1.4	5263	20.1	1115



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JULY 11, 1975

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POLICYNew OFF-LINE Format

This issue of OFF-LINE marks an important first for CSO. Now OFF-LINE is produced using RUNOFF, a DEC-10 text formatting program. By using the computer, last minute corrections and additions are much easier to make.

Also, an organization is possible. OFF-LINE is now subdivided into five areas of concentration: the POLICY section contains non-technical news about CSO administrative decisions; the SYSTEM NOTES section contains technical news about CSO activities; the LANGUAGES section contains news about specific languages; the SYSTEM PERFORMANCE section, included once a month, contains reports on turnaround and uptime on CSO's machines; and the TECHNICAL NOTES section is a mix of announcements about small system changes and modifications that probably won't affect anyone, but should be documented somewhere.

Users interested in submitting articles for OFF-LINE publication, or who have comments about OFF-LINE, should visit or call Paula Jones, room 120 DCL, 333-6492.

Test Sunday July 13

There will be a test Sunday on July 13, 1975. All jobs run on CSO's IBM 360/75 between noon and 5pm will be run free of charge. All jobs in the system at 5pm will be lost. System programmers will be testing out Multiple Console Support (see TECHNICAL NOTES).

ISR RJE Hours Changed Again

Revised Illinois Street Residence Halls RJE Hours are 11am to 10pm, seven days a week. CSO users should note that the ISR terminal, located in the basement of the Wardall tower at ISR, is filled with ten keypunches, three CRTs, two Teletypes, and very few users.

SYSTEM NOTESPSINQ Program Now on DEC-10

A version of the PS INquiry program has been installed on the DEC-10. See "HELP PSINQ" for details.

Detached Jobs Zapped After 8 Minutes

If a DEC-10 job is detached and idle (where idle is defined as no cputime, diskreads, and diskwrites) for more than eight minutes, it will be removed from the system via KJOB/F, if possible. Jobs which are over disk quota are left detached.

Jobs running SOS or TECO are removed as follows: an "E:SOS.ZAP" command is sent to SOS; an "EX\$\$" is sent to TECO. This is an attempt to preserve an edit in progress, but it is by no means foolproof. The best procedure is for a user to delete his own detached jobs promptly.

DEC-10 CHARGE Program Developed

CHARGE is a DEC-10 program that gives the user the amount of CPU time, kilo-core-seconds, connect time, and service unit charges that he has used up to the point when CHARGE was run during that login. Type "\_HELP CHARGE" for more details.

SOS Reference Card Available

CSO's SOS Reference Card is now available in the Accounting Office, room 134 DCL. The card is a handy reference to all SOS commands, parameters, matching characters, and command formats.

LANGUAGESIMSL's New VXPADD Implemented

In the April 18 issue of OFF-LINE, users were warned of an error in VXPADD, an IMSL subroutine. A problem with the code occurs if the first of two numbers dealt with by VXPADD differ by a number on the order of  $16^{**14}$ . The code does not unnormalize the value being added to the least significant double word register (accumulator). The most significant register is unaffected.

A new version of VXPADD from IMSL corrects the problem and has been installed on CSO's IBM 360/75. The error situation, we believe, was very unusual and occurs with extremely small probability. Refinement in many IMSL routines using VXPADD would have corrected an occurrence of the problem there.

Features of SPSS Version 6

This article describes many of the new features of SPSS Version 6. To run a Version 6 SPSS program, use the following JCL:

```
/*ID PS=ps#
/*ID CODE=code
// EXEC SPSSV6
   <program>
/*
```

The new features are described in detail in the Second Edition of SPSS, published by McGraw-Hill, 1221 Avenue of the Americas, New York, NY 10020. This manual also includes extensive new discussions of multivariate techniques (chapters 20 through 22), with detailed instructions on how to run and interpret path analysis, dummy variable regression, non-linear regression and analysis of variance and covariance.

New Statistical Capabilities

Analysis of Variance	ANOVA procedure performs n-way analysis of variance with covariates and produces MCA tables. The user has the choice of the classic experimental, the hierarchical, or the regression approach, and may have covariates entered before, with, or after factors.
Canonical Correlation	New CANCORR procedure allows for more flexible specification of relate lists. The user may specify processing criteria. Canonical variate scores for each case may be written on an "FT09" file.
Discriminant Analysis	New DISCRIMINANT procedure gives the user considerably more control over processing criteria, including choice of direct or five stepwise methods of entering variables. A variety of plots and classification tables are available. Discriminant scores for each case may be written on an "FT09" file.
Z-scores	May be written on an "FT09" file by the CONDESCRIPTIVE procedure.
Residuals, Factor Scores	May now be produced during subfile processing.
Regression with Pairwise Deletion	Degrees of freedom are now calculated from the regression list rather than the variable list.

New Larger Version of SPSS



SPSSM (1000-variable version) SPSSM is identical to SPSSH, the 500-variable version, except that it processes up to 1000 variables and 200 subfiles, and allows twice as many elements in the INPUT FORMAT statement and twice as many variables to be recoded.

SPSSM requires a region of 240-250K when the default SPACE of 80K is used; the 500-variable version requires 200-210K with the default 80K space.

SPSSG, the 100-variable version which runs in 100K, is also available.

### New File-Management Capabilities

Multiple "FT09" output files With the new RAW OUTPUT UNIT control card the user may use any or all of units FT09F001 and FT15F001 to FT20F001 for output data. Thus when several types of output data (e.g., correlation matrices, WRITE CASES data, residuals) are produced in a single job step they may be placed on separate output units.

### Data Transformation

Data transformations are now stored in a portion of the statistical procedure's work space, rather than in fixed-length arrays. The default is to reserve 1/8 of the working space for transformations, but the user may increase or decrease the size of this reserved area by means of the new ALLOCATE control card.

This enables users to perform large amounts of data transformations on a single run. (The number of variables which may be recoded has been increased from 140 to 400.)

Since a separate ALLOCATE card may be placed before each statistical procedure, space needed during the first procedure for permanent transformations may be released for statistical manipulations in later procedures.

This change has reduced the size of the load module by approximately 10K.

### DATA LIST

The new DATA LIST control card provides a simplified method of defining variables and specifying their location on the raw input data file ("FT08" file) and the format with which they should be read. It may be used in place of the VARIABLE LIST and INPUT FORMAT

cards. The style of the DATA LIST card is similar to the codebook specifications many social scientists use to describe their data sets, and should be less error-prone than the INPUT FORMAT card.

Similarly, ADD DATA LIST may be used in place of ADD VARIABLES and INPUT FORMAT.

#### WRITE FILEINFO

The new WRITE FILEINFO facility will produce SPSS control cards which correspond to the file- and variable-definition information of an SPSS system file. This facility, in conjunction with WRITE CASES, helps users to re-create system files at different computer installations.

#### SPSS Archival and File-merging Facilities

The GET ARCHIVE and SAVE ARCHIVE facilities have been improved. SAVE ARCHIVE now produces a single archive file of up to 5000 variables, and preserves all variable and value labels, including those of latent (non-active) variables. The LIST ARCHINFO facility (analogous to the old DUMP facility) provides information on the contents of archive files.

Users who wish to merge two to five system files into a single system file of 500 or fewer variables may also use the analogous MERGE FILES facility.

#### Aggregated Files

The AGGREGATE procedure has been improved, providing a greater variety of aggregated statistics. Up to twenty-five variable lists may be entered, and a separate missing value specification may be included for each list.

The values of the grouping variables may be written on the aggregated output file.

#### Binary Raw Input Data

Binary input data may now be entered into SPSS by specifying the keyword BINARY on the INPUT FORMAT card.

Associated with the BINARY keyword is an (optional) format list which may be used to select the data elements to be read. Omission of the format list causes all data elements to be read.

#### Defining a Subfile Structure

The procedure for defining or redefining subfiles has been simplified. The number of cases in a subfile is now entered on the SUBFILE LIST card along with the subfile

name, and the SUBFILE LIST card may be used any time a new subfile structure is desired.

### Miscellaneous Niceties

CROSSTABS, CONDESCRIPTIVE,  
and FREQUENCIES Indexes

CROSSTABS, CONDESCRIPTIVE, and FREQUENCIES now produce optional indexes which list the name and output page number of each variable (or table) processed. (FREQUENCIES is a new procedure which replaces CODEBOOK, MARGINALS, and FASTMARG.)

Breakdown Tables in  
Crosstabulation Format

The BREAKDOWN procedure will print tables in crosstabulation format when the CROSSBREAK keyword is used.

Printing of Correlation  
Matrices

PEARSON CORR and PARTIAL CORR will now optionally print condensed matrices of correlation coefficients (without the N of cases and significance) with \* and \*\* appended to coefficients significant at the .01 and .001 levels.

When using pairwise deletion the REGRESSION procedure will optionally print a matrix which contains correlation coefficients in the lower triangle and number of cases for the correlation coefficients in the upper triangle.

Saving paper

The new NOEJECT keyword for the PAGE SIZE control card will suppress page ejects. A dotted line will be printed to separate "logical" pages.

### EISPACK II Added to NEW:FORLIB

The 70 routines in the EISPACK II package have been added to the NEW:FORLIB on the DECsystem-10. The package solves the standard and generalized eigenproblems. The routines are the same as are available on the IBM 360/75, except that the EISPACK control program is not available; the individual routines must be called. For the names of the files containing documentation for individual EISPACK routines, type:

\_DIR DSKB:\*.DOC[ 10,15]

For a subject index of the EISPACK routines, type:

\_TY DSKB:EISDOC[ 10,15]

Technical Notes

This section is dedicated to the user with highly advanced programs that could be affected by slight changes on the DEC-10 or the IBM 360/75. This section assumes a knowledge of the procedure involved and is not intended to be tutorial. Most users probably will not be interested in reading this section, and will find that all important system announcements are explained in full in earlier pages of OFF-LINE.

Multiple Console Support -- System programmers are working on installing a new system on the IBM 360/75 that will support IBM's new 3277 CRT consoles. The MCS system will be cheaper and more reliable than the 1052-1443 console combination CSO now is using. This will allow CSO to have a 360 CRT console in both the Routing Room and at the 360 console. If all goes well, this should be installed some time this month.

Detached Jobs Zapped--OPR SUBJOB Z is now running ZAP, which initially gets rid of detached jobs which aren't doing anything. Other functions will be added later. Some useful information:

1. Initially ZAP won't respond to any commands but a "^A". "Z-^A^A" will kill it. It can be restarted again by "Z-R ZAP".
2. Jobs are zapped if they are detached and idle for more than eight minutes (idle is defined as no CPU+diskreads+diskwrites). Since the detached job manager only wakes up once each four minutes, and DAEMON wakeups are not precise, the job may be detached and idle for up to 16 minutes. If an idle job is zapped, the message "ZAPDIJ DETACHED IDLE JOB NN[P,PN] ZAPPED" is produced on the console.
3. ZAP won't get rid of a job if it is over disk quota or won't come to monitor level properly (for any number of reasons). It produces an error message on the CTY the first time it fails to get a job off, and every fourth time thereafter as it continues to try to get rid of the job. If the job just won't wake up to be zapped, the operator will usually be able to KJOB it manually by attaching to it and "^C"ing for a while.

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POLICYGoodbye!

This is my last issue as editor of OFF-LINE. By the time you get this issue, I will be in San Antonio, Texas, working as a technical writer for Datapoint Computer Corp.

I want to thank everyone for being so very helpful and encouraging while I made my way through lots of learning experiences here. Bob Foster will take over as editor of OFF-LINE. I'm sure that with everyone's continued cooperation, OFF-LINE will continue to grow.

No Special Forms on the DEC-10 Printer

Because CSO does not have a dedicated DEC-10 operator, CSO is not supporting special forms on the DEC-10 printer. Users can print with special forms on the IBM printer in the Routing Room. See "HELP LST360" for details on how to print a file on the IBM printer.

SYSTEM NOTESNew PROCLIB Facility Installed

"Easy Reader", a program product of Subsystems, Inc., has been installed on the IBM 360/75. This extension to the operating system implements a "PROCLIB" statement. Users may now maintain their own catalogued procedure libraries.

A procedure library is a partitioned data set on one of the permanently mounted 3330 disks (UIPUB1, UIPUB2, or UIPUB3), with the DCB attributes

```
DCB=(LRECL=80,BLKSIZE=nn,RECFM=FB)
```

where nn is an even multiple of 80 up to 3120. Members of the data set may contain procs in card-image form. These members will be used by the system when referred to by a job with a PROCLIB statement before any EXEC cards. If the proc is not found in that data set, the system proc library will be searched. It is not possible for this procedure library to be on a setup disk pack.

To create and use a PROCLIB, follow these steps:

1. Allocate space for the data set on one of the public disk packs. Here is an example of allocating space:

```

/*ID <ID card parameters>
// EXEC DUMMY
//ANY DD UNIT=3330,VOL=SER=UIPUB3,DSN=USER.P1234.MYPROCS,
// SPACE=(TRK,(1,1,10)),DISP=(,CATLG)
/*

```

2. Members of your proc library must be added to this data set. Here is an example of adding a member to the data set:

```

/*ID <ID card parameters>
// EXEC PGM=IEBUPDTE,PARM=NEW
//SYSPRINT DD SYSOUT=A
//SYSUT2 DD DSN=USER.P1234.MYPROCS,DISP=OLD
//SYSIN DD DATA
./ ADD NAME=HORRAY
//HORRAY PROC
<the rest of the text for the proc follows>
/*

```

This user could have used more "./ ADD" cards to add more than one member to his catalog procedure library. See the IBM Utilities manual for complete instructions on how to use IEBUPDTE. The consultants, room 166 DCL and room 70a Commerce West, can give more complete advice on maintaining partitioned data sets.

3. Here is how the user used his proc library:

```

/*ID <ID card parameters>
//PROCLIB DD DSN=USER.P1234.MYPROCS,DISP=SHR
// EXEC HORRAY
<program>
/*

```

Users who need to use JOBLIB DD cards with the PROCLIB DD cards may put the cards in either order. All that matters is that they both appear before the first EXEC card, and after the ID and SETUP cards.

### DEC-10 Downtime Problems

CSO DEC-10 users recently have experienced some problems with unscheduled downtime. CSO appreciates everyone's cooperation and has been working hard to fix the bugs that have created the problems. These are some of the problems CSO has faced:

1. After months of searching, the hardware problem in the link between the DEC-10 and the IBM 360/75 was isolated. This bug occasionally caused double character transmission over the link. Users who experience any further transmission problems should bring them to the attention of the consultants in room 166 DCL or room 70a Commerce West.

2. The software for the link doesn't handle error conditions well (conditions such as when the 360 crashes). CSO system programmers are working on replacement software that will have more capabilities and will be more resilient.
3. A lot of the extra scheduled downtime (from midnight to 5am) has been for the DEC engineers to work on the installation of the second processor for the DEC-10.
4. Over a month ago, a hardware problem in the controller for the RP04 disk drives brought the DEC-10 down for a day and a half and wiped out all the disk files. The disks had to be restored from FAILSAFE dumps that were taken on day before the crash.
5. CSO is undertaking a major system reconfiguration on the DEC-10, with the introduction of a second processor and virtual memory, therefore a lot of new things are being tested. Whenever a machine is tampered with in any way, things may go wrong. Because of this, no work is being done on the installation of the second processor until July 30. After that time, CSO may schedule more downtime to complete installation.

#### DEC-10 TALK Program Added

TALK is a program that allows two logged in terminals to communicate directly with each other. Type "HELP TALK" for details.

#### ESTIMA Estimates 360 Charges

See "HELP ESTIMA" for details about a program that estimates the charges for IBM 360/75 batch jobs based on the resources used in those jobs.

#### Use Suggestion and Complaint Forms

After much encouragement, users are now giving CSO a steady flow of comments on the User Suggestion and Complaint Form. It is CSO's policy to answer these forms in writing within a week and, with very few exceptions, we have kept to this policy. Below are a few of the most popular complaints and suggestions and the general responses which they receive.

1. Those RJE stations with 300 cpm card readers (ME, Chemistry,...) have not performed reliably during the past few months. Cards have been read in error or occasionally skipped.

ANSWER: We have had considerable difficulty with the maintenance program for the slow card readers and almost no difficulty with the 600 cpm readers (CSO South, CSO North,...). The design of the readers is somewhat different and it is more important to take

specially good care of the 300 cpm readers. Nevertheless, we do not feel that a satisfactory job is being done on the maintenance and have notified DEC about the necessity of correcting this or working out a replacement program. As a short term aid to the users, we are giving refunds on reader errors independent of their cost.

2. CSO has recently adopted the policy of removing files from disks on the system when the files are not used for a period of 30 days. This is an inconvenience to the users since they feel that the files on disk serve as a repository for use at any time.

ANSWER: It is a great convenience if a file system is large enough to hold all of the files which users would like to leave there. Unfortunately, CSO cannot afford to retain such a large file system and has chosen a policy which puts the most volatile and frequently used information on-line while preserving, in an archive, information which is not actively being used. The length of time for removing files from disk to tape was chosen in such a way that there will be an infrequent recall from the tape to the disk. 30 days is the initial estimate on this. If our experience shows that the time period is not sufficient, we will extend it.

3. Why has CSO cut out refunds below \$2.00?

ANSWER: Unfortunately, CSO operates on a limited budget and we must make decisions on the best allocation of staff time. While our users are certainly justified in requesting refunds below \$2.00, this is a time consuming use of people and not a very useful service given the general volume of business. Also, small refunds were given in a rather automatic fashion and the kinds of problems which they reflected did not get to the attention of CSO management. With the cut off of the refunds at \$2.00, these problems are getting the attention which they deserve.

4. CSO has discontinued reloads. Why?

ANSWER: The old CSO policy was to allow the consultants to reschedule jobs due to errors. This had a significant impact on the turnaround time for users when the turnaround was completely out of control. Given present levels of service, it would have a minimal impact. The reload privilege was sometimes abused and did not really treat all users alike. CSO will attempt to aid any user in the process of getting his work done and meeting his deadlines independent of whether he has been the subject of an error on our part. As in the case of other questions, this answer reflects an allocation of resources to concentrate on real problems rather than dividing the attention of the staff to treating crises.

5. CSO almost never hears this question, but we have the feeling that it is an important one and would appreciate it if all users notified us when this problem comes up:

Where is my lost output?



6. What is the state of the link between the 360 and the DEC-10? Why has the DJOB facility frequently been behind schedule?

ANSWER: Over the first several months of the DEC-10 service, there have been a variety of problems related to the link between the two machines. Most of these have been repaired and the link is now running reliably most of the time. It is relatively unusual to find the DJOB data more than 10 minutes out of date. There are two projects going on within CSO to enhance the performance of the link and both will be completed before the start of the next semester. The first is a reworking of much of the software supporting the link. This should improve both the reliability and the error handling capability of the system. Secondly, the speed of the link is being increased by a factor of 10.

These are some of the topics which have been most frequently discussed in the complaints, suggestions, and comments from our users. We invite you to raise your own questions as this is the best means of bringing them to our attention and getting action on them. Complaint forms are available at all RJE's.

#### LANGUAGES

##### SPSSM Now at UIC

SPSSM, the extended version of SPSSH that allows 1000 variables per file, is now available at UIC. To use SPSSM at UIC, use this JCL:

```
/*ID SYSTEM=UIC
/*ID <other ID card parameters>
// EXEC SPSS,VER=M
//GO.SYSIN DD *
   <SPSS control cards>
/*
```

See the last issue of OFF-LINE (July 11, 1975) for more information about SPSS facilities.

##### SAS Available on UIC's FAST-BATCH

The following article is adapted from the article by Brian Gravenhorst in UIC's Communication Channel for July, 1975.

The Statistical Analysis System (SAS) is now available on UIC's FAST-BATCH system. It will perform all the SAS functions. Current processor limitations are 20 seconds of CPU time and 2000 lines of output.

To run a SAS job on UIC's FAST-BATCH system, use the following JCL:



```

/*ID SYSTEM=UICSAS
/*ID <other ID card parameters>
   <SAS program>
/*

```

Parameters can be passed to SAS via the JOBPARM ID card parameter. The following parameters can be passed:

T=xx or TIME=xx      xx=time in seconds. Default is 20.

L=yy or LINES=yy      yy=thousands of lines. Default is 2.

SEQ or NOSEQ      SEQ means there are sequence numbers punched in columns 73 - 80 on the input control statements. NOSEQ means columns 73 - 80 on the input control statements are blank. If SEQ is coded, the sequence numbers will be ignored. Default is NOSEQ.

For example, a user could code this JOBPARM ID card parameter for his SAS program:

```
/*ID JOBPARM='T=15,SEQ'
```

#### New IMSL and EISPACK Routines

The latest (and final) version of EISPACK for the IBM 360/75 is now on-line on the 360, as well as edition 4 of the IMSL library. These routines are all currently in a library which may be accessed with the following FORTRAN EXEC JCL statement:

```
// EXEC FORTLDGO,LIBFILE='SYS9.FORTUOI'
```

The LIBFILE parameter will not work with the FORTGCLD or FORTGCLG FORTRAN cataloged procedures.

After August 1, this special JCL will no longer be necessary and only the new EISPACK and IMSL routines will be available.

In IMSL edition 4, routines DCSLM1, FTFUNC, VMULQQ, and ZSYSTEM have had their calling sequences changed, so please check the IMSL manual before using the new versions of these routines. Also, the following routines have had the description of some of their parameters changed: DREBS, EQRT2S, GGBTA, GGEXP, GGNOR, GGNRM, GGPOSH, GGPOSR, GGSPR, GGU1, GGVACR, GTPRT, MDSTI, VCVTFS, and VCVTSF.

For a complete list of changes and updates in IMSL edition 4, see the math consultants in room 166 DCL. For documentation on the new EISPACK, see the math consultants (for verbal information) or use this JCL to obtain documentation on a specific routine:

```
/*ID <ID card parameters>
/*SETUP UIMATH DISK
// EXEC COPY
//SYSUT1 DD DSN=UIMATH.EISPACND(XXXDC),DISP=SHR
//SYSUT2 DD SYSOUT=A
```

where xxx is the name of the routine.

An article appeared in the June 13, 1975 issue of OFF-LINE on the new EISPACK routines. The most important additions to EISPACK, as cited in that article, are:

1. Routines for the generalized eigenvalue problem  $Ax = \lambda Bx$ .
2. Routines for linear least squares fitting.
3. Routines for banded eigenproblems.
4. Methods for handling matrices in a packed storage mode, allowing, for instance, to halve the array storage required for a symmetric problem.

#### MPSX to be at UIC Only

On August 31, 1975, MPSX will be withdrawn from CSO's IBM 360/75. Users that want to use MPSX will have to use UIC's computer after that date. To use MPSX at UIC, use the same JCL as for UOI, with the addition of the "SYSTEM=UIC" ID card parameter.

#### New UIM SORT Utility Available

This article is adapted from a memo from UIM.

A new SORT utility has been installed at UIM. This program has several improvements over the old SORT program. Two of the most significant features are the printing of SORT parameter cards and the use of 3330 disks as SORT work areas.

If you currently use the UIM procedure called "SORT", you may leave all your DD and parameter cards the same and change the procedure name SORT on the EXEC card to SM1. For example, a SORT step using the new program might look like this:

```
// EXEC SM1
//SORTIN DD <DD card parameters>
//SYSIN DD *
SORT FIELDS=(1,20,CH,A)
/*
```

The SIZE and OUTPUT parameters are still valid on the EXEC card of SM1 as

they were on that of SORT.

If you do not wish to use the new cataloged procedure, you may use the JCL described in either the new or old IBM SORT/MERGE manuals with three exceptions:

1. The program name is SORT.
2. A STEPLIB card must be inserted after the EXEC card. The format is:

```
//STEPLIB DD DSN=SYS1.SMO1LIB,DISP=SHR
```

3. The SORTLIB DD card is now as follows:

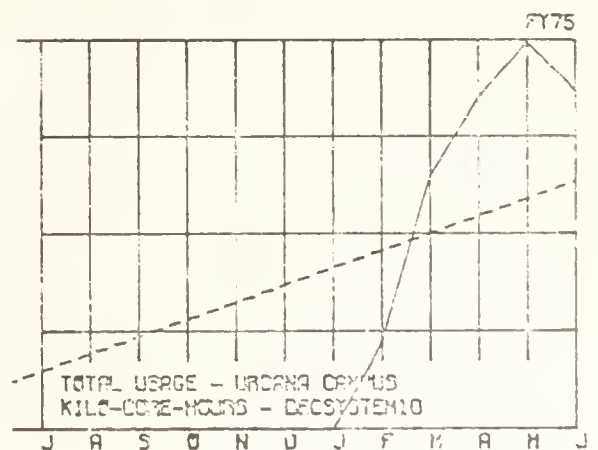
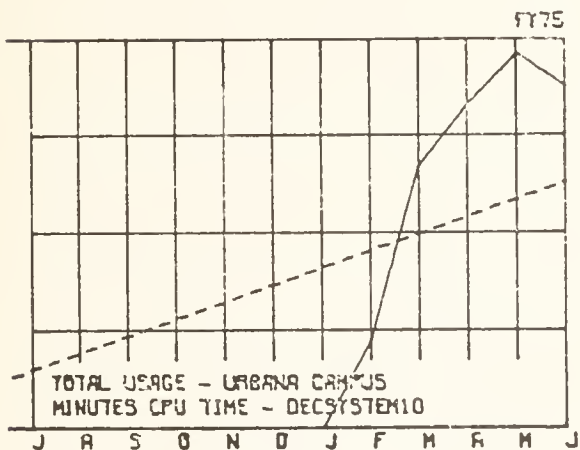
```
//SORTLIB DD DSN=SYS1.SMO1LIB,DISP=SHR
```

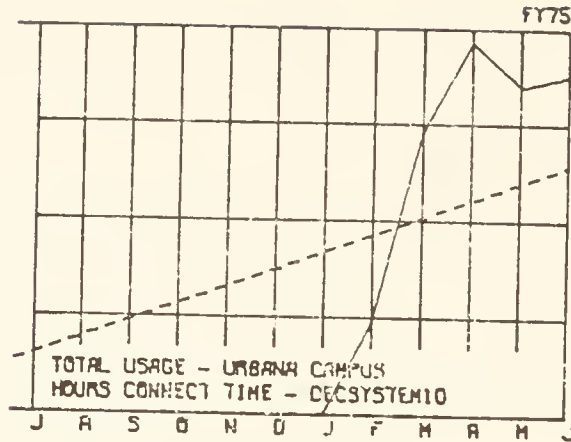
The old SORT program still exists, but it is recommended that you convert to usage of the new program soon.

### SYSTEM PERFORMANCE

#### DEC-10 Statistics

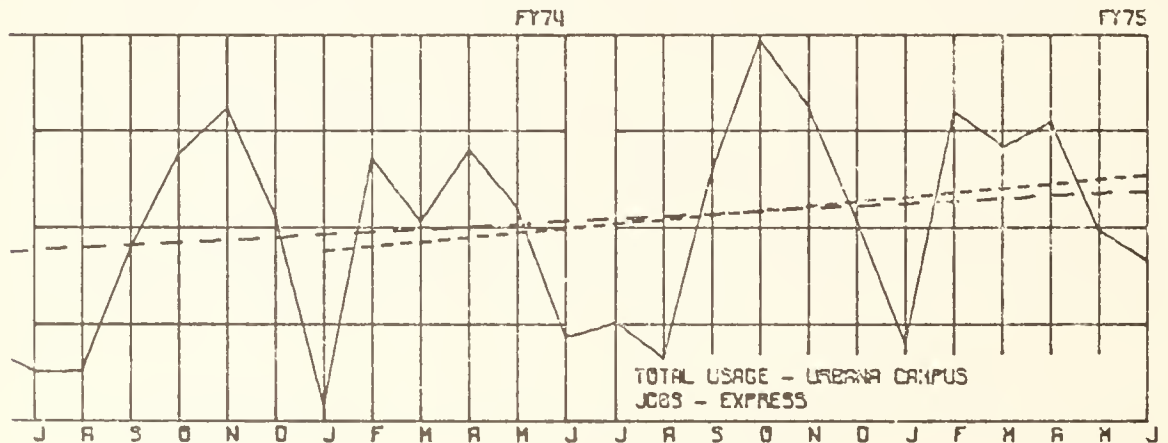
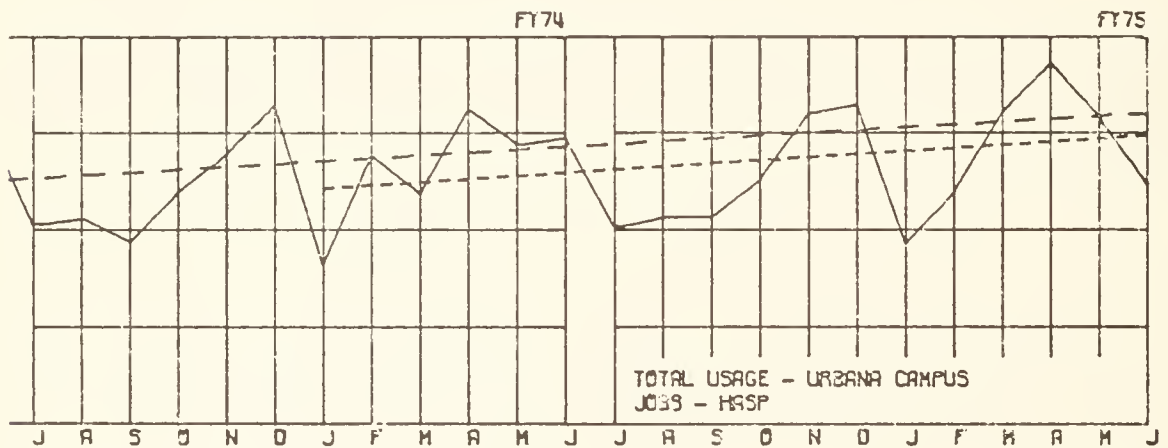
The following charts give the total usage for the DEC-10 for fiscal year 1975 in regard to cpu time, kilo-core hours, and connect time. The heavy charted line is the actual amount. The dotted line is the least squares linear fit.

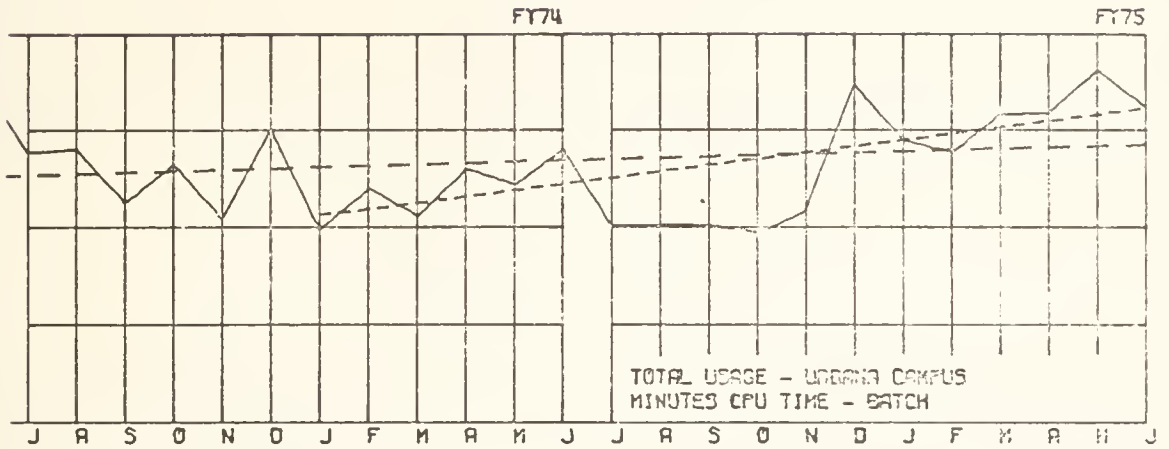




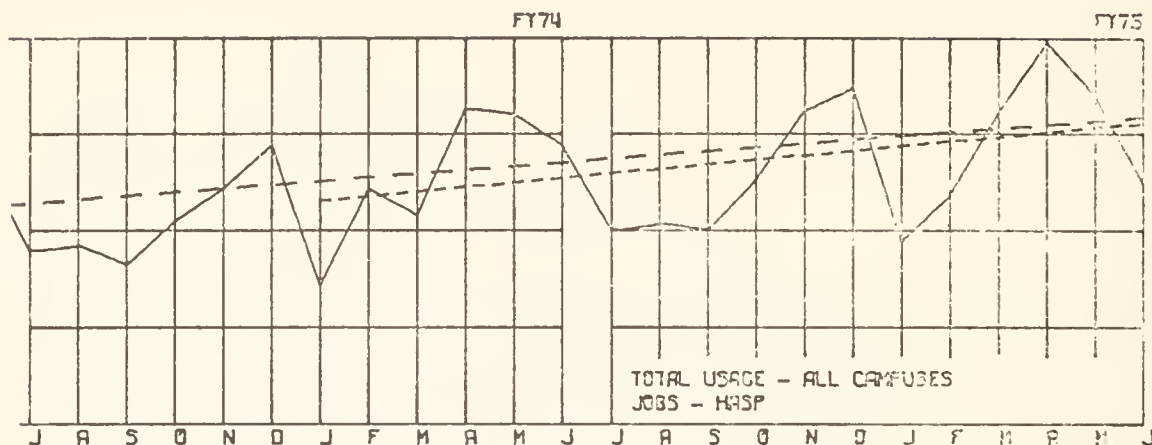
IBM 360/75 Fiscal Year Comparisons

The following charts shows the use of cpu time and the number of jobs run on CSO's IBM 360/75. The heavy line is the actual amount. The dotted line is the least squares linear fit. And the closely dotted line is the linear least squares fit of that period.





The following chart gives CSO's usage of all IBM computers (including CSO's IBM 360/75, as well as UIM and UIC).



### Technical Notes

This section is dedicated to the user with highly advanced programs that could be affected by slight changes on the DEC-10 or the IBM 360/75. This section assumes a knowledge of the procedure involved and is not intended to be tutorial. Most users probably will not be interested in reading this section, and will find that all important system announcements are explained in full in earlier pages of OFF-LINE.

PASCAL -- NEW:PASCAL and NEW:PAS were put in SYS:. These versions include a minor change that will correctly insert INCHAR and OUTCHAR procedures.

FORTGCLD at UIC -- The problems with the FORTGCLD proc at UIC that were bothering users for about 10 days are now fixed.

New LISTDISK -- A new version of LISTDISK has been installed on HASP and EXPRESS at UOI and at UIC and UIM. Changes include:

1. The EXPRESS and HASP source is the same, with an assembly parameter defining the differences.
2. Internal tests were installed to see if any tables overflow.
3. Clearer error messages were added.
4. With variable table size, the tables are not directly addressable; an address variable is used.

If you encounter any problems, see the consultants. All of these changes should be transparent to most users.



HASP Changes -- Recent HASP changes include: "PRINT=PLORTS" ID card parameter deleted; CIVIL is now Remote 81 instead of 22; and the lines limit on the Remote 11 printer is 512.



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# Off-Line

VOL. 3, NO. 22 AUGUST 8, 1975

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OFF-LINE is the newsletter of the Computing Services Office at the University of Illinois at Urbana-Champaign. OFF-LINE is printed every two weeks except for interruptions due to holiday schedules. Articles may be reprinted provided that the source of the article is noted. CSO operates an IBM 360 model 75 with one million bytes of fast core and two million bytes of slow core, under HASP and OS, and a dual-processor KI10 DECsystem-10 with 256K words of core, under TOPS-10 Version 6.01B, serving up to 80 simultaneously active terminals.

POLICYFAR Remote Job Entry Station To Open

A new remote job entry station in the Florida Avenue Residence Halls will be opened August 25, 1975. The RJE, to be located in the former Library Room, will include a 600 LPM printer, 600 CPM card reader, PDP-11 remote station, ten keypunches, and four interactive terminals.

Operator-consultants will man the RJE during its hours of operation, which will be announced in the next OFFLINE and in the forthcoming Student Guide. The Department of Computer Science will also man the center with graders for some of its 100-level courses.

The RJE is the second to be opened in the residence halls. The first, in the Illinois Street Residence Halls, was opened in February of this year. By the end of the spring semester, the ISR station was running about 350 student jobs a day. The cost of operating the RJE's is shared by CSO and the Housing Division.

With the opening of this latest student center, student Express service will no longer be offered at the Digital Computer Laboratory.

Pick Up DEC-10 Paper Tape

Users who have punched paper tape on the DECsystem-10 are reminded to pick up their output at the routing room windows, CSO North. A quantity of unclaimed paper tape output has accumulated there.

Beginning September 1, and each two weeks thereafter, any paper tape output more than two weeks old will be discarded. Special arrangements for longer storage must be made with Don McCabe. This is the same procedure followed for all other output.

Plotter Policy

In order to minimize the turnaround of most plot jobs during the busy weekday hours, CSO will not schedule any plots which will run over one hour between 1000 and 2000 Monday through Friday. Small special plot jobs (India ink, wide paper) may be run during these hours when the plot queue is otherwise empty.



### Semester Break Consulting Hours

During the semester break, through August 24, the system consulting office at CSO North will be open only Monday through Friday from 9:00 A.M. to 5:00 P.M. The Statistical Services group and the system consulting office at CSO South will continue their regular schedules; they are open from 9:00 A.M. to noon, and from 1:00 P.M. to 5:00 P.M., Monday through Friday. Statistical Services is also closed from 1:00 P.M. to 2:00 P.M. each Wednesday, for a staff meeting.

### User Accounting on the DEC-10

User level accounting will be available on the DECsystem-10 for the Fall semester. Instructors may assign previously generated IBM 360 user numbers to corresponding DECsystem-10 project-programmer numbers by completing a new form in the Accounting Office, 134 DCL.

The actual billing to user numbers from the corresponding project-programmer numbers will be implemented by the start of the Fall semester, August 25. At that time, deactivation of an IBM 360 user number will result in deactivation of the corresponding DECsystem-10 number. Accounts will be updated on a daily basis.

### Attention Instructors Using DEC-10

If you will need DECsystem-10 manuals for your classes, check with the bookstore before the Fall semester begins, so they can order them if insufficient quantities are in stock.

### SYSTEM NOTES

#### Virtual Memory Monitor on DECsystem-10

TOPS-10 version 6.01B has been installed on the DECsystem-10. This version of the monitor allows users with virtual memory privileges to run partially core resident programs. The previous monitor required that a program be entirely resident in core before it could begin execution.

At present, only the staff is permitted to use the virtual memory option, while we gather statistics about its performance. Thus, the change should be transparent to users except for a few extra lines in the response to the .CORE monitor command (for documentation, see HELP CORE). A policy for user use of the virtual memory option will be announced in the first OFFLINE after the beginning of the fall semester. At that time also, user

documentation will be available.

The expected benefits of the virtual memory facility are:

1. The ability to respond to special requirements for large core applications without degrading the performance of the system as a whole.
2. The ability to run certain system software at all times of the day (perhaps the performance of this software will be degraded at some hours, but at least it will be available).
3. Better overall performance due to an improved swapper algorithm and disk optimization added in the 6.01 monitor.

So far, the 6.01 monitor has proven more reliable than the 5.07 monitor it replaces; there were no software caused crashes at all in the first week of 6.01 operation.

#### SOS Bugs Fixed

The bug in SOS which permitted a user to delete the file he was accessing in read-only mode has been fixed. In addition, "Are you sure?" messages are typed out whenever the user attempts to exit with an ED (exit and delete the original file) or an EBD (exit and delete the original file and the backup file).

#### UIPUB4 Disk Now Available on 360

A new public disk pack for user data sets, UIPUB4, has been installed for users of the IBM 360/75. The pack may be used the same as are UIPUB1, UIPUB2, and UIPUB3 currently. See the system consultants for specific advice.

#### See IBM Procs on DEC-10

A DECsystem-10 user can now examine the catalogued procedures available to him on the local IBM 360/75, or on the Medical Center 370/155, by typing .R PROC.

The PROC program will ask which library to search (currently UOI, USR, IBM or UIM), the name of the procedure to be shown, and for a file in which to copy the procedure. To simply look at a procedure, type TTY: instead of a

file name.

To aid those who have problems remembering procedure names, the program will accept a partial name, and will question the user about each procedure name which begins with the characters typed.

## LANGUAGES

### TELL STATSERVICES Your Problem

The CSO Statistical Services group has set aside a PPN for communicating with its users. To pass on a suggestion, gripe, or question about statistical software supported on any machine accessible from the DECsystem-10, simply .TELL STATSERVICES. (See HELP TELL for more information about the TELL program.)

Statistical Services consultants will respond, also via TELL, directly to any person who uses this facility, usually within the same day.

### PASCAL INCHAR and OUTCHAR Procedures Added

As briefly noted in the last OFFLINE, the INCHAR and OUTCHAR procedures were added in the last update of DECsystem-10 PASCAL.

Both procedures take a single CHAR argument; INCHAR reads a single character from the users TTY: (in line wait mode), and OUTCHAR types a single character on the TTY:. All ASCII values are transmitted by the procedures. In particular, the user must be prepared to deal with carriage returns and other end of line characters, and must explicitly output them.

The procedures were primarily designed for use in minor system utilities, where the standard PASCAL TTY facility is inconvenient. When they are used, the standard TTY file should be turned off by a %\$T-\ switch at the beginning of the program, or the result will be confusing.

## Technical Notes

This section is dedicated to the user with advanced programs that could be affected by slight changes on the DECsystem-10 or the IBM 360/75; it is not intended to be tutorial. All important system announcements are explained in full in other sections of OFFLINE.

Second KI10 CPU Tests -- Beginning in the last week in July, testing began on both the second KI10 processor (which was delivered in June, but not installed because of the possibility of causing service interruptions during the summer session) and the software to support it. The software, the dual-CPU version of 5.01B, was successfully run in production on a single CPU for several days before OFFLINE went to press. Users should not notice any differences when the second CPU is added, except that response times when there are more than 50 users on the system should be improved.

New DEC-10/360 Link Tests -- The Free Sunday last week was the first public test of the new locally written link software for the DAS78, which connects the DECsystem-10 to the IBM 360/75. The new code capitalizes on the experience CSO gained in developing our PDP11-based remote job entry stations, and should provide substantially improved service. Among the design goals are: full HASP workstation facilities including multileaving (the ability to send in both directions at the same time) and console service (the ability to send and receive responses to operator commands). In addition, escape conventions will be provided which will allow the transmission of the full EBCDIC or ASCII character sets. Software for the DECsystem-10 is being developed concurrently which will permit job inquiries from the DEC-10 about jobs at any of the three IBM machines. The target date for full production use of these facilities is the beginning of the Fall semester.

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# Off-Line

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OFF-LINE is the newsletter of the Computing Services Office at the University of Illinois at Urbana-Champaign. OFF-LINE is printed every two weeks except for interruptions due to holiday schedules. Articles may be reprinted provided that the source of the article is noted. CSO operates an IBM 360 model 75 with one million bytes of fast core and two million bytes of slow core, under HASP and OS, and a DECsystem-10 with 256K words of core, under TOPS-10, serving up to 80 simultaneously active terminals.

POLICYCSO Liaison Committee Formed

The Campus Computer Policy Committee is charged with advising the Vice Chancellor for Academic Affairs on all matters of policy pertaining to academic computing activities on the Urbana-Champaign campus. Because this committee must provide broad campus representation it is relatively large, and its members often carry many other responsibilities. For this reason this committee is convened infrequently, usually to deal with weighty matters such as the acquisition of new computers, or relations involving off-campus computing. This has left the governance structure of CSO with limited access to advice on matters of policy arising in the course of the daily operations of CSO. Both the CSO management and the Computer Policy Committee recognize that this state of affairs weakens the academic governance of CSO by leaving policy responsibility to the CSO staff.

The Computer Policy Committee has decided, therefore, to create another committee, to be called the CSO Liaison Committee. This group, appointed by the Policy Committee and chaired by a member of the Policy Committee will, it is hoped, be able to meet on a more frequent basis and serve as the locus of review for all policy questions related to computer services on this campus.

The Liaison Committee's functions have been defined specifically as:

1. Serve as "overseers" of the CSO operations on behalf of the Computer Policy Committee. Examples of areas for consideration:
  - Scheduling and priority systems.
  - Disk space allocation.
  - Location of equipment.
  - Acquisition of application software.
2. Meet regularly with CSO management staff; become familiar with operations and management questions.
3. Provide liaison between the Computer Policy Committee and CSO; report to the Policy Committee on status of operations and planning of CSO management.
4. This committee will not consider matters which are the province of the Users Committee or the CSO complaint answering system.
5. In interactions with CSO this Committee will play an advisory role. Suggestions and criticisms pertaining to CSO management will be communicated to the Vice Chancellor for Academic Affairs. Dr. Mapother and Mr. Badger will, however, actively participate in the Committee's deliberations.

6. The committee will serve as a communication channel between users and CSO.

The Committee has now been appointed and its membership includes:

William J. Hall, Civil Engineering  
 Duncan H. Lawrie, Computer Science  
 John Scott, Jr., Farm Management and Production Economics  
 Joe L. Spaeth, Survey Research Laboratory  
 Samuel S. Wagstaff, Jr., Mathematics  
 A graduate student will be named by the Graduate Student Association.  
 The Committee is chaired by Emanuel Donchin, Psychology.

The Committee began operations in early May and has decided to meet on the first Wednesday of each month. On its agenda it has placed the following items:

1. Review in detail the process of computer time allocation for instructional and research purposes, at the departmental, campus and CSO levels.
2. Review current policies related to the acquisition, installation, and support of software packages at CSO.
3. Review the availability and feasibility of access to off campus computer sites via the ARPANET or other services.
4. Review planning for new acquisitions at CSO.

Users are encouraged to bring policy issues to the Committee's attention. You can contact any of the Committee's members by phone or letter. Dr. Donchin's extension is 3-3384.

#### CSO Budget Reduced This Year

As part of the general University budget reduction, the CSO budget was reduced \$100,800 from its expected FY '76 level. In addition, the current tightness of money brings into question the amount of "hard" research contract income CSO can prudently anticipate in the coming year. Last year contract income accounted for one-fifth of CSO's budget.

To handle this situation, we have taken several actions:

1. All current personnel vacancies will be held open (not filled), and money from future attrition will be assigned to the most critical areas.
2. Student employment has been cut by approximately one-fourth.

3. Two 3330 disk drives on the IBM 360/75 are being returned as non-funded.
4. Additional disk planned for the DECsystem-10 will not be added.
5. The number of hard-copy terminals purchased by CSO has been cut by four.
6. Service hours will be reduced at all staffed remote job entry facilities, both in operations and consulting. The central machines, however, will continue in operation 24 hours a day. The new RJE schedules are in this issue of OFFLINE.

These measures will enable CSO to deliver the planned level of computing service to the University community. In fact, some activities will be expanded this fall. Examples are the addition of 30 character per second DECwriter II terminals at some RJE sites, and the opening of the Florida Avenue Residence Hall RJE in cooperation with the Housing Division.

#### Hours Cut Back at CSO RJE's

As a consequence of the reduced budget, operating hours have been reduced at the remote job entry stations CSO North, CSO South, and Lincoln Hall. This cutback does not affect the operation of the IBM 360 or the DECsystem-10, which will continue to run 24 hours per day. The DECsystem-10 will be available at all hours to users who own their own terminals.

The new schedules call for CSO North to be closed from 2 A.M. to 8 A.M. Monday through Saturday mornings, and from Midnight Saturday night until Noon Sunday. The Digital Computer Laboratory will be locked while the RJE is closed. CSO South, at Commerce West, will now be closed all day Saturday, and open Sunday from 2 P.M. to 8 P.M. The Social Sciences Quantitative Lab, at Lincoln Hall, will not be staffed after 9 P.M. Monday through Friday, and will be closed Saturday and Sunday.

Since it is not possible to assure a consistent level of quality for output produced by unattended equipment, the printers at all RJE's will be turned off when the RJE's are not staffed. Special plots at CSO North will be done from 8 A.M. to 10 A.M. and from 8 P.M. to 2 A.M. on weekdays, and at any time during the weekend. Special plots may be started at other times during the day only if the plot queue is otherwise empty, but as before no plot longer than one hour will be started from 10 A.M. to 8 P.M. on weekdays.

#### DECwriter II Terminals Added to RJE Sites

CSO has purchased 10 Digital Equipment Corporation DECwriter II terminals. The new terminals will be available for public use at CSO North, Lincoln Hall, and in the Florida Avenue Residence Halls. A complete list of RJE

hours and equipment is later in this issue.

The DECwriter II terminals were purchased through the Illinois Educational Consortium. The Consortium is prepared to supply these terminals to other University units for \$1372 each, or to lease them for \$47.75 per month. Maintenance is available locally from Digital Equipment Corporation for \$25 per month. For technical information, contact Cliff Carter, 3-3723.

The DECwriter II offers the full ASCII upper/lower case character set at 30 CPS. It uses ordinary computer paper, and will print up to 132 characters on a single line. CSO has used a DECwriter II for several months as a DECsystem-10 console, and it appears to be a reasonably reliable device.

The DECwriters and the Infoton Vistar II purchased for CSO North will enable the growth of text processing computer applications on this campus. Interested users are referred to the RUNOFF text processing program on the DECsystem-10. A manual, "Getting Started With RUNOFF", is a part of the DECsystem-10 Utilities manual, available at the Illini Union Bookstore.

#### Fall Schedule for Remote Job Entry Stations

For the Fall, a new RJE is added at the Florida Avenue Residence Halls, new equipment is present at some sites, and some schedules have been reduced. The following attempts to summarize the hours, equipment, and special services at each RJE station. If student express service, in the form of an Express line for student jobs, is available, it is explicitly noted.

Agriculture (W-515 Turner Hall - 333-8170)

8:30 A.M. - 10 P.M. Monday through Friday

1 reader, 1 printer, 3 keypunches, 8 calculators

Terminal: 1 dialup Infoton CRT

Chemistry (154 Noyes Lab - 333-1728)

8 A.M. - 5:30 P.M. Monday through Friday

1 reader, 1 printer, 3 keypunches

CSO North (127-131 Digital Computer Laboratory - 333-6203)

8 A.M. - 2 A.M. Monday through Friday

8 A.M. - Midnight Saturday

Noon - 2 A.M. Sunday

2 readers, 3 printers, 17 user keypunches, 1 card punch

Terminals: 9 Infoton CRTs, 1 Vistar II CRT, 5 DECwriter-IIIs, 1

Teletype with paper tape reader/punch

CSO South (70 Commerce West - 333-4500)

8 A.M. - Midnight Monday through Friday 2 P.M. - 8 P.M. Sunday

2 readers, 3 printers, 22 user keypunches, 1 card punch,

3 interpreting keypunches, 2 calculators,

1 paper tape reader/punch (being added);

Terminals: 5 online CRTs, 2 dialup CRTs

Student Express Service



FAR (Florida Avenue Residence Hall - 333-2695)

1 P.M. - 2 A.M. Monday through Friday

11 A.M. - 2 A.M. Saturday

Noon - 2 A.M. Sunday

1 reader, 1 printer, 10 keypunches

Dialup terminals: 1 Teletype, 1 DECwriter II, 2 CRTs

Student Express Service

ISR (Student Gov't. Room, Ill. St. Residence hall - 333-0307)

1 P.M. - 2 A.M. Monday through Friday

11 A.M. - 2 A.M. Saturday

Noon - 2 A.M. Sunday

1 reader, 1 printer, 10 keypunches

Dialup terminals: 2 Teletypes, 2 CRTs

Student Express Service

Mechanical Engineering (32 M.E. Bldg. - 333-2072)

8 A.M. - 5 P.M. Monday through Friday

1 reader, 1 printer, 3 keypunches, 2 calculators

Dialup terminals: 1 Teletype, 4 CRTs

Psychology (453 Psychology Building - 333-7531)

8 A.M. - 5 P.M. Monday through Friday

1 reader, 1 printer, 3 keypunches, 2 calculators

Dialup terminals: 2 CRTs

Social Science Quantitative Lab (202 Lincoln Hall - 333-6751)

8 A.M. - 9 P.M. Monday through Friday

1 reader, 1 printer, 2 keypunches

Terminals: 6 CRTs, 4 DECwriter IIs

The following locations are not RJE's, but do contain terminals for interactive use of the DECsystem-10.

PAR (22B Penn. Ave. Residence Hall - 333-2950)

24 Hours Daily

3 keypunches

Dialup terminals: 1 Teletype, 2 CRTs

Snyder Hall (Counseling Office - 333-2394)

24 Hours Daily

Dialup terminals: 2 Teletypes, 2 CRTs

Also, there are independent remote job entry stations on campus at the State Water Survey, the State Geological Survey, and at Civil Engineering. The Department of Mathematics operates several terminal classrooms, with dialup Teletypes for interactive use of the DECsystem-10.

#### Student Consulting, Graders at RJE's

Beginning this semester, the CSO RJE's at Illinois Street Residence Halls and Florida Avenue Residence Halls will be staffed by operator/consultants. These are students who are trained by the CSO



consulting staff to answer questions as well as keep the RJE's running.

The student consultants are not substitutes for Department of Computer Science graders, who will also be present at the two RJE's, but supplement the graders on problems which are not strictly course-related. In addition, the consultants will answer questions for students in courses which have no graders.

The student consultants are organized and supervised by the CSO System Consulting staff, managed by Sue Greenberg. The new consultants should increase the usefulness of the two dormitory RJE's and make them independent of the other campus sites.

#### No Student Express Service at CSO North

For the first time since the Express system was developed here over 4 years ago, there will be no "Express line" at DCL. The equipment which was used for Express last year has been moved to the Florida Avenue Residence Halls to open a new student RJE there.

CSO North will continue to provide service for faculty, research assistants, and upper-level undergraduates from the North campus, as well as handle special output requirements, such as quality print or plot output. These users will still be able to run jobs under the Express monitor, but the input and output will be handled the same as that of HASP jobs; that is, the output will be available at the window or placed in the output bins.

To accommodate the shift in emphasis, CSO has implemented the ability to selectively allow users access to specific RJE's, by PS number and user number. Initially, several large undergraduate classes will not be allowed use of CSO North.

#### Virtual Memory Available for Limited Use

Unlike many other systems, on the DECSYSTEM-10 the use of virtual memory is a privilege, which may be granted or not by the system administrator. The reason for this approach is that demand paging can cause a serious performance degradation to programs of a certain type. In fact, although the system is designed to avoid such problems, it is probably true that the misuse of virtual facilities by many users could degrade the response of the system as a whole.

Some programs run quite well when up to a third of their core is "virtual", others, notably the FORTRAN-10 compiler, show serious performance degradation. Since the user is charged for paging overhead, the degradation shows itself in chargeable CPU time as well as elapsed time. The FORTRAN-10 compiler run in 35P of physical core may use up to 100 times more CPU time to compile than it does in 60P. Similiar (80:1) degradation has been observed in COBOL internal sorts, though this is easily circumvented.

For this reason, we are approaching the use of virtual memory cautiously. Persons who wish to make use of virtual memory should contact the consultants, who will discuss the application for which the facility is required. In the meantime, CSO is gathering performance statistics both on the system as a whole and on individual programs. Initially, virtual memory privileges will be granted to users who have a specific use for the facility and who understand the potential cost of misuse.

As statistics become available, we will publish them as guidelines for virtual memory use. Some preliminary results appear in the Technical Notes.

## SYSTEM NOTES

### Second Processor Added to DECsystem-10

As planned, the second KI10 processor was added to the CSO DECsystem-10 August 10. This is the last hardware expansion slated for the DECsystem-10.

The second processor should be transparent to users, except that the SYSTAT program now reports activity on both processors. (See .SYSTAT E for an example.)

By an interesting coincidence, the double precision floating point arithmetic did not work properly when the new CPU was brought up. This was also true of the first CPU, when it was installed at the beginning of the year. Both processors are now functioning correctly.

### New DEC-10 to 360 Link Software

Locally written software is now running on the DAS-78, which connects the DECsystem-10 to the IBM 360.

The new software makes the DECsystem-10 appear to be a HASP workstation remote job entry station to the IBM machine. This is the same interface used by all of CSO's RJE's.

The advantages of the new code to the user are:

1. Faster link. The new code can both send to and receive from the 360 at the same time, allowing almost twice the throughput on the link from the same speed line. When the faster line is installed later this semester, the queues for link output should be virtually eliminated.
2. Increased reliability. Several odd problems due to the former IBM 2780 emulation will no longer exist.

3. Faster restarts. If trouble develops, the IBM machine will automatically restart the line to the DECsystem-10 now, without operator intervention.
4. Full EBCDIC transmission. For example, IBM object decks can now be sent back and forth without any special action on the part of the user. An escape convention is automatically used to translate any EBCDIC characters which do not have an ASCII equivalent. The EBCDIC character is translated to a right bracket (]) followed by the two hexadecimal digits which represent the character. Similarly, any such sequences sent from the DECsystem-10 to the 360 are translated into the appropriate single EBCDIC character.
5. Reasonable page eject conventions. Page marks sent to the 360 no longer result in an extra blank line. A skip to channel 1 from the 360 is translated to a correctly formed page mark for the DECsystem-10.
6. Carriage control option. All carriage control except page ejects sent from the 360 to the DECsystem-10 is ignored (no blank lines are created). This can be overridden by writing a /L switch just after the DECsystem-10 file name on the ID card.
7. Console capability. While not yet being used, the new link has a console pseudo-device which will allow HASP job inquiries from any DECsystem-10 terminal. It is hoped a test version of this will be working by the end of August.

#### PROCUSR Library to be Discontinued

Additions to the PROCUSR catalogued procedure library are no longer being accepted, and the entire library will be withdrawn in December. Persons who were using PROCUSR can now create and maintain their own procedure libraries, through the Easy Reader facility described in the July 25, 1975, issue of OFFLINE.

The system consultants can help convert to the new facility. Essentially, all that is involved is creating a partitioned data set which contains one procedure per member. The procedures are then used just like catalogued procedures in system libraries, with the exception that a //PROCLIB DD card, the first card in the JCL deck, tells the system to look in the user library.

The user procedure library must be on a permanently mounted 3330 disk, and have an LRECL of 80 and a BLKSIZE of at most 3120. The July 25 OFFLINE contains examples of creating and using the libraries.

Accounting Records Available to Users

Users who wish may obtain a detailed list of IBM 360 accounting records associated with a particular PS number. The JOBLIST procedure is invoked by:

```
/*ID IOREQ=6000,TIME=1,LINECT=66
/*SETUP TAPE=tapename
// EXEC JOBLIST,PS=ps#,TAPE=tapename,SORT=sort
```

The tapenames currently available are JANUSR, FEBUSR, MARUSR, and APRUSR. As the names suggest, the tapes are kept month-by-month. One year's tapes will be retained.

The ps# must be a 4-digit number. The sort field may be one of the keywords DAY (sort by day, by location, by time), DYU (sort by day, by user number, by location, by time), or USR (sort by user number, by location, in day-time order). The locations are 360, Chicago, and DECsystem-10. Sort by DAY is the default.

Dec-10 Daily Charges Itemized

A summary of the DECsystem-10 charges for the preceding day will be found in the file DOC:MONEY.PRT. The first pages of this file contain an itemized list of all chargeable activity on the system, and the next to last page contains a summary of daily charges by PPN.

Interested users may look at the file by, for example, .SOS DOC:MONEY.PRT/R. The command F<TAB>proj#<TAB>prog#\$/1:/\*-2 will type out all records for a given project, programmer number. The command Fproj#<TAB>prog#\$/\*-1 will list the summary record for the project, programmer number specified. It may be helpful to list the headings also, which are at 800/1 (for the detailed listing) and 400/\*-1 (for the summary).

LANGUAGESMATHLIST Procedure

A catalogued procedure, MATHLIST, is now available on the IBM 360 for listing and punching source and documentation stored on the UIMATH setup disk pack.

The procedure takes up to three parameters, R, T, and OUT, which indicate respectively what member is being listed or punched, what data set it is in, and whether to list it (the default) or punch it. For example, to list the source for local routines in the FORTUOI library:

```
/*SETUP DISK=UIMATH (always needed)
```

```
// EXEC MATHLIST,R=xxx
```

where xxx is the routine to be listed. The SETUP card is always required, and will be assumed in the examples which follow. To punch the routine:

```
// EXEC MATHLIST,R=xxx,OUT=B
```

To list or punch something other than FORTUOI source decks, the T parameter must be explicitly coded, as follows:

1. T=FORTUOIS accesses FORTUOI source (the default). For example:

```
// EXEC MATHLIST,T=FORTUOIS,R=RAN3Z
```

2. T=FORTUOID accesses FORTUOI writeups. For example:

```
// EXEC MATHLIST,T=FORTUOID,R=GAUSZ
```

3. T=FORTUOIN accesses new and updated FORTUOI writeups. For example:

```
// EXEC MATHLIST,T=FORTUOIN,R=UNDERZ
```

4. T=EISPACND accesses the EISPACK documentation, as:

```
// EXEC MATHLIST,T=EISPACND,R=TSTURM
```

5. T=EISPACNS gets the latest EISPACK source. For example:

```
// EXEC MATHLIST,T=EISPACNS,R=TSTURM
```

6. T=WATLIB gets the source to the University of Waterloo WATFIV routines. For example:

```
// EXEC MATHLIST,T=WATLIB,R=ZYMBOL
```

7. T=CALCOMPS accesses the source code to the Calcomp plotter routines. As:

```
// EXEC MATHLIST,T=CALCOMPS,R=CCP4SC
```

To obtain a listing of the possible values of R for a given T, do the following:

```
/*SETUP DISK=UIMATH
// EXEC LISTPDS,DSNAME='UIMATH.t'
```

where t is one of the values mentioned for T above.



ALPS Moving to UIC With MPSX

When the MPSX system is moved to the Chicago Circle IBM 370/158 in late August, the ALPS system, which uses MPSX, will go with it. Users or instructors of classes which use ALPS should keep in mind that a "/\*ID SYSTEM=UIC" will be required to use ALPS.

New UNDERZ in FORTUOI

A new version of the UNDERZ routine, which controls underflow interrupts on the IBM 360, has been installed in FORTUOI. The new routine extends the capabilities of the old one by allowing the caller to save the old state of the underflow flag as it is being changed. Thus, underflow can be disabled for a local computation and restored without affecting its global status. For a full writeup explaining the extension, do:

```
/*SETUP DISK=UIMATH
// EXEC MATHLIST,T=FORTUOIN,R=UNDERZ
```

PASCAL I/O Conventions Change

In Edit 15 of PASCAL and later, the default RESET(INPUT), REWRITE(OUTPUT), and RESET(TTY) are no longer done. This change removes a number of inconveniences which were caused by the former convention. The default REWRITE(TTYOUTPUT) is still done.

Programs which are recompiled and use one of the standard files will have to be altered. A %\$I+,O+,T+\ switch at the beginning of the program will restore the former action, however the explicit RESET and REWRITE provide better documentation, and allow the use of meaningful file names.

In addition, Edit 15 implements a /CREF switch, which must immediately follow the source file name when compiled. When /CREF is used, a .CRF file is produced instead of the default .LST file, and it is in CREF format. The CREF system program will produce a cross-referenced listing from this file. For example, to compile and print a cross-referenced listing of a file named TEST.PAS:

```
.R PASCAL
*TEST/CREF
VERSION 8/10/75 EDIT 15 - SEE HELP NEWPAS
NO ERROR DETECTED
EXIT
.CREF
*TEST.LST=TEST.CRF
*^C
.PRINT TEST.LST
```

For further details, see HELP NEWPAS.



Technical Notes

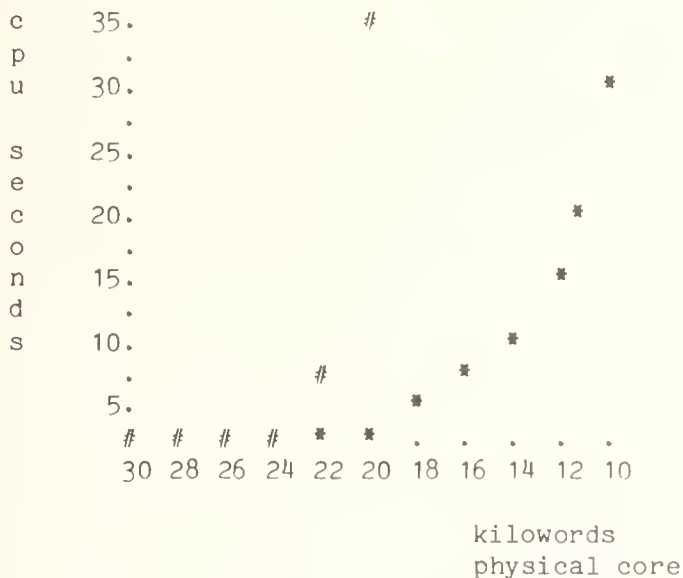
This section is dedicated to the user with advanced programs that could be affected by slight changes on the DECsystem-10 or the IBM 360/75. All important system announcements are explained in full in other sections of OFFLINE.

Virtual Memory Performance on DEC-10

As noted in the Policy section, CSO is extending the virtual memory privilege to users cautiously because of our lack of quantified effects of VM on overall system performance, and because our initial experience indicates that some individual programs perform very much worse under VM.

Initial study has concentrated on those items of system software for which users have requested changes upward in CORMAX. These are primarily PASCAL and FORTRAN-10. CORMAX was in fact moved from 20K to 21K so that a mini version of PASCAL could run during all hours of the day. Since there is an easily demonstrated inverse relationship between the value of CORMAX and overall system responsiveness, successful virtual execution of high-demand software without adversely affecting the non-virtual user could mean that CORMAX could be at least held down and possibly lowered further, thus improving overall system responsiveness while providing extended service.

Most software is found to have a pseudo-exponential performance curve. The curve for PASCAL is shown below:

VM Performance of the PASCAL Compiler

The # curve shows the chargeable CPU time used to compile a fairly small

PASCAL program with a sharable compiler. The compiler has a 14K low segment, and a 16K high segment. When the compiler is sharable, only the low segment "goes virtual". When 8 of the 14K is virtual, serious degradation results, as would be expected.

Making the compiler non-sharable produces the \* curve. With a non-sharable high segment, both the program and data are paged. This runs quite acceptably until about 10K is virtual, and serious degradation again sets in. (The same curves, moved slightly to the left, appear when compiling very large PASCAL programs.)

Thus, we expect PASCAL to run acceptably at hours of the day when CORMAX is set to 20K, although setting CORMAX any lower would seriously degrade the compiler. Of course, the smaller version of PASCAL runs better in less core, so it is up to the user whether to request virtual privileges for PASCAL. The improved error messages probably make it worthwhile to suffer slightly degraded performance.

It is clear from the example that it is very useful to know exactly where the knee of the curve falls for a particular piece of software. Given this single datum, possibly as a simple linear function of the amount of work to be done, the user can judge rationally whether to use VM and how much is safe to use.

The knee in the FORTRAN-10 compiler curve appears to be at around 25K of physical core (compiling a 550-card program with 3 subroutines). Running FORTRAN-10 in 20K produces a 6:1 CPU time degradation. For larger programs, naturally, the curve will shift slightly to the left, and the degradation will be worse. For FORTRAN-10 the user (and CSO) must weigh the advantage of having the software available at all times of the day versus a significantly increased cost of compilation. At this point, it would not seem reasonable to grant a user virtual privileges simply for FORTRAN-10.

Data for other common system programs will be gathered and reported in the future. An area of high interest for which we now have no feeling is how much VM costs in terms of overall system performance. Other avenues we are exploring include tailoring page fault handlers for individual high-demand pieces of software, and policy changes which require system modification such as not counting sharable system high segments against the core limits for an individual user.

In the meantime, the system is set up to discriminate against the VM user by scheduling his or her job to a lower priority than non-VM jobs whenever any paging is done. (This is how DEC distributes the system.) Tests indicate that the VM user does not perceive any special loss of performance, but the discrimination should be sufficient to safeguard non-VM users until we can determine how best to proceed.

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AUG 30 1977

OFF-LINE is the newsletter of the Computing Services Office at the University of Illinois at Urbana-Champaign. OFF-LINE is printed every two weeks except for interruptions due to holiday schedules or lack of news. Articles may be reprinted provided that the source of the article is noted. CSO operates an IBM 360 model 75 with one million bytes of fast core and two million bytes of slow core, under HASP and OS, and a dual-processor DECsystem-10 with 256K words of core, under TOPS-10, serving up to 80 simultaneously active terminals.

## POLICY

### CSO User Meeting

An Open User Meeting for all CSO users will be held October 7, 1975, from 1 P.M. to 3 P.M. in the CSL Auditorium.

Topics to be discussed will include:

1. Status of the new machine acquisition.
2. RJE service review.
3. Use of machines at the Medical Center, Chicago Circle Campus, and Administrative Data Processing.
4. Summary of current service problems, changes in service, and new facilities.
5. A brief review of the allocation of computer time.

Users will have the opportunity to ask questions on these (or any other) topics.

### Fall CSO Short Courses

The CSO Short Course schedule and registration form is at the back of this issue of OFF-LINE. CSO Short Courses are open to University faculty, staff, and graduate students. The courses present application-oriented instruction about various CSO facilities.

A particularly wide range of courses will be available this Fall for users of both the IBM 360/75 and the DECsystem-10. Three sections on SOS, the DECsystem-10 text editor most used here, will be offered. Other topics are: 360/370 Assembler, Fortran Debugging, Math Libraries, JCL, CalComp, Load Modules, Utilities, ALTRAN-FORMAC, and MPSX. Short courses are typically multi-session, with one to two hours per session.

### CSO Seminars to be Offered

CSO seminars are single session talks about topics of general interest to the user community, and are open to all who wish to attend.

The seminars now scheduled are:

#### Introduction to CSO

September 22, 10-11 A.M., room 237, DCL. A basic overview of facilities and services available from CSO. Recommended for newcomers to the Urbana campus, or for persons who have not used CSO facilities in the last year.



Introduction to the DECsystem-10

September 23, 2-3 P.M. and 7-8 P.M., room 237 DCL. A first-time introduction to the DECsystem-10 timesharing system.

How to Run a Program on the IBM 360/75

September 24, 10-11 A.M., room 239, DCL. How to set up the control cards surrounding your program. Useful for those who have done some programming on other systems, and wish to adapt to IBM-ese.

Statistical Packages Available

September 25, 2-3 P.M. and 7-8 P.M., room 237, DCL. An overview of available and supported statistical packages and programs.

No pre-registration is required for these seminars.

Corrections to Schedules and Equipment

The RJE schedule and equipment summary which appeared in the last OFF-LINE was in error about the following items:

The Psychology terminal actually has 3 Infoton CRT terminals.

The ten DECwriter II upper/lower case terminals have been distributed 5 at CSO North, 2 at Lincoln Hall, 2 at Commerce West, and 1 at the Florida Avenue Residence Halls.

The Agriculture RJE is open in the evenings until Midnight, Monday through Friday. The building closes at 10 P.M., however, so users are advised to arrive before that hour.

CSO Documentation Available

The following locally produced documents are available at the CSO accounting office, room 134, DCL.

For the DECsystem-10:

Introduction to Batch on the DECsystem-10. A guide to the use of the DEC-10 batch monitor for jobs submitted from an interactive terminal.

IBM-DEC Fortran Differences. A guide to aid conversion of IBM Fortran programs to run on the DECsystem-10.

SITBOL. A manual for the Stevens Institute of Technology fast SNOBOL4 compiler.

SOS Reference Card. A pocket guide to the use of the SOS text editor.

(The following are being reprinted. Estimated availability dates are shown where possible.)

Monitor Commands Reference Card. (October 1) A pocket guide to the DECsystem-10 terminal command language.

DECsystem-10 Guide. A short manual designed for the beginning user of the DECsystem-10.

For the IBM 360/75:

CalComp User Guide. How to use the CalComp plotter.

Compilers. A short introduction to the control cards commonly used to access IBM compilers.

CSO Utilities. Guide to locally-written utility programs.

DEBBY Tape/Disk Guide. DEBBY is a utility program used primarily to diagnose tapes received from other installations.

Express User's Guide. A description of the processors and control language available under the Express fast batch submonitor.

FORTUOI Writeup. Writeups of all the programs in the FORTUOI program library (slightly outdated).

SOUPAC Manual. (Not free; also available at the bookstore.) Writeups of the subfunctions of the SOUPAC statistical system.

Standard IBM Macros. A description of IBM macros for the beginning 360/370 assembler language programmer.

(The following manual is being reprinted and is expected to be available by September 15.)

CSO 360 User's Guide. A guide to running programs on the IBM 360/75 and on the IBM 370 machines in Chicago. Schedules, access facilities, and special services available.

Unless otherwise noted, the manuals above are available at no charge to any CSO user, except that instructors must make special arrangements for students in classes using the computer.

In addition to these locally written documents, the accounting office has a limited supply of DECsystem-10 BASIC and Fortran-40 manuals, which may be obtained free of charge by non-class users with a valid DEC-10 project, programmer number.

Some IBM manuals may be ordered free of charge through the accounting office, namely those in the G series. IBM will supply these manuals only for faculty and research users. DECsystem-10 or IBM manuals other than those mentioned here must be obtained either from the university bookstore (see the article below) or directly from the vendors.

IBM will sell manuals in single-unit quantities, but Digital Equipment Corporation requires a minimum order of 10 documents.

Documentation Available at the Illini Union Bookstore

The following DECsystem-10 documentation was available in limited quantities at the Illini Union Bookstore at the beginning of the semester. Of course, supplies may be exhausted at any time. Persons with bulk requirements, such as class instructors, should notify the bookstore as they would for any textbook.

AID User Guide  
 ALGOL Reference Manual  
 BASIC Reference Manual  
 Batch Beginner's Guide  
 BLISS-10  
 COBOL Reference Manual  
 COBOL User Guide  
 Fortran IV (Fortran-40 compiler)  
 Fortran-10 Reference Manual  
 Getting Started With the DECsystem-10  
 Introduction to the DECsystem-10  
 LINK-10 (linking loader)  
 MACRO-10 Reference Manual  
 Operating System Commands (monitor commands)  
 TECO Reference Manual  
 Utilities Manual

The bookstore also has Wirth and Jensen's PASCAL User Manual and Report (Springer-Verlag) in ample quantities, filed under CS325. The manual contains a description of standard PASCAL, and may be used as a handbook for DECsystem-10 PASCAL with the aid of the HELP files, HELP PASCAL, HELP NEWPAS, and HELP PASBUG.

SYSTEM NOTES

SHOW Command Allows 360/370 Job Inquiry

The SHOW command now available on the DECsystem-10 allows any terminal user to inquire about the status of jobs on the local IBM 360/75 or at either of the IBM machines in Chicago.

The format of the job inquiry command is:

```
.SHOW JOB jobname
-or-
.SHOW JOB haspnumber
```

The jobname is the 1 to 8-character alphanumeric job name; haspnumber is the 1 to 3-digit number assigned to the job by HASP.

To inquire about jobs sent to Chicago, either the /UIC or /UIM switches must be written before the word JOB. For example,

```
.SHOW /UIC JOB MYJOBNAM
.SHOW /UIM JOB 234
```

A job inquiry may be made from any terminal, whether logged in or not.

Other widely useful functions of the show command are:

Show the recent turnaround at UOI, UIC, and UIM:

```
.SHOW TURNAROUND
```

Show the job class limits at UOI:

```
.SHOW CLASS
```

Other functions are also available, corresponding to inquiry facilities implemented in HASP, such as SHOW INITIATORS, and SHOW QUEUE.

A complete description of the SHOW command appears in the Technical Notes in this issue of OFFLINE, and is summarized in HELP SHOW.

The SHOW command is made possible by the locally written DEC-10/360 link code installed in August.

#### WHO Command Provides On-line "Phone Book"

Installed with the latest monitor update, the WHO command complements the previously available TELL command by looking up the name or ppn of other DECsystem-10 users on demand.

The WHO command accepts any user identification that would be acceptable to TELL, and returns the converse. That is, given a user name, it returns a PPN; given a PPN, it returns a user name. Wildcard project or programmer numbers are also permitted.

An example dialog is:

```
.WHO STATSERVICES
[142,445]
.DIR DSKD:FIXED[142,445]/F/W
FIXED .PGM
TOTAL OF 3 BLOCKS IN 1 FILE
.TELL STATSERVICES THANK YOU FOR THE FIX$
OK, I TOLD STATSERVICES
```

For another example, the names of all the system consultants can be obtained by:

```
.WHO 14,*
```

The WHO and TELL programs were developed by the Coordinated Science Laboratory systems staff.

#### VETMED and ARL RJE's Added

Two new remote job entry stations are connected on a dialup basis to the IBM 360/75. The stations, a Data General minicomputer at the Veterinary Medicine Building (PRINT=VETMED), and a PDP-11/45 minicomputer at the Aviation Research Laboratory (PRINT=ARL), are both stand-alone systems owned and operated by their respective departments.

The stations are not full-time RJE's; they establish connection when they wish to send input to the 360/75, or receive output. Print routed to a dialup location is queued by HASP until the RJE is ready to receive it.

#### Experimental IBM/PLATO Link Tested

An experimental link which will allow file transfer between the PLATO IV system and CSO's IBM 360/75 is currently being tested at the Illinois Street Residence Halls remote job entry station.

The link makes use of existing access paths by connecting a PLATO terminal to the PLATO IV system on one side, and to one of CSO's PDP-11 based RJE stations on the other. An appropriate command lets the PLATO terminal function as a peripheral to the RJE.

The experimental link has been used to transfer data from the PLATO IV system to the IBM machine. Plans are for development of two-way communication between the machines. Since each system believes it is talking to one of its standard devices, transfer of text back and forth should be realizable without a large investment in additional system software. The project is a joint undertaking of the PLATO IV group and CSO.

#### /\*HOLDJOB For UIC Users

Persons running jobs on the IBM 370/158 at the Chicago Circle campus can use the new /\*HOLDJOB card to cause the job to be held on the UIC machine and to relay special instructions to the operator.

Syntax:

Col 1	Col 12
!	!
/*HOLDJOB	TEXT OF SPECIAL INSTRUCTIONS

The /\*HOLDJOB card is placed after the /\*ID cards in the user's deck. Unlike the /\*SETUP or /\*MESSAGE cards at UIC, the /\*HOLDJOB card requires no special privileges and does not alter the job class or priority.

For example, to ask the operator at UIC to run two jobs in sequence, the first job, named OS01234, might contain:

```
/*HOLDJOB  RUN OS05678 AFTER THIS JOB
```

The second job might contain:

```
/*HOLDJOB  RUN OS01234 BEFORE THIS JOB
```

The /\*HOLDJOB card may be used at UIC only; it is not available on the local IBM 360/75.

#### Acknowledgement

The above information is from the August 1975 Chicago Circle Campus Communication Channel, Cynthia Klemens, Editor.

### LANGUAGES

#### New SPSS Version

A new version of SPSSG has been installed on the IBM 360/75. It is compatible with version 6, and can be accessed by:

```
// EXEC SPSSG
```

The new software can read version 5 and version 6 SPSSH files, with the following restrictions:

1. The G version does not allow subfiles. If the H file contains a subfile structure, it will be processed as if a RUN SUBFILES ALL command were invoked.
2. SPSSG is restricted to 100 variables. If the H file contains more than 500 variables, it must be accessed by a GET ARCHIVE command with a VARIABLES= list containing no more than 100 variables.

Conversely, SPSSG files can be read by version 5 and 6 of SPSSH.

SPSSG normally executes in about 100K. The load module requires 80K and the remainder is for workspace. The default space parameter to SPSSG is PARM=20K. Thus,

```
// EXEC SPSSG,REGION=100K
-or-
// EXEC SPSSG,REGION=(80K,20K)
```

is sufficient for most jobs.

All of the statistical programs available in SPSSH are also available in



SPSSG, with some restrictions on data and file modification, and some specific statistical limitations. For details, refer to Appendix D of the SPSS Manual, pp. 578-584.

Please take any problems or questions about SPSSG to the Statistical Consultants, room 85, Commerce West.

#### Interactive PL/I Available on DEC-10

CSO is serving as a test site for CPL, a conversational PL/I now being developed by Digital Equipment Corporation.

CPL is a submonitor, containing its own editor, and a facility to both execute PL/I statements in desk-calculator mode (similar to AID) and enter statements into a file for later execution (similar to BASIC).

CPL needs at least 93P of core to run, requiring the Virtual Memory privilege to be used during the day. No performance statistics are available at this time.

For interested users, the complete CPL manual has been placed in DOC:CPL.MAN. CPL itself currently resides in NEW:, and can be run by:

\_R NEW:CPL

Running virtual, there is some delay before the initial "CONVERSATIONAL PROGRAMMING LANGUAGE" is typed, and for the first few interactions. Once the working set is established, however, response appears to improve.

#### Don't Forget to TELL STATSERVICES

Users with statistical problems or questions about available statistical software can obtain fast response to a TELL STATSERVICES message sent from any DECsystem-10 interactive terminal.

STATSERVICES is a special ppn used by the statistical consultants at CSO South for user communication. The consultants attempt to reply within the same day to most questions.

The TELL facility is also useful for reporting frustration with a piece of software or documentation before the mood passes. These unfiltered inputs can be used by the Statistical Consultants as guidelines for future improvements.

SPSS Corrections Available

The Statistical Consultants at CSO South have a one-page list of corrections to the SPSS Manual, 2nd Edition. The list contains a number of editorial alterations, and one new Limitation: "A maximum of 100 variables is allowed on any VARIABLES list."

A copy of the correction list will be furnished users on request.

TECHNICAL NOTES

This section is for the knowledgeable user who could be affected by slight changes on the DECsystem-10 or the IBM 360/75. All important systems announcements are explained in full in other sections of OFFLINE.

SHOW Command Syntax

The SHOW command (see the System Notes for an announcement) has the general format:

```
.SHOW /cpu function additional arguments
```

The /cpu is optional for some commands, and must be one of /UOI, /UIC, or /UIM. If /UIC or /UIM is specified, only the ACTIVE, DISKS, ENQUEUES, FORMS, INITIATORS, JOBS, LINE, MESSAGE, QUEUE, REMOTES, or UNITS functions may be used. The /cpu defaults to /UOI.

All commands, switches, and arguments may be abbreviated to the smallest non-ambiguous truncation of the word, and words are only significant to the first 5 characters.

Several command functions include the specification of a remote. If /UOI, this may be written as a decimal number or a mnemonic route code. For /UIM and /UIC, only the decimal number may be coded. Currently valid route code mnemonics at /UOI are: LOCAL, UIC, CHEM, SWS, COMM, SGS, PSYCH, AGRIC, SSU, UIM, FAR, ISR, ME, LH, DEC10, SRL, and SIU.

Some of the command functions are privileged, where the privileges required are functions of the identity or logged-in status of the user. The privileges which apply to publicly available functions (the only ones shown here), are ULI (User Logged In) and NCU (Non-Class User). A non-class user is defined as one whose project number is less than 1751, or whose programmer number is even. If a function requires a privilege, it is noted below. The SHOW CLASSES, SHOW JOB, and SHOW TURNAROUND functions are unrestricted.

The functions are:

To see the active jobs on a cpu:

```
.SHOW ACTIVE  
(ULI,NCU)
```

To examine the job class limits at /UOI:

.SHOW CLASSES

To show the mounted disks:

.SHOW DISKS  
(ULI,NCU)

To see the enqueues pending on a cpu:

.SHOW ENQUES  
(ULI,NCU)

To examine the forms queue:

.SHOW FORMS  
(NCU)

To see the initiator status:

.SHOW INITIATORS  
(ULI,NCU)

To find out the status of a named job:

.SHOW JOB jobname

To find out the status of a numbered job:

.SHOW JOB haspnumber  
(Up to four haspnumbers are allowed in a single command, separated by commas. For example, SHOW JOB 1,2,3,4.)

To see the status of a remote line:

.SHOW LINE linenummer  
(ULI,NCU)

To send a message to a remote operator:

.SHOW MESSAGE remote text  
(ULI,NCU)

Currently, the text is limited to 40 characters. The command processor prefixes each message with the TTY number and PPN of the user sending the message. At present, the operators cannot respond to such messages. The remote number of the IBM 360 console is 0. WARNING: the operators are busy and are free to ignore any messages to the console.

To examine a queue:

.SHOW QUEUE /remote queuename  
(ULI,NCU)

The /remote and queuename may be omitted, in which case not a remote and all EXECUTE queues are assumed. The valid queuenames are: EXECUTE (optionally followed by a colon and a class letter), PRINT, PUNCH, PLOT, SETUP, or TOTAL.

To see the status of a remote:

.SHOW REMOTE remote  
(ULI,NCU)

The remote specification may be omitted; the default is DEC10.

To obtain information about the UOI setup queue:

.SHOW SETUP class-spec or jobnumber  
(ULI)

SHOW SETUPS with no arguments shows the entire setup queue at UOI, by class. The job number and queue position within class for each queued job are shown. WARNING: this output can be quite lengthy. The queue for a single class or range of classes may be obtained by typing a two-letter beginning and ending class-range. For example, SHOW SETUPS FG, or SHOW SETUPS GG. If a HASP jobnumber is typed after the word SETUP, the /\*SETUP card(s) which placed the job in setup hold are returned.

To see the turnaround at UOI, UIC, and UIM:

.SHOW TURNAROUND

This form of the command shows the turnaround of the jobs which printed in the last 15 minutes in classes A, B, and C at each of the 3 centers. The command SHOW TURNAROUND, LAST displays turnaround for jobs which completed from 30 to 15 minutes ago. The command SHOW TURNAROUND, class where class is a single-letter job class, shows the turnaround for that class (must be A, B, or C) only. The command SHOW TURNAROUND, LAST, class does the obvious.

To display the status of a unit:

.SHOW UNIT unit-spec  
(ULI, NCU)

The unit-spec is not syntax-checked by the SHOW processor, and must be a syntactically valid unit to HASP. For example, SHOW UNIT RM11.PR1. If the unit-spec is omitted, all units are assumed. WARNING: this output can be quite lengthy.

### New Express in Final Test Stage

A new version of the locally-developed Express fast batch submonitor will allow users to access private disk datasets from Express jobs. This ability will allow Express to be used for a much broader class of programs than heretofore possible.

As it will be installed initially, the new Express will permit access to private datasets on public disk packs with disposition OLD or SHR. (The public disk packs are UIPUB1 through UIPUB4 and MERLIN.

Ordinary Job Control Language statements will be used to access the datasets. The same JCL will probably suffice to rerun a job under HASP if the Express time limits are exceeded.

This is a major enhancement of Express, and is expected to increase the effective throughput of the IBM 360/75. Right now, around half the jobs run on the 360 are Express jobs, which have nearly instant turnaround but use only 5-10 percent of the cpu. More than half of the remaining HASP jobs take less than 10 seconds of cpu time, and might possibly be candidates for running under the more powerful Express.

Instructors of classes which had been planning to use HASP instead of Express because of the lack of this dataset facility are urged to contact Milt Cloud, at 3-6264.

Release of the new software is expected in the next few weeks.

CSO SHORT COURSES

NAME \_\_\_\_\_ ADDRESS \_\_\_\_\_  
 DEPT. \_\_\_\_\_ PHONE # \_\_\_\_\_

THE FOLLOWING CSO SHORT COURSES WILL BE OFFERED. REGISTRATION IS LIMITED TO GRADUATE STUDENTS, FACULTY AND STAFF. CHECK THE COURSES YOU WISH TO ATTEND AND RETURN THIS FORM TO:

CSO SHORT COURSES  
 181 DCL  
 CAMPUS

IF YOU HAVE ANY QUESTIONS PLEASE CALL 333-6630. CLASS SIZE IS LIMITED TO 30 PEOPLE ONLY.

<u>CLASS</u>	<u>DATES</u>	<u>TIME</u>	<u>ROOM NUMBER</u>	<u>CHECK HERE</u>
360/370 Assembler	Oct. 14, 16, 21, 23, 28, 30	7:00-9:00 PM	#237 DCL	_____
Macro-10	Oct. 14, 16, 21, 23, 28, 30	3:00-4:00 PM	#351 CERL	_____
Fortran Debugging	Sept. 22, 24	7:00-9:00 PM	#237 DCL	_____
Math Libraries	Sept. 30, Oct. 2, 7	9:00-10:00 AM	#237 DCL	_____
SOS (3 Sessions Offered)	Sept. 29, Oct. 1	7:00-9:00 PM	#237 DCL	_____
	Sept. 30, Oct. 2	2:00-3:00 PM	#237 DCL	_____
	Sept. 30, Oct. 2	7:00-9:00 PM	#237 DCL	_____
JCL	Sept. 30, Oct. 7, 14	2:00-3:00 PM	#239 DCL	_____
	Oct. 2, 9, 16		#115 DCL	_____
JCL II	Oct. 20, 22, 24, 27, 29, 31	10:00-11:00 AM	#351 CERL	_____
CalComp	Oct. 7, 9, 14, 16	2:00-3:00 PM	#351 CERL	_____
Load Modules	Nov. 3, 5, 10, 12	7:00-9:00 PM	#237 DCL	_____
Utilities	Oct. 6, 8, 10	1:00-2:00 PM	#237 DCL	_____
Altran-Formac	Sept. 30, Oct. 7	1:00-2:00 PM	#239 DCL	_____
	Oct. 2		#237 DCL	_____
MPSX	Oct. 9, 14, 16, 21, 23, 28	1:00-2:00 PM	#351 CERL	_____



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# Off-Line

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OFF-LINE is the newsletter of the Computing Services Office at the University of Illinois at Urbana-Champaign. OFF-LINE is printed every two weeks except for interruptions due to holiday schedules or lack of news. Articles may be reprinted provided that the source is noted. CSO operates an IBM 360 model 75 with one million bytes of fast core and two million bytes of slow core, under HASP and OS, and a dual-processor DECsystem-10 with 256K words of core, under TOPS-10, serving up to 80 simultaneously active terminals.

POLICYCSO Computer Printout Policy

Because of increased prices and an increased volume of work our budget for supplies is growing at a rate we cannot support. Paper forms last fiscal year cost us over \$90,000, representing an increase of about 30% over the previous year, and present indications are for a 30-40% increase again this year.

To control this cost we are considering a broad revision of printing practice and policy, to be put into effect after we hear from the user community at the CSO User Meeting on October 7 (see next article).

Below is a brief outline of some of the policies to be considered. Users are urged to attend the User Meeting and give us their opinions:

1. Suppress "top-of-page" default and replace it with triple space. User can override at a price.
2. Convert as much work as possible from 11 x 14 inch 20 lb paper at 6 lines per inch to 8 1/2 x 14 inch 15 lb paper at 8 lines per inch. The old paper will be available as a special forms request.
3. Use the cheapest available paper for DECwriters and other hardcopy terminals.
4. For users who override the triple space feature, charge a minimum of 45 lines per page.
5. Use a reduced break between jobs.

CSO Open User Meeting

As announced in the last issue of OFF-LINE, the CSO Open User Meeting is scheduled for 1pm Tuesday, October 7, in the CSL auditorium. Topics to be covered include:

Dorm RJE Service  
 Production Status and Accomplishments  
 DEC Configuration Changes and Their Effects  
 STP, PLANTET, SPEAKEASY  
 How DEC-10 VM Works  
 Cost Control and Budgets  
 Status of UIM/UIC/CACC Use  
 New Machine Acquisition Status  
 General Service Problems  
 Questions

PAR and Snyder Hall Hours

On page 5 of the August 22 issue of OFF-LINE we stated that the PAR and Snyder Hall DEC-10 terminals were available on a 24-hour daily basis. This is not strictly correct, and the hours should read as follows:

PAR                   The DEC-10 terminal room must be accessed with a key, which can be obtained from the office during normal office hours (the office is closed between 7am and 10am daily). The building is locked from midnight to 10am daily, which excludes non-residents during that interval; however, persons already in the building are not required to leave, and a night clerk is on duty from midnight to 7am. Users may obtain a key to the terminal room prior to office closing.

Snyder Hall       The DEC-10 terminal room must be accessed with a key, which can be obtained from the office or from the night clerk during the following hours: Weekdays from 8am to 8pm, Saturday from 10am to 8pm, and Sunday from 10am to 2pm and from 7pm to 8pm. The building is accessible 24 hours a day.

SYSTEM NOTESNew UOI Command

A locally written version of the UOI command has been added to the system test library (NEW:). It differs from the present version in the following respects:

1. If an error is encountered while processing a request the entire request is terminated.
2. The first file encountered in a request is checked to verify a 360 job card. If one is not present one is generated (only applies if not /NEW).
3. By default, line numbered files will be copied to a temporary file with the line numbers appearing in columns 73-80. The temporary file is then queued to the 360 with a /DISPOSE:RENAME switch. To prevent modification of columns 73-80 use the /NONUMBER switch. The format of columns 73-80 is PPPNNNN where PPP is the page number and NNNNN is the line number. The /NUMBER switch can be used to turn on line numbering for a particular file if /NONUMBER was in the SWITCH.INI file. To force copying of a file regardless of line numbering use the /COPY switch.
4. If a file is copied line length is verified to be less than 73, unless /NONUMBER is used, then it is verified to be less than 81. If a long line is found it is truncated and a warning is given.

5. ID cards can either be in the first file of a request or specified by the /ID switch. The file specified by an /ID switch will prefix the request.
6. The message printed by the command is:
 

```

I1800000 JOB QUEUED (DEC:800000,FILES: 2,BLOCKS: 30)
  ↑           ↑           ↑           ↑
360 JOB NAME      DEC JOB NAME  # OF FILES  # OF BLOCKS
      
```

The default for the DEC job name is the last 6 non-blank characters of the 360 job name.
7. The /PRIORITY switch is not supported.
8. /DISPOSE:DELETE or /NEW cannot be specified for copied files.

The SWITCH.INI file is scanned if a non-indirect file specification is given. This version of UOI will become the system default at some future date; until that time NEW: must be in the user's search list. Other features will be added later. If any problems develop please see the consultants.

Example:

If SWITCH.INI has an entry

```
ID:IDFILE.UOI
```

the command

```
UOI PROG.EXT
```

is equivalent to

```
UOI IDFILE.UOI,PROG.EXT.
```

If the files are line numbered they are copied to a temporary file with line numbers in columns 73-80.

#### Multiple Tape Mounts

Users whose jobs require a tape mount and which have more than one job step requiring the same tape should use

```
VOL=SER=(,RETAIN,SER=tapename)
```

instead of

```
VOL=SER=tapename
```

on their DD card. This prevents the tape from being dismounted automatically after each job step. (The operators will cancel any job which requires an excessive number of remounts.)



DEC-10 Usage Statistics

Following are some statistics on DEC-10 usage, gathered over a 48 hour period beginning at 10:55pm on 9/14/75:

## 1. DEC-10 processor use:

<u>Processor</u>	<u>Frequency of use</u>
SOS	1895
BASIC	649
PIP	248
QUEUE	188
SHOW	170
DIRECT	150
TECO	137
LOADVT	77
HELP	53
MASTER	44
TELL	43
NEWS	39
SYSTAT	37
KJOB	30
RGTIME	28
INITIA	28
BASICL	27
SLINEQ	19
LEVEL	18
BR	18

## 2. Batch and terminal logins:

Terminal logins:	845/day
Average length of terminal sessions:	1083 seconds
Average cpu time:	27 seconds/session
Batch logins:	337/day
Average length of batch sessions:	963 seconds
Average batch session cpu time:	88 seconds

## 3. 2288 spool seconds, 6435 spool pages, 316 spool requests.

## 4. Following is a breakdown of batch jobs over the two day period according to the amount of cpu time used per session:

<u>cpu seconds</u>	<u>no. of jobs</u>	<u>% of total</u>
01-05	199	29.44
06-10	169	25.00
11-15	70	10.36
16-20	55	8.14
21-25	29	4.29
26-30	31	4.59
31-35	16	2.37
36-40	15	2.22
41-45	15	2.22
46-50	13	1.92
>56	64	9.46

LANGUAGESInteractive Statistical Software

The Statistical Services Office of CSO has attempted to determine the availability of interactive statistical software considered adequate for the local campus community. The survey results and evaluations are documented in a report available from the Statistical Services Office. As a consequence, the packages STP from Western Michigan, SPEAKEASY from Argonne National Laboratory, and PLANETS from the Brookings Institute are being obtained. A notice announcing their availability will be given in OFF-LINE when they are running locally.

GASP IV

GASP IV, a simulation and modeling set of FORTRAN routines, is now available and supported by the Statistical Services Office. To use, code:

```
//PROCLIB DD DSN=SYS4.PROCLIB,DISP=SHR
// EXEC GASP
//FORT.SYSIN DD *
    <user's FORTRAN program>
//GO.SYSIN DD *
    <data if any>
```

A copy of the documentation is available in the Statistical Services Office and in the CSO North System Consulting Office.

SAS75

A new update of SAS will be installed when it becomes available in January or February of 1976. This will be a complete replacement for the current version of SAS. All of the currently available functions will be supported in addition to new features such as non-linear regression and enhanced data management. The new version uses a new syntax, so old programs (i.e., those in use now) will not run directly on the new version. We will maintain both versions through the spring semester and remove the old version during the summer of 1976. An advance copy of the new manual can be examined in the Statistical Services Office.

SAS Workshop

Tentatively, Statistical Services plans to offer an SAS workshop in the spring of 1976. If you have suggestions make them known to Jim Bradley (333-1427) or Joe Kolman (333-2172).

### SAS Bug

It has been found that if a user tries to process a large number of subfiles or subsamples or a large number of regression equations, SAS will fail with a string of error messages claiming variables have not been specified and/or the file in question does not exist. "Large" is to be taken as greater than 70. The case is that somehow SAS in this situation loses the identification records of the file in question and therefore no longer recognizes the variables and/or the file. Possible circumventions are:

1. Rerun the job. The bug may not be reproduceable. This is not however a recommended procedure.
2. Increase space on SASDATA. This may help. However, it only increases the size of the "large" before the error re-occurs.
3. Restrict yourself to 50 to 60 subsamples.

We recommend items 2 and 3. No fix will be made locally and none is available from SAS.

### BMDP

Statistical Services has recently received a voluminous set of updates, changes, and corrections to the BMDP series of programs. The number of changes was so great we have decided to acquire a completely new BMDP. While our experience with BMDP is limited we nonetheless encourage users to verify that their BMDP results are correct until such time as the new corrected BMDP is received and installed. An announcement will be made in OFF-LINE when the new BMDP is available.

### SPSS Primer

The publication of the SPSS primer, an introductory manual for students with no computer background, has been delayed. It is now scheduled to arrive about January of 1976.

### SPSS Version 5 Users

Users are urged to convert from Version 5 of SPSS to Version 6. Statistical Services is offering a seminar on the differences between the two versions on Thursday, October 2 from 3pm to 5pm in Room 152 Commerce West.

Maxiverson of SPSS

The SPSS maxiversion is currently being supported and can be accessed with the following JCL:

```
/*SETUP UNIT=DISK,ID=UITST5
//PROCLIB DD DSN=SYS4.PROCLIB,DISP=SHR
// EXEC SPSSM
```

The SPSSM system allows a user to define, process, and save a maximum of 1000 variables, while the standard SPSS system allows for only 500 variables. However, the standard SPSS limitations on number of variables for particular statistical procedures still apply in SPSSM. A typical region requirement for running SPSSM is (180K,80K). When manipulating large data sets the user may need to increase his work space from the default 80K. The example below illustrates the use of the PARM parameter to achieve a workspace of 160K:

```
// EXEC SPSSM,REGION=(180K,160K),PARM=160K
```

For more information about SPSSM consult the SPSS manual, pages 576-577, and/or contact Statistical Services in Room 84 Commerce West.

Users are encouraged to save paper. This can be accomplished in SOUPAC by using a #NOPAGE card and in SPSS by using a PAGESIZE NOEJECT card.

TECHNICAL NOTESONEWAY Problems in SPSS

The range values printed out by SPSS for the LSD, LSDMOD and SCHEFFE's a posteriori contrast tests are critical values multiplied by the square root of 2. For example, with  $\alpha = .05$  and  $d.f. = 197$ , the range value for  $LSD = 1.64 * \sqrt{2} = 2.31$ , as shown on page 432 of the SPSS manual.

It would appear that Option 8 of the ONEWAY program is not working.

The SPSS manual does not explain how to use Option 7 in ONEWAY. Our tests indicate that one needs a VARIABLE LIST, an INPUT MEDIUM, and an N OF CASES equal to the sum of group frequencies. In addition, the min-max specification for the independent variable should allow for each group to be processed. The example below is a card deck setup for running a Tukey test on five groups, given frequencies, means, and standard deviations as input:

```
VARIABLE LIST      V1,V2
INPUT MEDIUM      CARD
N OF CASES        50
ONEWAY            V1 BY V2(1,5)/RANGES=TUKEY
OPTIONS           7
READ MATRIX
```

The user is advised to check the results of the Tukey, Tukey b, SNK, and Duncan's range tests from program ONEWAY. Our analysis of the sample output on page 432 of the SPSS manual (assuming that the harmonic mean is used) indicates that the results are incorrect.

### SPSS Errors

The following errors are known to exist in both SPSSV6 and SPSSM. Many of these errors will be corrected in an updated version which should be available about October 15, 1975:

1. ONEWAY, Option 6. Option 6 in ONEWAY which prints values labels for groups in the RANGE tests results in SPSS ERROR 1773 - 'AN ATTEMPT TO READ PAST THE END OF A DATASET.'
2. BREAKDOWN, Integer mode. The minimum-maximum specification (0,HIGHEST) will produce SPSS ERROR 764 - 'INVALID VALUE RANGE ON 'BREAKDOWN' CARD.' The value specification on the dependent variable will not exclude cases from the analysis.
3. LIST FILEINFO with keyword COMPLETE will loop in printing subfile names if the number of subfiles exceeds 4.
4. DISCRIMINANT will occasionally produce negative square root arguments when computing standardized discriminant functions. Errors of precision causing the negative square root argument occur during the computation of the covariance matrix and result in extremely high values on the diagonal. No fix is currently available but the problem may be avoided if the discriminating variables are modified to vary on a similar range. For example, if the mean of VARX is 100 times as large as other variables in the analysis use the following COMPUTE statement prior to the analysis:
 

```
COMPUTE      VARX=VARX/100
```
5. GET ARCHIVE. If no variables are specified on the GET ARCHIVE control card SPSS ERROR 283 - 'FORMAT OF THE 'GET ARCHIVE' CARD IS INVALID' will occur.
6. DISCRIMINANT, Statistic 5 will not be printed if the number of groups defined by the dependent variable is less than 2.
7. CONDESCRIPTIVE, Option 3 will not produce Z-Scores if preceded by a \*SELECT IF.
8. FACTOR, with Keyword FSCORE specified on multiple 'VARIABLES=' lists will not produce factor scores for the 2nd to nth requests.
9. WRITE FILEINFO does not recognize EDIT.
10. ONEWAY does not recognize EDIT.
11. N OF CASES with keyword UNKNOWN used with card input produces the wrong error text for SPSS ERROR 86.

12. MISSING VALUES will not flag as an error the assignment of 4 missing values for a single variable.
13. FREQUENCIES in general mode will produce spurious histograms for variables with only missing values.
14. CROSSTABS in general mode will calculate LAMBDA incorrectly if ETA is not requested.
15. FACTOR, Option 4 does not work (a check for correlation matrix entries larger than 1.0 is performed even when Option 4, factor matrix input, is in force).
16. BREAKDOWN, Statistics 1 and 2. Coefficients produced are not those indicated in Fig. 17.3 on page 259 of the SPSS Manual, 2nd Edition. In particular:

Statistic 1:

  1. ETS SQRD is not printed.
  2. ETA SQRD = Between groups sum of squares/Total sum of squares, and has the same value as the ETA SQRD currently produced by Statistic 2.

Statistic 2:

ETA SQRD and CORR COEFF are printed; the manual indicates that R and R SQUARED are to be printed. R is the CORR COEFF under a different name, and R SQUARED is simply the square of R.
17. SCATTERGRAM scale printing is controlled by the print format of the variable being plotted. Since the default print format in Version 6.00 is 0 the scale is printed with no positions to the right of the decimal unless the print format is specified on a PRINT FORMAT card.
18. BREAKDOWN with keyword CROSSBREAK. All statistics printing is controlled by the print format for the aggregated variable; this is similar to the SCATTERGRAM problem.
19. CROSSTABS in integer mode produces an incorrect workspace message. Workspace does not include value labels.
20. ONEWAY, Option 8 produces the wrong degrees of freedom.
21. INPUT FORMAT does not check for double nesting which will generate an incorrect format correspondence table.
22. FACTOR, TYPE=RAO. The formula used for calculating chi-square is appropriate only for final solutions; a more general formula is needed for intermediate and alternate solutions.
23. DISCRIMINANT, Option 12 will only produce results when the discriminant analysis is done in stepwise mode.
24. DISCRIMINANT, Options 13 through 19 and STATISTICS 7 and 8 are not available.



25. DISCRIMINANT, Option 5 will only produce a complete table when the number of groups is less than 10.

Differences Between Discriminant Analysis Programs  
in SOUPAC, SPSS, and BMD

Differences exist between the Discriminant Analysis programs in SOUPAC, SPSS, and BMD. Discriminant Analysis in BMD is conceptually the same as Classification Analysis in SOUPAC and SPSS. Discriminant Analysis in BMD is carried out on the observed scores, whereas Classification Analysis in SOUPAC and SPSS both use the output from the Discriminant Analysis.

Although Discriminant Analysis in SOUPAC and SPSS are conceptually identical, there are three main differences in the output of the two programs:

1. For each unstandardized discriminant function output, SPSS also outputs a constant. When added to each subject's discriminant score, this constant serves the purpose of giving the sample discriminant scores a grand mean of zero. This constant may be useful, but it is not part of the Discriminant Analysis model and is not output from the SOUPAC Discriminant Analysis program.
2. The discriminant functions in SPSS are standardized by using the total standard deviations. In SOUPAC, the discriminant functions are standardized by using the square root of the diagonals of the within SSCP matrix, which are proportional to the unbiased estimates of the population within group standard deviations.

These two methods of standardization utilized by SPSS and by SOUPAC are theoretically distinct and will yield different interpretations of the discriminant functions. Neither method of standardization is "incorrect"; each represents a different theoretical viewpoint. (See Multivariate Analysis by M. Tatsuoka. pp. 161-164, and Multivariate Data Analysis by W. Cooley & P. Lohnes, p. 250).

3. The unstandardized discriminant functions in SOUPAC are normalized, whereas in SPSS they are not.



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OFF-LINE is the newsletter of the Computing Services Office at the University of Illinois at Urbana-Champaign. OFF-LINE is printed every two weeks except for interruptions due to holiday schedules or lack of news. Articles may be reprinted provided that the source of the article is noted. CSO operates an IBM 360 model 75 with one million bytes of fast core and two million bytes of slow core, under HASP and OS, and a dual-processor DECsystem-10 with 256K words of core, under TOPS-10, serving up to 80 simultaneously active terminals.

POLICYHighlights of CSO User Meeting

Progress of new hardware acquisition and the use of off-campus machines highlighted the CSO Open User Meeting held October 7. Both topics were discussed by George Badger, CSO Associate Director.

CSO is proceeding toward the acquisition of new hardware to either replace or enhance the existing IBM 360/75 and DECsystem-10. A major increase in capacity is sought, to accomodate the measured demand on the Urbana campus. The timetable is: selection by January 1, 1976, and installation by July 1, 1976.

Vendors who have responded to requests for benchmarks include:

1. Ahmdahl
2. Burroughs (7700 System)
3. CDC (CYBER 173 and 175 Systems)
4. DEC (KL-10 System)
5. IBM (370/168 Models 1 and 3)
6. UNIVAC (1110 System)

Selection of the new equipment will be based upon price/performance, with potential conversion expense added to the cost where appropriate. Mr. Badger stated that it was likely that a multiple-vendor configuration would be selected, because no single machine available today will perform acceptably for both timesharing and heavy batch use.

In response to questions, Mr. Badger reiterated that the DECsystem-10 was selected to be an interim machine, and that its presence now does not imply that it will be a part of the final configuration. The same is true of the IBM system, as IBM 370 time is likely to be available from off-campus sources for users whose requirements cannot be met on non-IBM equipment.

On the use of off-campus machines, Mr. Badger noted that presently CSO users are running 20 hours per day of CPU time on the Chicago IBM 370s, evenly divided between the Circle Campus and the Medical Center. Both centers have taken steps to protect the service offered their local users. In the case of the Medical Center, the line is turned off until 6 P.M. each evening, and no UOI jobs are run until 10 P.M. The Circle Campus center has implemented scheduling controls which limit UOI jobs to 1 hour per day and 8 hours per night.

Major changes in off-campus usage were forecast, due to the removal of the Medical Center machine (see the following story).



UIM 370/155 To Go

At the CSO User Meeting it was announced that the IBM 370/155 at the Medical Center campus will be removed before the first of the year.

Fortunately, the removal of the Medical Center hardware will (nearly) coincide with the relocation of University Administrative Data Processing facilities to Chicago, and the acquisition of an IBM 370/168 by that branch. Arrangements have been made for CSO to get time on the new machine to replace the time formerly available on the Medical Center's 370/155.

A 9600 baud link will be established between the IBM 360 in Urbana and the new IBM 370/168 in Chicago. In most respects, the user interface will be unchanged. CSO and CACC staff are currently meeting to work out details of the projected link; these will be announced in OFF-LINE as they become definite.

Disk and PDP-11 to be Added to DECsystem-10

Because of savings made possible by the locally developed code for the IBM/DECsystem-10 link, a fifth RP04 disk complete with controller and channel and a PDP-11 for computer-to-computer communications will be added. Bob Penka explained at the CSO User Meeting that the enhancement is essentially a trade to DEC and does not increase the cost to CSO.

The new disk will be used primarily for swapping, and should improve the performance of the DECsystem-10.

The added PDP-11 will make possible remote computer-to-computer connections to the DECsystem-10. CSO now has no facilities for this application, which typically involves on-line communication with a task-dedicated minicomputer which handles devices in real time, and requires a second, larger system for data storage or computation.

In the past, projects of this sort were limited by incompatible hardware interfaces, and by the lack of a suitably general communications protocol for multi-vendor systems. CSO hopes to circumvent these difficulties by using standard ASCII asynchronous communication in the medium-speed ranges. Software will be developed to allow users (on the DECsystem-10 side) to treat their line as a standard buffered device from, for example, a FORTRAN program. The remote computer can treat the DECsystem-10 as a fast Teletype, an interface found on nearly every existing system.

The new hardware is being traded for the return of the DECsystem-10 line printer and the DEC-written DAS-78 link software. IBM 360 line printers will be used for DECsystem-10 print after the end of October. Software will be developed by the first of the year to allow print to be conveniently and cheaply sent to any remote job entry station.

### CSO Offers Take-Home Keyboard Terminals

Portable Texas Instruments terminals (TI-735) are available for rent at the CSO North Routing Room, 131 DCL. The cost is six dollars per day, for a maximum guaranteed period of 10 days.

The suitcase terminals are equipped with acoustical couplers that use an ordinary telephone handset for connection to the DECsystem-10. Heat-sensitive paper is supplied with the terminal.

By use of rental terminals, users with appropriate funding can obtain a short-term private terminal for use in their home or office for special projects. Rental payments must be from standard University accounts, not from class or research board accounts.

For further details, see Don McCabe at CSO North.

### SYSTEM NOTES

#### Paper-Saving Changes to be Implemented

As soon as possible, CSO will implement measures designed to minimize printer paper use. The changes include use of smaller (8 lines per inch) paper forms, system-wide suppression of page ejects, and default page overflow.

The smaller forms will be used as soon as they become available, probably by the end of October. New print trains for the IBM printers with smaller type will be ordered, but will not be available for several months.

The new defaults will cause page ejects (skips to channel 1 or '1' FORTRAN carriage control) to be translated to a few blank lines, and the blank lines at the top and bottom of pages to be eliminated. The user may avoid eject suppression by use of the new EJECT= ID card parameter. EJECT=NO is the default; EJECT=YES indicates that page ejects are to be allowed. Blank lines at the top and bottom of the page can be obtained by using the OVFL= parameter. The default for OVFL= will be changed from YES to NO. As a penalty, the job which avoids paper saving will be charged for a minimum of 45 lines per page. The rate per line will remain the same.

#### How to Minimize Compiler Output

Most compilers on the IBM 360 have an option which suppresses printing of the compiled program while allowing any errors found to be printed. This form of output is often more useful than the voluminous full listing, particularly for a programmer who will fix the program from an interactive terminal. The following list summarizes the print suppression options available for common IBM software:

<u>Processor</u>	<u>Option</u>
Assembler	PARM.ASM=(NL,NX) PARM.GO=NOMAP
FORTRAN	PARM.FORT='NOSOURCE,NOMAP,LINECT=60'
PL/C	\$PL/C NOSOURCE
PL/I	PARM=NS
SPITBOL	-NOLIST
SOUPAC	#NOPAGE
SPSS	PAGESIZE NOEJECT
WATFIV	\$JOB NOLIST

Users are cautioned, however, that the system consultants will require a complete program listing when discussing any problem, even if this means the program must be rerun at the user's expense to obtain it. In particular, complete listings of program libraries, including linkage editor or loader maps, are essential to debugging on the IBM 360.

#### DECTapes Moved to User Area

The dual DECTape drives are now physically located in room 127, DCL, adjacent to the user terminals. Users may mount and dismount their own tapes while working at a nearby terminal, making for more convenient service.

The MOUNT command will no longer accept devices which do not require operator intervention. Specifically, MOUNT will tell DTA: users to use ASSIGN instead. The format of the ASSIGN command is:

```
.ASSIGN DTA:
```

The system will respond by assigning the job a DECTape unit, or by telling who currently has the units assigned. Further software instructions are available from HELP DTA. Directions for physically mounting tapes are posted above the units.

#### LANGUAGES

##### SPSS FORTRAN Source No Longer On Line

On October 1, the IBM Scientific Subroutine Package FORTRAN source was taken off line. The load module form of the subroutines is still available on line, and may be accessed as before.

SSP source is now maintained on the UIMATH setup disk, and can be retrieved as follows:

To list routine xxx:

```
/*SETUP DISK=UIMATH
// EXEC MATHLIST,T=SSPFORS,R=xxx
```

To punch a copy of routine xxx:

```
/*ID CARDS=1000
/*SETUP DISK=UIMATH
// EXEC MATHLIST,T=SSPFORS,R=xxx,OUT=B
```

The SSPSRCH procedure formerly used to obtain SSP source will produce an error message until November 1, when it will be removed altogether.

Persons thinking of using SSP routines should keep the following in mind:

1. Some of the routines in SSP have a bad reputation. If there is a routine in the FORTUOI library or in the IMSL package that does what you want, you should use it instead of the SSP routine.
2. The SSP load modules are compiled exactly as the routines appear in the SSP manual. In most cases, if a routine has a double precision version, that version has a different name, obtained by prefixing a 'D' to the single precision name. In a few cases, the single precision routine must be converted to double precision by the user. The manual should be checked to see which situation holds for a given program.

#### TECHNICAL NOTES

This section is for the knowledgeable user who could be affected by slight changes on the DECsystem-10 or the IBM 360/75. All important systems announcements are explained in full in other sections of OFF-LINE.

#### SHOW Command Reliability Note

DECsystem-10 users should notice a marked improvement in the availability of the SHOW command, which enables job inquiry on the linked IBM machines.

The two major sources of unreliability are bugs in the DEC-supplied interface routine for the DAS-78, and downtime on the IBM 360. Of the two, the bugs have been the most frequent offender. Solution of the problem was delayed because the problem only showed itself when the SHOW interface and the UOI spooler were both heavily loaded.

We have circumvented the problem by preventing interaction between SHOW and the spooler, and we believe that we have found a permanent fix, which we are now testing. In the meantime, the circumvention has

eliminated the symptom, and we are hopeful that SHOW service will be consistent in the future.

SOS Bug Fixed

In the latest version of SOS, the /LOWER switch is correctly accepted when it appears in a SWITCH.INI file. This edit moves to SYS: October 19.





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POLICY

Documentation Needs Help

CSO is seeking members of its user community who are willing to criticize, make suggestions about, and review our documentation. For a user with sufficient interest, this is an opportunity to influence the development of documentation in new areas, or to help correct deficiencies in existing approaches.

We are also searching for a full-time professional technical writer to take responsibility for documentation.

If you have an interest or recommendation in either area, please contact Sue Greenberg, 166 DCL, 3-6133.

UIM Announces Closing of Computer Center

In a letter dated October 1, Chancellor Begando of the University of Illinois Medical Center announced the merger of UIM'S computing with the University Consolidated Administrative Computer Center, and the closing of UIM'S own IBM 370/155 facility "not prior to" January 1, 1976.

The Medical Center's computing will be done on the new IBM 370/168 to be acquired by CACC, via an RJE. Target date for the completion of the transition is March 1, 1976.

As announced in the last OFF-LINE, persons who are using the UIM facility with CSO accounts should be prepared to make the transition to another machine. The IBM 370/158 at the Chicago Circle campus will still be available, and CSO will be given time on the new CACC 370/168 when it is installed.

UIC Machine to be Unattended Weekends

Beginning on Sunday, November 2, the Chicago Circle 370/158 will run unattended from Midnight Saturday until 8:00 a.m. Monday.

Two-day Limit for Jobs in HOLD

Users are reminded that a job on the IBM 360/75 may not be in user hold (HOLD=YES on the ID card) for longer than 48 hours. A job in hold for more than two days may be cancelled by the operator.

If a job in hold is waiting to be released by another job which is experiencing long turnaround, please notify the operator.

Computer Science Machine Problems Due

The schedule for machine problem due dates for Department of Computer Science courses is:

<u>Date</u>	<u>Course(s)</u>	<u># Students</u>
Nov 4	CS101 MP6	700
5	CS121 MP4	140
7	CS105 MP5	600
	CS325 MP3	75
10	CS400 MP4	85
12	CS103 MP7	90
	CS321 MP3	95
18	CS101 MP7	700
21	CS105 MP6	600
	CS325 MP4	75
24	CS103 MP8	90
	CS121 MP5	140
Dec 1	CS400 MP5	85
3	CS321 MP4	95
8	CS103 MP9	90
9	CS101 MP8	700
10	CS325 MP5	75

SYSTEM NOTESDEC-10 Loses Printer, Improves Print Service

After the DECsystem-10 line printer is removed, users will enjoy improved print service. Effective November 2, it will be possible for a DECsystem-10 user to route output to any CSO Remote Job Entry station by a DEC-10 PRINT command.

New code has been added to the DAS-78 link to simulate a DECsystem-10 printer, thus ensuring that existing DEC-10 programs which format print output will continue to work properly. New switches added to the PRINT command, /EJECT and /PRINT:NARROW, support the HASP EJECT= option and EBCDIC character escapes, respectively.

As a companion to the change, the translation of characters to and from the IBM machine has been changed. The ] (right bracket) is no longer the escape character for EBCDIC translation; instead the ^N (control-N) serves this purpose. A ^N followed by two hexadecimal digits sent to the 360 is translated to the single EBCDIC character equivalent. This is the default action; the /PRINT:NARROW option sends a ^N as the two characters "uparrow" "N", thus suppressing the escape. A simple program will be provided to translate existing files on the DECsystem-10 which were created with the right-bracket convention.

To implement print routing from the DECsystem-10, pseudo LPT devices are defined. These are currently of the form LPTnnn, where nnn is the

number of the 360 remote station in octal. As this convention is rather hard to remember, mnemonic names (the same names as are accepted for the HASP PRINT= ID card parameter) will be allowed in the device context of the PRINT command. Thus, to print file PGM.F4 at CSO South, one may type:

```
.PRINT COMM: = PGM.F4
```

Users are encouraged to use the mnemonics rather than the device numbers, as we will be forced to change the numbering convention with the next monitor (forecast for January). For users with specialized print applications a UUO will be provided which will return the current device corresponding to any mnemonic. In addition, the user will be provided the option of setting a default print destination for all a job's output. See the discussion of the LPT command and the LPT. UUO later in this issue of OFF-LINE. A help file, HELP PRINT, will also be available on November 2.

The default PN train on the CSO North printers does not have the characters [, ], or \. We have ordered a GN print train, which does have these characters, and in the meantime, have changed the default print translation on the 360 so that other characters (\$,?, and %) print in their place. For users who find this unsatisfactory, a DK train is provided. This is physically a TN train with translation so that the [, ], and \ are treated correctly. Use of the DK or TN train is a special form setup, which is requested by use of the /FORMS: switch on the print command. See the new forms designations in this issue of OFF-LINE.

#### New UOI Command to be Default

The enhanced version of the UOI command for sending jobs to the IBM machines will become the system default November 2. The command has the following improvements:

1. The command is aborted if any error is detected, preventing unwanted file deletions.
2. The command checks the first file in a request for an IBM JOB card. If none is present, one is generated and inserted in the stream. (This is not done if the first file has the /NEW switch.)
3. By default, line numbered files are copied to a temporary file in which the numbers are transferred to columns 73-80. The temporary file is then queued with a /DISPOSE:RENAME switch. The /NONUMBER switch prevents modification of columns 73-80. The /COPY switch forces copying of a file regardless of line numbers. This is useful when a file is to be submitted a number of times with minor changes.
4. When a file is copied, the length of each line is verified to be less than 73 characters, or less than 81 if /NONUMBER is in effect. If a long line is discovered, the line is typed out,



and a truncated line is sent. If five lines are truncated, the command will ask if it should continue. If the response is Y, no further truncation diagnostics are produced.

5. The /ID:filename switch allows you to designate a file which will be sent before the other files in the request. This is most useful in a SWITCH.INI file, explained below.
6. If a file named SWITCH.INI is present in the user's directory, and no indirect files are specified, UOI will scan the SWITCH.INI files for switches. Switches are taken from lines which begin with UOI. For example, a SWITCH.INI file might contain:

```
UOI/ID:IDFIL.UOI/COPY/NONUMBER
```

The SWITCH.INI switches apply to the entire command, unless overridden.

7. The /DEXT:extension switch sets the default extension for all files in the request for which the extension is not specified explicitly.
8. The command prints out the IBM job name, followed by the DEC job name, which is set by default to the last 6 non-blank characters of the IBM name.

Users who do not wish to use the new command may use .QUEUE XXO: = list.

### Using Special Print Forms

The combination of paper-saving measures and DEC-10 printing has more than doubled the number of print options available to the user. The following summarizes the more probable switch permutations; a more complete discussion is available as the ID Card Reference Guide.

For the DEC-10: /FORMS:parm (on PRINT command)

For the IBM 360: FORMS=parm (on ID card)

<u>Parms</u>	<u>Mean</u>
6	6 lines per inch, regular paper
LA	CSO labels (6 lines per inch for 11 inches)
R	Reverse forms (8 lines per inch for 8.5 inches)
R6	Reverse forms (6 lines per inch for 11 inches)
TN	TN print train and translation (DEC-10 users see the DK train). Also TN6, TNR, TNR6, TNL (labels), TNL8.
DK	TN train with ASCII translation for [, ], and \.
SP	Special forms. Used for cases not covered above, or where special instructions must be transmitted to the operator. The user must

submit a Special Handling Card with  
the job.

### IBM-compatible Procedure Library

A procedure library containing IBM catalogued procedures exactly as they appear in their respective Programmer's Guides has been installed on the 360/75. The library, SYS1.PROCIBM, contains procedures for:

360 Level F Assembler Language  
COBOL Version II  
Fortran Levels G and H  
PL/I Level F, Optimizer, and Checkout  
RPG Version II

These procedures can be accessed by placing a PROCLIB DD card after the ID and SETUP cards, and before any other JCL. The card is written:

```
//PROCLIB DD DSN=SYS1.PROCIBM,DISP=SHR
```

Prospective users are warned that JCL for the most commonly used subroutine libraries is not contained in these standard procedures.

A listing of the procedures is available at the Consulting Offices, or may be obtained by use of the PROC program on the DECsystem-10.

### LPT Command for Default Print Routing

The new LPT command allows a DECsystem-10 user to set the default RJE where the job's print output is to go. The format of the command is:

```
.LPT destination
```

The destination may be a mnemonic name for any CSO RJE (any name which would be accepted as a PRINT=dest on a HASP ID card). Unambiguous abbreviations are also accepted. Thus, to send all PRINT output by default to CSO South, one would type:

```
.LPT COMM
```

The LPT command responds by typing the mnemonic name in full and the LPTnnn ersatz line printer which corresponds to the mnemonic.

If the LPT command is invoked with no destination, the job's current default destination is typed.

LANGUAGESEISPACK Moved to FOR: area

EISPACK II has been moved from FORLIB to its own library, FOR:EISPAC. This new library is not searched automatically by LINK-10; to use EISPAC, add FOR:EISPAC/LIBRARY to the EXEC, LOAD, or DEBUG command, as:

```
.EXEC MYPROG,FOR:EISPAC/LIBRARY
```

Note that EISPAC can only be used with the F40 compiler.

PDP-11 Cross-assemblers Available on DEC-10

Several PDP-11 cross-assemblers are now available to timesharing users. Although the assemblers are not supported by DEC or CSO, they appear to work. One of them, MACDLX, has been used extensively for in-house development.

The assemblers are MACDLX, MACR11, and MACY11. MACDLX cannot generate relocatable code. MACR11 and MACY11 can, but they have not been tested with the LNKX11 loader. All the assemblers have macro capabilities, similiar to MACRO-11.

To try one of the assemblers, type:

```
.RUN MXI:MAC???
```

where ??? is one of DLX, R11, or Y11.

For further information, contact Rick Lindberg, 185 DCL, phone 3-7159.

New Features Added to 360 CARDS Program

In response to user requests, several new features have been added to the CARDS program, available on the IBM 360/75. Among them are: a triple-spacing option, the ability to use OS datasets for input, the ability to specify a flag for page ejects in the listing, and the ability to have an arbitrary number of command cards interspersed with the data.

To implement OS dataset access, the program now allows its commands to be specified in the PARM field of the CARDS EXEC card. For example,

```
// EXEC CARDS,PARM='LIST punch'  
//SYSIN DD <dataset specification>
```

Two new keywords, RECORDIN and RECORDOUT, have also been provided. These need be used only when the input or output record sizes are not 80 bytes, and may specify any length up to 500 bytes.

Other new commands of interest are:

**COMMAND column flag**

Specifies that further command cards may appear in the data. The command cards are identified with a flag beginning in the indicated column. Only one COMMAND command may appear per command card. For example:

```
// EXEC CARDS
//SYSIN DD *
LIST COMMAND 1 GO
..
GO PUNCH
..
/*
```

This lists the deck up to the GO card, and punches it afterward.

**EJECT column flag**

Causes a page eject when flag appears in the specified column of the input. Only three EJECT commands may be active at once.

**TLIST**

Triple spaces the output to the printer.

**New SPSS Release**

An updated version of SPSSV6 and SPSSM is now available on the IBM 360/75. The new version corrects errors 1 through 22 described in the October 3 OFF-LINE. The following features of SPSSM are now working:

1. GET ARCHIVE will accept more than 500 active variables.
2. DISCRIMINANT will plot correct symbols on the territorial maps.
3. LIST ARCHINFO with keyword COMPLETE will generate output.
4. SAVE ARCHIVE works.

In addition, new features are available in both SPSSV6 and SPSSM:

1. FACTOR: improvements to the matrix inversion routine.
2. CROSSTABS: Fisher's exact test now check for marginal proportions before calculating the tail. Option F previously would drop rows or columns which had only missing values.
3. ANOVA: various improvements to file inversion to obtain higher order interactions.

The contingency coefficient, phi coefficient, and significance for both Tau b and Tau c were incorrect in Version 5 of SPSS. These errors have been corrected in Version 6.

Programs Available in 360 STATLIB

Some statistical programs, old and new, are now available on the IBM 360/75 STATLIB. The JCL to access any of the STATLIB programs is:

```
//PROCLIB DD DSN=SYS4.PROCLIB,DISP=SHR
// EXEC STATLIB,PROG=name
```

where name is the name of the program to be run.

The new programs available are:

(In the area of cluster analysis:)

## JOHNSON

Hierarchical clustering from a lower half matrix of distances (dissimilarities) or proximities (similarities) without the main diagonal.

## HOWARD

Howard-Harris type cluster analysis.

## NORMIX

Cluster and Pattern Analysis of Normal Mixtures (Wolfe cluster analysis).

(In the area of scaling and preference analysis:)

## POLYCON

Polycon II polynomial conjoint analysis.

## KYST

Multidimensional scaling.

## MAPREF

Preference mapping by Coombs Unfolding Model: subject plots, monotone fit.

## MDPREF

Multidimensional analysis of preference data.

## PREFMAP

Preference mapping by Coombs Unfolding Model. See also MAPREF.

## PROFIT

Carrol and Chang property fitting by linear, non-linear regression, and eigen methods.

(In the area of multivariate analysis:)

## MULDIS

Multivariate discriminant analysis.

## GENCAN

Generalized canonical by 5 methods for more than 2 groups.

SFRL

SFRL factor matching.

(In the areas of regression and econometrics:)

WOODSLIN

Linear least squares curve fitting (ARIMA).

TPOLY

Fit Chebychev polynomial of specified degree by least squares.

FIML

Full Information Maximum Likelihood.

AUTOECON

Autoregressive OLS.

(Other programs:)

CASE5

Thurstone case 5 of the Law of Comparative Judgement.

MONANOVA

Non-metric analysis of factorial designs by weighted least squares monotone regression.

Consulting on these programs is minimal at this time; the Statistical Consultants may be able to help you access the programs, but may not be able to tell you how or why they do what they do.

In addition to these new programs, the following previously available programs can now be accessed in the STATLIB:

IDENT	Box-Jenkins identification
ESTIM	Box-Jenkins estimation
ESTFOR	Box-Jenkins estimation and forecast
MOCA	Multiple ordered cluster analysis
CLUSTER	Parks q-mode cluster analysis
MCRAE	McRae K-means cluster analysis
LISREL	Linear regression models
ACOVSM	Analysis of covariance structures (small)
ACOVSF	Analysis of covariance structures (large)
SIFASP	Simultaneous factor analysis, confirmatory factor analysis
TSP	Time-series analysis (Harvard-MIT version)

Some of these programs have individual procedures of the same name to provide the extra JCL the programs require. To use these procedures, one would code:

```
//PROCLIB DD DSN=SYS4.STATLIB,DISP=SHR
// EXEC proc
```



where proc is one of KYST, LISREL, MONANOVA, MULDIS, NORMIX, POLYCON, or WOODSLIN.

### TECHNICAL NOTES

This section is for the knowledgeable user who could be affected by slight changes on the DECsystem-10 or the IBM 360/75. All important systems announcements are explained in full in other sections of OFF-LINE.

#### LPT. UUO Added

The LPT. uuO (CALLI -4) allows user programs to set or retrieve their job's default LPT destination. To use the LPT. UUO in a MACRO program, precede the first use by:

```
OPDEF LPT. [CALLI -4]
```

The call is:

```
LPT. AC,      -or-      CALLI AC,-4
```

<u>AC=</u>	<u>Result</u>
------------	---------------

0	Error return: not implemented. Skip return: AC=SIXBIT/LPTnnn/ (the job's current default LPT destination.
'LPTnnn'	Error return: AC unchanged=not implemented AC=0: Not a known LPT Skip return: AC=SIXBIT/mnemonic/ (the mnemonic for the job's current default LPT destination). The job's LPT destination is changed by this call.
'mnemonic'	Error return: AC unchanged: not implemented AC=0: not a valid mnemonic. Skip return: AC=SIXBIT/LPTnnn/ (the LPT which corresponds to the mnemonic). The job's default LPT destination is not changed by this call.

The default LPT destination is used by the QUEUE program to replace a queue request to generic LPT: by a request to the job's default LPT device. Currently, the LPT device so selected is used later by LPTSPL to pass routing information to the IBM 360/75. Thus, the default LPT destination determines the routing of print output for all PRINT commands executed under that default.



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# Off-Line

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### OFF-LINE'S MAILING LIST

OFF-LINE is the newsletter of the Computing Services Office at the University of Illinois at Urbana-Champaign. OFF-LINE is printed every two weeks except for interruptions due to holiday schedules or lack of news. Articles may be reprinted provided that the source of the article is noted. CSO operates an IBM 360 model 75 with one million bytes of fast core and two million bytes of slow core, under HASP and OS, and a dual-processor DECsystem-10 with 256K words of core, under TOPS-10, serving up to 80 simultaneously active terminals.

## POLICY

### Tape Use on the DECsystem-10

This article is intended to clarify CSO policy on the use of magnetic tapes, DECTapes, and paper tape on the DEC-10. The DEC-10 is intended to run with a minimum of operator intervention, so requests for mounts should be kept to a minimum. Prices quoted below will go into effect January 1, 1976.

#### Magnetic Tape

1. Private tapes: Users wishing a single transfer of data to or from a private tape may obtain the necessary request form from the routing room. The completed form should be handed in with the tape. In most cases the operation will be performed by 9am the following day, at which time the tape may be retrieved from the routing room. The charge for this service is \$1.00. CSO does not mount tapes on a continuing basis for online use.
2. CSO failsafe tapes: Users who need restores from CSO's regular backup tapes should fill in the appropriate form in the consulting office and hand it in at the routing room. Backups are taken nightly after midnight. Recent backup tapes are stored at CSO, and older ones are stored outside the building. Restores are normally completed by 9am on the following day, but they may take longer if the backup tape is not on hand. The charge for a restore is \$5.00 if the cause for the restore is a user error. There is no charge if the cause is a CSO error.

#### DECTape

Users may mount their own DECTapes in the user area at CSO north. Users may purchase formatted DECTapes from CSO for a price of \$12.00 each. Purchase request forms are available at the routing room. (See article below under SYSTEM NOTES.)

#### Paper Tape

Paper tapes may be read in either on a Teletype or via the 360 on the high-speed paper tape reader at CSO South (the latter may involve conversion problems). Eventually a high-speed paper tape reader/punch will be available in the user room at CSO North.

Paper tape output requests are spooled. Since users frequently do not claim punched tapes, requests in the paper tape queue which are not claimed within three days are cancelled. Therefore, the user should request punching of his output through the routing room. In most cases the request will be filled by 9am the following day, or sooner if possible. The output may be retrieved from the routing room. The charge for paper tape punching is \$15.00 per thousand feet of tape.

There is no card punch or plotter on the DEC-10, and requests in the above queues are cancelled.

Any user whose needs are not met by these procedures should contact Jack Knott for further assistance.



New Tape Ring Policy

Effective December 22, 1975, the policy concerning rings in tapes is as follows:

1. All tapes in the machine room (194 DCL) will be stored without rings.
2. When a tape is mounted, a ring will be inserted only if the user specifies RING in the SETUP card; e.g.,

```
/*SETUP UNIT=TAPE,R=999,ID=ABCDEF RING
```

This procedure will give the user protection against accidentally overwriting his tape. Users who depended on the old policy, which defaulted to RING, must now be sure to include RING on their SETUP cards in order to be able to write on their tapes.

UIM Conversion to CACC

The Chicago Medical Center computer (UIM) will be "absorbed" by the Consolidated Administrative Computer Center (CACC) in January, 1976. CACC, it appears, will offer service equivalent to UIM's present service (third shift only), but it is likely many procedural changes will occur. These procedural changes will especially affect disk and tape users. In addition, there is still some discussion regarding which proprietary packages will be available at CACC. Many of the details will not be known until mid-December.

If you are a UIM disk user, tape user, or proprietary package user (including statistical packages), or if you have any questions about the move, contact the consultants.

Semester Break Schedules

The following schedule gives CSO consulting and operations hours over the semester break period, from December 15, 1975 through January 18, 1976:

Consulting, CSO North

9am-5pm, Mon-Fri, EXCEPT:  
9am-12n, Dec. 24  
Closed Dec. 25, 31, Jan. 1

Consulting, CSO South

9am-12n, 1pm-5pm, Mon-Fri, EXCEPT:  
9am-12n, Dec. 24  
Closed Dec. 25, 26, 31, Jan. 1, 2

Statistical Services

9am-12n, 1pm-5pm, Mon, Tue, Thu, Fri  
9am-12n, 2pm-5pm, Wed, EXCEPT:  
9am-12n, Dec. 24  
Closed Dec. 25, 26, Jan. 1, 2

Operations, CSO North

8am-2am, Mon-Fri  
 8am-12m, Sat  
 12n Sun - 2am Mon, EXCEPT:  
   8am-4pm, Dec. 24  
   Closed Dec. 25, Jan. 1  
   8am-4pm, Dec. 31

Operations, CSO South

8am-12m, Mon-Fri  
 2pm-8pm, Sun, EXCEPT:  
   8am-12n, Dec. 24  
   Closed Dec. 25 through 28  
   8am-12m, Dec. 30  
   Closed Dec. 31 through Jan. 4

Agriculture

8:30am-9pm, Dec. 15 through Dec. 19  
   Jan. 5 through Jan. 9  
   Jan. 12 through Jan. 16  
 (Normally closed Saturday and Sunday)  
 8:30am-4:30pm, Dec. 22, 23, 26, 29, 30, Jan. 2  
 8:30am-12n, Dec. 24  
 Closed Dec. 25, 31, Jan. 1  
 Resume normal schedule Jan. 19

Chemistry

Previously published regular hours for Chemistry were incorrect. The Chemistry RJE is available whenever Noyes Lab is open, which is normally from 6am to 10pm on weekdays, and 6am to 6pm on Saturday (closed on Sunday). Holiday exceptions to this rule are:

Closed Dec. 25, 31, Jan. 1

Mechanical Engineering

8am-5pm, Mon-Fri (no exceptions)

Psychology

8am-5pm, Mon-Fri, EXCEPT:  
   8am-12n, Dec. 24  
   Closed Dec. 25, 31, Jan. 1

Social Science

9am-10pm, Mon-Fri, EXCEPT:  
   9am-5pm, Dec. 22, 23, 26, 29, 30, Jan. 2  
     Jan. 5 through 9  
     Jan. 12 through 16  
   9am-12n Dec. 24  
   Closed Dec. 25, 31, Jan. 1

FAR and ISR

From December 11 through December 19 FAR and ISR will open at the regular times, but close uniformly at 10pm; i.e.:

1pm-10pm, Mon-Fri, 11am-10pm Sat, 12n-10pm Sun,  
 Dec. 11 through Dec. 19  
 Closed Dec. 20 through Jan. 18

SYSTEM NOTESCalComp Guide Reprints Now Available

Known errors in the CalComp Guide have been corrected, and the updated version is now available in the Accounting Office, Room 134 DCL.

Fixes to PLC

A new version of PLC has been created which incorporates fixes to 49 known problems. A list of these fixes is available at the consulting offices. This version of PLC may be accessed on HASP by using the following JCL:

```
// EXEC PLC
//STEPLIB DD DSN=SYS9.PLCLIB,DISP=SHR
```

Users are urged to try this version. Unless serious problems are reported, it will become the standard version on HASP and EXPRESS on January 5, 1976.

Changing the Access Date on a 360 Dataset

To change the access date of a 360 dataset to the present date, use:

```
// EXEC PGM=ACCESS
//ddname1 DD DSN=USER.Pps#.name1,DISP=OLD
//ddname2 DD DSN=USER.Pps#.name2,DISP=SHR
...
```

This will access any dataset for which there is a DD card.

PROCUSR to be Scratched January 4th

As mentioned in a previous OFFLINE article, the cataloged procedure library SYS1.PROCUSR will be scratched from the system on January 4th, 1976. Users who would like to retain some of the procedures in their own private library may do so by allocating a dataset with the appropriate DCB characteristics by using the following JCL:

```
// EXEC DUMMY
//DD1 DD DSN=USER.Pps#.name,UNIT=3330,VOL=SER=UIPUBx,
// SPACE=(TRK,(5,2,1)),DISP=(NEW,CATLG),
// DCB=(RECFM=FB,LRECL=80,BLKSIZE=3120)
```

ps# is your ps#, name must conform to the standard OS data set naming conventions, and x is the number of the public disk pack desired (x=1, 2, 3, 4).

The space allocated is large enough to hold up to 21 different members. To copy members from SYS1.PROCUSR to your own procedure library use the following JCL:

```
// EXEC COPY
//SYSUT1 DD DSN=SYS1.PROCUSR(member1),DISP=SHR
//SYSUT2 DD DSN=USER.Pps#.name(member2),DISP=SHR
```

member1 is the name of the procedure in SYS1.PROCUSR which is being copied, and member2 is the name of the procedure in the created library. member2 need not be the same as member1.

The above JCL is needed for each member of SYS1.PROCUSR to be copied.

#### Use the Loader!

A load module can be created by either the loader or the linkage editor. It is an executable copy of a program, and is generated after all external references in the program have been resolved. There are two major differences between the loader and the linkage editor: 1) the loader puts the load module into memory and the linkage editor puts it onto disk, and 2) the loader is cheap to use in terms of overhead, and the linkage editor is relatively expensive.

Often the loader and the linkage editor can be used to accomplish the same objectives, and it is clearly to the user's advantage to save money by using the loader whenever possible. The linkage editor is required in cases where a subroutine library is to be created, but in most other cases the loader can be used to get the desired result. (See "Removal of FORTRAN Linkedit Procs", under Notes on Chicago Circle below.)

#### New UOI Cataloged Procedures Library to be Installed

On January 4th, 1976, CSO will install a new SYS1.PROCUOI, replacing the old library with updated cataloged procedures. The changes made will affect only HASP users.

In the new library we have eliminated procs which are no longer valid and included some new ones. Changes have been made to all of the cataloged procedures, making them more stable and consistent. One of the major changes was to put all DDnames in alphanumeric order to insure ease in overriding DD statements. There are two exceptions to this rule, as explained below:

1. The //STEPLIB DD statement, if any, immediately follows the EXEC statement.
2. DDnames which have the "DDNAME=" parameter on the DD card appear last in the step. This is to enable concatenation onto the dataset described in the DD statement. The prime examples of this occur in all of the FORTRAN procedures; e.g.,

```
//FT06F001 DD SYSOUT=A
```

```
//FT07F001 DD SYSOUT=B
//FT05F001 DD DDNAME=SYSIN
```

The user will then be able to have more than one input dataset included through SYSIN, as in the following example:

```
// EXEC FORTLDGO
//FORT.SYSIN DD *
    <FORTRAN source program>
//GO.SYSIN DD DSN=DATASET1,DISP=SHR
//  DD DSN=DATASET2,DISP=SHR
//  DD *
    <instream data cards>
/*
```

Another major change is the elimination of all procs with IBM type names; e.g., FORTGCG, PL1LFCLD, COBUC, etc. We have created a set of procedures to replace them which are easier to use and have more features.

As mentioned in a previous OFF-LINE, there is a procedure library called SYS1.PROCIBM which contains all of the IBM type procs in their pure form, as they are described in the programmer's guide for each language, respectively. To use the IBM type procs insert

```
//PROCLIB DD DSN=SYS1.PROCIBM,DISP=SHR
```

after your ID and SETUP cards. Care should be taken using these procs because the subroutine libraries are not included in the procedures. Other changes which were made are evident in the individual procs, and can be examined in the system consulting office or by using the PROC program on the DEC10; e.g.,

```
.R PROC
(/ANY FOR LIB LIST.)
LIBRARY ? <specify NEW>
(/AZ TO LIST NAMES)
PROC ? <specify particular proc>
OUTPUT FILE ? <specify TTY: or some file.ext>

<use CONTROL-C to exit>
```

The "NEW" library will exist only until January 11.

The most important changes were changing step names and renaming of individual procs. Users who wish to start using the new procedures can do so by inserting //PROCLIB DD DSN=SYS9.PROCUOI,DISP=SHR after their ID cards.

The effect of the above changes on the various languages are given in full detail in the TECHNICAL NOTES section. Users are urged to examine carefully those areas of TECHNICAL NOTES which will affect them.

Notes on Chicago Circle (UIC)New Procs

The following cataloged procedures have been added to our library at UIC, for use only with ASMG:

```
ASM
ASMLDGO
ASMLKED
ASMLKGO
PROGASM
```

How to Scratch a Dataset at UIC

SCRATCH is a simple batch program which can be used to scratch and uncatalog (i.e., delete) a disk dataset. Unlike many conventional utility programs, it requires no control cards. To utilize SCRATCH, specify the dataset name on the EXEC statement in the following format:

```
// EXEC SCRATCH,DSN='MUC3041.Pps#.obsolete'
```

instructs the SCRATCH program to scratch and uncatalog the dataset MUC3041.Pps#.obsolete.

Unlike the IBM null program (IEFBR14), SCRATCH does not terminate with a JCL error if the dataset is not in the catalog.

How to RENAME a Dataset at UIC

Since you don't necessarily know on which volume your datasets reside at UIC, renaming them with IEHPROGM can be a problem. To alleviate this problem, we have installed a cataloged dataset RENAME utility at UIC. It is used as follows:

```
// EXEC RENAME,OLDDSN='oldname',NEWDSN='newname'
```

If something goes wrong, you should be able to look up the return code it prints, in "Data Management for System Programmers" (IBM Manual #GC28-6550).

Removal of FORTRAN Linkedit Procs

On January 1, all FORTRAN compile, edit, and go procs will be removed at UIC. This step will be taken because it has been found that one in three OS FORTRAN jobs currently uses the linkage editor for compile-linkedit-go type execution, whereas in most cases the loader would be adequate and cheaper.

Since the procs being removed are used occasionally to create a permanent load module, for example when a subroutine library is being created, a CALL option will be added to the compile and linkedit procs. The CALL parameter will have a default value of NCAL, which means no CALLs are being issued. By coding

```
// EXEC FORTGE,CALL=
```



the FORTGCE proc can be used to create a permanent load module copy of the main programs.

CSO has installed a library with cataloged procedures compatible with our library at the Urbana campus. We urge users to convert their programs and use these procedures at UIC (see the article on page 5 on the new procedures, and the TECHNICAL NOTES section.) For help in converting, see a system consultant.

#### Formatted DECTapes Available

CSO now has in stock a supply of formatted DECTapes which users can purchase for \$12.00 each at the CSO North routing room. The first thing the user must do with the tape is to zero the directory. This can be done most easily with a .ZERO DTA: monitor command. To label a DECTape internally in addition to zeroing the directory one should use .ZERO DTA:↑tapename↑.

DTA0: and DTA1: are located in Room 127 DCL. Users must mount and remove their own DECTapes. To assign a DECTape to your job, type .ASSIGN DTA: and the system will respond "DTA&n ASSIGNED", where &n is 0 or 1. You are then free to mount and dismount as many tapes as you wish. If no drive is available, the system will respond with the job and TTY numbers of the jobs to which the drives are currently assigned. You may either wait or petition the current owners of the devices to give them up. DECTape drives may not be reserved.

When you are finished, remove your tape and then type .DEASSIGN DTA&n:. If you get an "OPR ACTION REQUESTED ON DTA" message, something has gone wrong and you must fix it. CONTROL-C out of your program, physically reset your tape, and start again. Instructions for mounting the tapes are posted on the drive cabinet. Further information on using DECTapes can be found in Reference Guide S01.N19 ("DECTape"), or type "HELP DECTAP(CR)".

#### Bug in DEC-10 Utility RUNOFF

The RUNOFF program treats multiple input files as separate RUNOFF jobs, and in some cases the output for the first files in the input list is overwritten. For example, if the user does

```
.R RUNOFF
*TEST=INFILE1,INFILE2
```

the response would be:

```
INFILE1    2 PAGES
INFILE2    1 PAGE
```

This indicates that the output for INFILE1 is 2 pages, and the output for INFILE2 is 1 page. However, the output is in TEST.MEM, which contains only the output for INFILE2, which has overwritten the output for INFILE1. On the other hand, if the output is to DSK: or LPT:, a separate output file with extension .MEM or .LPT, respectively, is generated for each file in the input list.

### SOS Enhancements and Fixes

The version of SOS presently in SYS: fixes several major bugs having to do with indirect files and the COPY command from other files. As an added feature, the protection of the output file may now be specified in the SOS command; e.g., .SOS file.ext[p,pn]<135>.

### DEC-10 PRINT Default now NOEJECT

The default for PRINT from the DEC-10 to the IBM 360 is now NOEJECT, to conform to the 360 default. To override, use the /EJECT switch with the PRINT command (such jobs are charged for a minimum of 45 lines per page). Jobs printing directly from FORTRAN may now use DISPOSE='ELIST' or DISPOSE='EPRINT' to obtain the effect of the /EJECT switch.

### /L to DEC-10 Needs /PRINT:ASCII Going Back

When using a /L after the file name on a PRINT=DEC10 job (which means preserve 360 carriage control information), you must also use a /PRINT:ASCII switch on the PRINT command which eventually prints the file back on the 360. Also note that the /L option puts some odd characters in the file, making the file difficult to edit with SOS.

### Notes on .DAT, .LPT, .CDP, and .PTP Files

When a file with extension .DAT is printed with the PRINT command, column 1 is used as carriage control, unless the switch /FILE:ASCII is used. Files with extension .LPT, when queued to the printer by means of the PRINT command or upon logout, will in certain cases be routed to an unwanted destination unless the user takes necessary precautions. This occurs when the file name proper contains one or two trailing digits which correspond to a valid route code; for example, with files named JUNK16.LPT or JOBX2.LPT, the output is routed to the destination specified by the two trailing digits of the name. This can be overridden on the PRINT command by specifying a destination; e.g., PRINT COM:=jobx2.lpt will file at Commerce West.

Files with extension .CDP or .PTP are automatically queued to (and then deleted from the user's area) a non-existent card punch or paper tape punch upon logout. Users should therefore exercise due caution when naming files. Entries in the card or paper tape punch queues can be deleted by using the commands .TPUNCH/KILL jobname= or .CPUNCH/KILL jobname=, whichever is appropriate. The command .TPUNCH or .CPUNCH will yield the DEC-10 jobname.

New Version of FOROTS

A new version of FOROTS (the FORTRAN run time monitor on the DEC-10) has been added to the system test library NEW:. The following features have been added to the DISPOSE: parameter of the OPEN/CLOSE statement:

1. The parameter 'ELIST' has been added. It is the same as 'LIST' except the /EJECT switch is set to allow page ejects.
2. The parameter 'EPRINT' has been added. It is the same as 'PRINT' except /EJECT is turned on.
3. The DISPOSE: parameters causing line printer queuing will use the routing information set by the LPT monitor command.

LANGUAGESNew BMDP Available

A new copy of BMDP incorporating all changes and corrections to date is now available. To access BMDP use the following JCL:

```
/*SETUP UNIT=2314, ID=UITST4
//PROCLIB DD DSN=SYS4.PROCLIB, DISP=SHR
// EXEC BMDP, PROG=NAME
```

STP (Interactive Statistical Package) Available

STP, an interactive statistical package developed at Western Michigan University, will be available to all DEC-10 users no later than December 19. To access STP a user will type only:

```
.R STP(CR)
```

STP provides programs for correlations, regression, T-test, analyses of variance, factor analysis, frequency counting, distribution analysis, and scatter plotting. A variable transformation facility is also available.

An STP manual can be printed from the DEC-10, as follows:

```
.PRINT DOC:STP.MAN
```

All STP questions should be referred to the Statistical Services Office.

Statistical Services Attitude Survey

Statistical Services is attempting to determine user attitudes toward the necessary and appropriate desired services which an optimal statistical services group should provide. We invite interested users to call Linda Schrom at 333-2170 and arrange for a questionnaire session to be held in the Statistical Services Office. This takes about one half hour. We will appreciate as much user input as we can get.

SPSS Primer

The SPSS Primer is available for \$3.95 at the Illini Union Bookstore. It is a short introductory manual intended for the student with little computer background. It covers some basic SPSS control cards in a non-technical manner, and briefly describes the programs CONDESCRIPTIVE, FREQUENCIES, CROSSTABS, SCATTERGRAM, and T-TEST. Those who intend to use SPSS extensively are advised to purchase the complete SPSS manual.

TECHNICAL NOTESEffects of New UOI Cataloged ProceduresChanges Affecting ALGOL Users

CSO no longer supports the ALGOL Level F compiler. Therefore all of the ALGOL cataloged procedures will be deleted. Users will still have the ALGOLW compiler available to them by using

```
// EXEC ALGOLW
```

Changes Affecting COBOL Users

With the elimination of all IBM type procedures users will have to use the UOI versions of the procs.

Procs which will be deleted:

```
COBUC      <compile only>
COBUG      <compile,load,go>
COBUCLD    "
COBUCL     <compile,linkedit>
COBUCLG    <compile,linkedit,go>
COBULG     <linkedit,go>
```

Procs which are replacements:

```
COB          <compile only>
Stepnames:  COB
COBLDGO      <compile,load,go>
Stepnames:  COB, GO
COBLKED      <compile,linkedit>
Stepnames:  COB, LKED
COBLKGO      <compile,linkedit,go>
Stepnames:  COB, LKED, GO
LKGOCOB      <linkedit,go>
Stepnames:  LKED, GO
```

The following procs will be added:

```
LDGOCOB     <load,execute>          Stepnames: GO
LKEDCOB     <linkedit program>     Stepnames: LKED
GOCOB       <execute program>      Stepnames: GO
```

We have eliminated the following procs either for lack of use or redundancy:

COBSORT, SORTCOB, GOCOSRT

Changes Affecting Assembler Users

To eliminate the need for duplicate procs a user can specify Assembler Level F OR Level G on his EXEC card by use of the LEVEL parameter; eg., // EXEC ASMLDGO,LEVEL=F. This will bring in the Level F Assembler. The default is

Assembler G, and the LEVEL parameter need not be specified.

Procs which will be deleted:

ASMFC <compile only>  
 ASMGCG "

ASMFCG <assemble,load,go>  
 ASMGCG "  
 ASMFCLD "  
 ASMGCLD "

ASMFCG <assemble,linkedit>  
 ASMGCG "

ASMFCG <assemble,linkedit,go>  
 ASMGCG "

ASMFLG <linkedit,execute>  
 ASMGCG "

Procs which are replacements:

ASM <compile only>  
 Stepnames: ASM

ASMLDGO <assemble,load,go>  
 Stepnames: ASM, GO

ASMLKED <assemble,linkedit>  
 Stepnames: ASM, LKED

ASMLKGO <assemble,linkedit,go>  
 Stepnames: ASM, LKED, GO

LKGOASM <linkedit,execute>  
 Stepnames: LKED, GO

The following procs will be added:

LDGOASM	<load,execute>	Stepnames: GO
LKEDASM	<linkedit program>	Stepnames: LKED
LKGOASM	<linkedit,execute>	Stepnames: LKED, ASM
GOASM	<execute program>	Stepnames: GO

FASMCLG will be deleted along with the IBM-type procs. See the section below for CalComp users for changes in Assembler programs with plot.

Changes Affecting FORTRAN Users

As mentioned previously, all of the IBM type procs are being deleted. The CSO-created procedures have always existed, with the ability to specify FORTRAN G or FORTRAN H by use of the LEVEL parameter. We are eliminating this feature because of the many problems it has caused stemming from the large amount of region necessary to run FORTRAN H. There is a complete set of procedures for Level H only and a set of procs for Level G only. When using FORTRAN H it is necessary to have a /\*ID REGION=348K card among your other ID cards. We advise that the FORTRAN H compiler be used mainly to create permanent load modules and not for everyday runs or testing.



Procs which will be deleted:

FORTGC <compile only>  
 FORTGCG <compile,load,go>  
 FORTGCLD "  
 FORTGCL <compile,linkedit>  
 FORTGCLG <compile,linkedit,go>  
 FORTGLG <linkedit,go>

Procs which are replacements:

FORT <compile only>  
 Stepnames: FORT  
 FORTLDGO <compile,load,go>  
 Stepnames: FORT, GO  
 FORTLKED <compile,linkedit>  
 Stepnames: FORT, LKED  
 FORTLKGO <compile,linkedit,go>  
 Stepnames: FORT, LKED, GO  
 LKGOFORT <linkedit,go>  
 Stepnames: LKED, GO

The following are FORTRAN H proc changes:

FORTHHC	<compile only>	FTNH	<compile only>
		Stepnames: FORT	
FORTHCG	<compile,load,go>	FTNHLDGO	<compile,load,go>
FORTHCLD	"	Stepnames: FORT, GO	
FORTHCL	<compile,linkedit>	FTNHLKED	<compile,linkedit>
		Stepnames: FORT, LKED	
FORTHCLG	<compile,linkedit,go>	FTNHLKGO	<compile,linkedit,go>
		Stepname: FORT, LKED, GO	
FORTHLG	<linkedit,go>	LKGOFORT	<linkedit,go>
		Stepname: LKED, GO	

In addition the following are also in the library:

LDG <u>xxx</u>	<load,execute FORTRAN>	Stepnames: GO
LKED <u>xxx</u>	<linkedit FORTRAN>	Stepnames: LKED
GO <u>xxx</u>	<execute FORTRAN>	Stepnames: GO

Where xxx is FORT for FORTRAN G or FTNH for FORTRAN H.

The proc FORTRAN is being deleted because of redundancy. FORTRAN procs which plot will be discussed later.

Changes Affecting PL/I Users

The changes made to the PL/I procs were mainly to eliminate the confusion between the use of "PLI" and "PL1". The use of the number "1" has been eliminated from all the names of procedures and stepnames. Procs which used "PL1F" will use "PLIF". Also all the stepnames are now simply PLI for PL/I Level F, PL/I OPTIMIZER and PL/I CHECKOUT compiler. This will allow users to change from one PL/I processor to another by having to change only the EXEC card. All IBM type procedures have been deleted and replaced with CSO created procs. In particular the PL/I Checkout compiler procs now conform to the proc conventions created here. The exception to this is PLICKR which will remain as is.

Procs which will be deleted:

The following are PL/I Level F changes:

PL1FC <compile only>  
 PL1LFC "  
 PL1 "

Procs which are replacements:

PLIF <compile only>  
 Stepnames: PLI



PL1FCG	<compile,load,go>	PL1FLDGO	<compile,load,go>
PL1FCLD	"	Stepnames: PLI, GO	
PL1LDGO	"		
PL1LFCG	"		
PL1LFCLD	"		
PL1FCL	<compile,linkedit>	PL1FLKED	<compile,linkedit>
PL1LFCL	"	Stepnames: PLI, LKED	
PL1MLK	"		
PL1LKED	"		
PL1MLXX	"		
PL1FCLG	<compile,linkedit,go>	PL1FLKGO	<compile,linkedit,go>
PL1LFCLG	"	Stepnames: PLI, LKED, GO	
PL1LKGO	"		
PL1MCLG	"		
PL1FG	<execute>	GOPLIF	<execute>
PL1LFG	"	Stepnames: GO	
PL1FLG	<linkedit,execute>	LKGOPLIF	<linkedit,execute>
PL1LFCL	"	Stepnames: LKED, GO	
LDGOPL1	<load,execute>	LDGOPLIF	<load,execute>
LKEDPL1	<linkedit>	LKEDPLIF	<linkedit>
PROGPL1	<execute load module>	GOPLIF	<execute load module>

The proc PL1FDECK will be deleted. The same results can be achieved by using

```
// EXEC PLIF,PARM.PLI=DECK
```

PL/I Level F procs using CalComp will be discussed later.

The following are PL/I Optimizer changes:

PLIXC	<compile only>	PLIX	<compile only>
		Stepnames: PLI	
PLIXCG	<compile,load,go>	PLIXLDGO	<compile,load,go>
		Stepnames: PLI, GO	
PLIXCL	<compile,linkedit>	PLIXLKED	<compile,linkedit>
		Stepname: PLI, LKED	
PLIXCLG	<compile,linkedit,go>	PLIXLKGO	<compile,linkedit,go>
		Stepnames: PLI, LKED, GO	
PROGPL1X	<execute load module>	GOPLIX	<execute load module>
		Stepnames: GO	

The following will also be included in the library:

GOPLIX	<execute program>	Stepnames: GO
LDGOPLIX	<load,execute>	Stepnames: GO
LKEDPLIX	<linkedit>	Stepnames: LKED

The following are PL/I Checkout Compiler changes:

PLICKC	<compile only>	PLIC	<compile only>
		Stepnames: PLI	

PLICKCG	<compile,load,go>	PLICLDGO	<compile,load,go>
		Stepnames: PLI, GO	
PLICKCL	<compile,linkedit>	PLICLKED	<compile,linkedit>
		Stepnames: PLI, LKED	
PLICKCLG	<compile,linkedit,go>	PLICLKGO	<compile,linkedit,go>
		Stepnames: PLI, LKED, GO	
PLICKG	<load,execute>	LDGOPLIC	<load,execute>
		Stepnames: GO	
PLICKI	<execute load module>	GOPLIC	<execute load module>
		Stepnames: GO	
PLICKLG	<linkedit,execute>	LKGOPLIC	<linkedit,execute>
		Stepnames: LKED, GO	

Also included is the proc PLICKR, with stepname GO. Procs to include the CalComp plotting routines are currently being tested but should be ready for insertion by January.

#### Changes Affecting RPG Users

The only change is the deletion of the IBM type procs and these are being replaced by the CSO procs.

#### Procs which will be deleted:

RPGEC <compile only>

RPGECLG <compile,linkedit,go>

RPGELG <linkedit,go>

#### Procs which are replacements:

RPG <compile only>  
Stepnames: RPG

RPGLKGO <compile,linkedit,go>  
Stepnames: RPG, LKED, GO

LKGORPG <linkedit,go>  
Stepnames: LKED, GO

Also included are the following procs:

RPGLDGO <compile,load,go> Stepnames: RPG, GO

LDGORPG <load,execute> Stepnames: GO

GORPG <execute> Stepnames: GO

#### Other procs which were changed are as follows:

WATFIV stepname changed to GO

PLC stepname changed to GO

WATBOL stepname changed to GO

These stepnames were changed so that users who use the regular language processors like FORTRAN or PL/I can use the same DD cards in these procs.

Changes to Utilities

Basically there are no changes which should affect the user. We have brought over a few utilities from the old user proc library. These are:

PTPROD Cards to paper tape utility.  
 PTREPROD Paper tape to cards utility.  
 LIBLKED Link edits subroutines compiled in one batch and places them in library.

Changes Affecting Load Module Users

The cataloged procedures PROG~~xxx~~, where ~~xxx~~ is ASM, COB, FORT, PLIX, PL1, PL1X, and RPG are being deleted. They are being replaced by the procs GO~~yyy~~, where ~~yyy~~ is ASM, COB, FORT, FTNH, PLIF, PLIC, PLIX, or RPG. When using one of these procs as the last step in a job stream, after doing one or more compilation steps and a linkedit step, it should appear as // EXEC GO~~yyy~~. For example:

```
// EXEC asm
    <assembler code>
// EXEC FORT
    <FORTRAN source>
// EXEC LKEDFORT
// EXEC GOFORT
```

This would properly execute your program.

If you are executing a program which is stored in load module form on disk, use the following JCL:

```
// EXEC GOyyy,PROG='membername'
//STEPLIB DD DSN=USER.Pps#.name,DISP=SHR
//GO.SYSIN DD *
    <data, if any>
```

where membername is the name of the program to be executed, and USER.Pps#.name is the dataset which contains the program.

Changes Affecting Statistical Users

The statistical procs currently in use will not be affected by the changes described here.

Changes Affecting All CalComp Users

The major change to the CalComp procs is the renaming of the "PLOT" step to "GO" step. Users who were using a non-plotting proc and then wanted to do plotting found it necessary to change all of their DD cards to correspond to the stepname. This will create consistency among all the procs and make it easier to go from one proc to another. Examples of new JCL follow:

Using the Loader

To run a plot program written in FORTRAN, Assembly Language, or PL/I, with or without object decks, and with or without data (ASM is for Assembly Language, FORT is for FORTRAN G, FTNH is for FORTRAN H, PLIC is for PL/I Checkout Compiler, PLIF is for PL/I Level F, and PLIX is for PL/I

Optimizer):

```
// EXEC xxxLDPT[,PARM.GO='plot_parms']
  <where xxx = {ASM|FORT|FTNH|PLIC|PLIF|PLIX}>
  ...
  <source program>
  ...
/*

[//GO.SYSDECK DD *      ] Needed only if program
[   ...                  ] includes object decks.
[ <object decks>        ]
[   ...                  ]
[/*                       ]

[//GO.SYSIN DD *       ] Needed only if program
[   ...                 ] reads data cards.
[ <data>                 ]
[   ...                 ]
[/*                       ]
```

To run a plot program consisting of object decks originally written in FORTRAN, Assembly Language, or PL/I, with or without data:

```
// EXEC LDPTxxx[,PARM='plot_parms']
  <where xxx = {ASM|FORT|FTNH|PLIC|PLIF|PLIX}>

[//GO.SYSDECK DD *      ] Needed only if program
[   ...                  ] includes object decks.
[ <object decks>        ]
[   ...                  ]
[/*                       ]

[//GO.SYSIN DD *       ] Needed only if program
[   ...                 ] reads data cards.
[ <data>                 ]
[   ...                 ]
[/*                       ]
```

Loader parms and program parms, if any, appear in the parm field after the plot parms, and are separated by slashes; e.g.,

```
// EXEC LDPTxxx,PARM='plot_parms/loader_parms/program_parms'
```

### Using Load Modules

To execute a program that exists as a load module on disk:

```
// EXEC CALCOMP,PARM='EP=<membername>'
//STEPLIB DD DSN=USER.Pps#.name,DISP=SHR

[//SYSIN DD *          ] Needed only if program
[   ...                ] reads data cards.
[ <data>                ]
[   ...                ]
[/*                     ]
```

where membername is the name of the program to be executed, and USER.Pps#.name is the dataset which contains the program.

If using // EXEC CALCOMP as the last step in a job stream, then it is not necessary to specify 'EP=' in the parm field; e.g.,

```
// EXEC FORTLKED
   <FORTRAN source>
// EXEC CALCOMP[,PARM='parm']
//GO.SYSIN DD *
   <data>
/*
```

### Using the Linkage Editor

With the linkage editor the JCL is as follows:

```
// EXEC xxxLKED
   <where xxx = {ASM|FORT|FTNH|PLIC|PLIF|PLIX}>
   ...
<source program>
   ...
/*
// EXEC PLOTyyy[,PARM='parms']
   <where yyy = {ASM|FORT|PLI}; note use of "PLI" for optimizing
   compiler, PL/I Level F, and also for Checkout Compiler.>

[//GO.SYSIN DD *      ]   Needed only if program
[   ...              ]   reads data cards.
[   <data>           ]
[   ...              ]
[/*                  ]
```

Notice that the procs CCPASM, CCPFORT, and CCPPL1 have been replaced by PLOTASM, PLOTFORT, and PLOTPLI, respectively.





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# Off - Line

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## SPECIAL ISSUE

This issue of OFF-LINE is devoted to the acquisition of new computing facilities for the Urbana campus. By the date of this publication, bids from computer vendors have been received, but the benchmarking process is not complete. The timetable for acquisition is: the bids are in now, benchmarks will be completed by the end of February, delivery of new hardware is expected by the beginning of the Fall semester.

The information which follows is extracted from a proposal submitted by CSO to the Computer Policy Committee. We feel it is of general interest.

-Editor

OFF-LINE is the newsletter of the Computing Services Office at the University of Illinois at Urbana-Champaign. OFF-LINE is printed every two weeks except for interruptions due to holiday schedules or lack of news. Articles may be reprinted provided that the source of the article is noted. CSO operates an IBM 360 model 75 with one million bytes of fast core and two million bytes of slow core, under HASP and OS, and a dual-processor DECSYSTEM-10 with 256K words of core, under TOPS-10, serving up to 80 simultaneously active terminals.

## PROPOSED CSO COMPUTER ACQUISITION

### I. INTRODUCTION

In recent years the computing services available to academic users on the Urbana-Champaign campus have slipped below the quality standards possible with current computer technology. This is due partly to the technical obsolescence of the IBM 360/75 computer (originally installed in 1968) and partly to the campus demand for computing services which has increased steadily and substantially during the life of the 360/75.

Facilities for general academic computing facilities at the Urbana campus rank poorly with those available at comparable schools. Table 1 lists the academic processing facilities currently available at the principal campuses of the Big Ten schools together with estimates of peak service loads for batch and interactive service.

The Illinois processing facilities are exceeded by those at Indiana, Michigan, Minnesota, Ohio State, Wisconsin, and, probably, Purdue. (Inclusion of services temporarily available from Chicago Circle and the Medical Center provide an aggregate power greater than that of Purdue.) Illinois facilities are approximately equal to those at Michigan State and greater than those at Iowa and Northwestern.

In terms of batch processing service, Illinois has one of the heaviest peak loads. Interactive service (still increasing at Urbana after recent installation of the DECsystem 10) is somewhat below the average of this group. The essential conclusion from these comparisons is that the Illinois academic computing service is characterized by a large (and growing) workload but with severely overloaded processing facilities. Services presently available to Urbana users are limited by obsolete equipment; such services as are available suffer deteriorated quality due to user contention for limited processing capacity. The only relief from the currently inadequate service conditions is to acquire more capable computing equipment, either as a supplement to or a replacement for the present equipment.

In conjunction with several faculty advisory groups, CSO has been studying the campus service needs and developing plans for needed changes in the computer configuration. The purpose of this report is to review the results of CSO's analysis for the information of the Urbana user community. The problems briefly sketched above are described in greater detail in the following sections. Service priorities are proposed as a basis for a new equipment acquisition. The status of discussions between CSO and computer equipment vendors is described.

### II. CURRENT SERVICE INADEQUACY

Evaluation of presently available services to CSO users indicates the following major deficiencies:

1. Poor turnaround time for all batch service (except EXPRESS) as well as extreme sensitivity of service quality to the fluctuating demands of the academic calendar. Appendix A shows this in more detail. (See also the discussion of turnaround time in the following section.)

Table 1: Survey of Academic Computing Services at Big 10 Universities (1975)

Institution	Academic Processing Facilities <sup>a/</sup>	Current Peak Load Estimates	
		Batch Proc. (jobs/mo)	Interactive (Connect hrs/mo)
Indiana	CDC 6600	86,000	3,800
Illinois	IBM 360/75 Dual DECSYSTEM 10	100,000	Not used 8,000
Iowa	IBM 360/65 HP-2100	45,000	5,000 5,000
Michigan	AMDAHL 470V6	61,000	26,000
Michigan State	CDC 6500	90,000	No data <sup>b/</sup>
Minnesota	CDC CYBER 74 CDC CYBER 72	70,000	39,500
Northwestern	CDC 6400	50,000	4,500
Ohio State	IBM 370/165	80,000	14,000
Purdue	CDC 6500 CDC 6400	10,000/day <sup>c/</sup>	700/day <sup>c/</sup>
Wisconsin	UNIVAC 1110 (Dual processor)	100,000	8,700

- a. Facilities described are those used to provide research/instructional computing services. In all cases separate processing facilities exist to provide administrative data processing (ADP) services; ADP work load data are excluded from this tabulation. In the case of multicampus universities, the tabulated data apply to the principal campus.
- b. Information on interactive connect time was not available.
- c. Peak load data on a daily basis are not readily comparable with data on a monthly basis but these were the only records available.

2. Inability to provide large amounts of computing resource for major computer intensive projects.
3. Users of mountable data bases (as opposed to those able to work with permanently mounted media) suffer a multiplication of turnaround time. As a group, the social scientists are very poorly served at present in this respect.
4. The inadequate availability of terminal access for both batch preparation and truly interactive service. In addition to the user advantage of more immediate interactive access to the computer, CSO is also concerned about controlling the cost of supplies through reduced use of cards/paper (by greater use of terminals).
5. There is currently no simple means of using a dedicated laboratory computer in conjunction with CSO facilities. A recently started project in this area (allowing asynchronous connection at up to 9600 baud) is the first step in this direction.
6. Commitment to a standard communication system (independent of the computing facility behind it) is necessary to several departments (e.g. Mathematics and Civil Engineering).

The common thread through all of these problems is that good service must have adequate capacity in all areas together with a presentation which gets the capacity to the user in the most direct and predictable way. By direct is meant that no artificial difficulties should be introduced by the service, i.e. the user should not have to know about several different machines to compute on one.

CSO believes the University's interest requires that work involving intellectual effort on a sustained basis should normally be capable of support during the regular working day. Those problems which involve running at a production level with the intellectual effort applied before and after extensive amounts of computing need not have this same level of attention. A new plan should address both types of work, recognizing that current support of the normal user is unsatisfactory because of limitations of present CSO facilities.

The interactive response time for time sharing is a fairly direct analog to turnaround time in the case of batch work. The level of system performance chosen should support a known and sufficient number of terminals with a predictable response. A problem to be avoided is interference between the batch service and timesharing. New equipment is available which has a clearly demonstrated ability to support 100 to 150 terminals doing limited functions such as editing without major impact on batch performance. This could be further helped by a project to move file editing work off the main computer and onto a communications front end. Such a project is easily within the capabilities of the CSO staff.

### III. TURNAROUND TIME CONSIDERATIONS

The present job mix has been reviewed in terms of what is being done vs. the amount of CPU time used and in terms of peak arrival rates of work per hour per job class.



The smallest jobs (those using less than 10 seconds of CPU time) are those which are most sensitive to various types of system overhead. Such small jobs account for 75% to 85% of all jobs processed. Most EXPRESS, A and B jobs are in this category. Although the absolute per job overhead is only a fraction of a second, this is a high percentage for EXPRESS and other small jobs averaging less than 2 seconds of CPU time. Applied to a rate of 500 jobs per hour, it is a significant concern.

Jobs requiring between 10 and 60 seconds of CPU time represent about 10-18% of the total job mix. For these, turnaround is very important and overhead is less important. Time reduction for this class will be roughly determined by the raw computing power of acquired new facilities. Most C and D jobs are in this category.

Jobs using more than 60 seconds of CPU time account for only a small fraction of the work submissions (about 2-4% of the total job mix) but a large fraction of the CPU time billed (about 65-80%). Large jobs will be reduced in CPU time used in proportion to raw computing power. Turnaround by job time for the above classes is shown in Appendix A.

Available new computers can reduce the CPU time required to process individual jobs (or allow several processors to handle jobs simultaneously). The average job whose requirement on the 360/75 is less than 60 CPU seconds can be reduced to an average of less than 10 CPU seconds if a single fast CPU is used; comparable load reduction is also possible if a multiple CPU system is used. Thus the present rate of job arrival at the system for processing would represent a smaller CPU time requirement on such equipment.

Present processing requirements for EXPRESS plus classes A through D show a maximum hourly arrival rate demanding about 5000 CPU seconds to process. This rate is due to arrival of 200 EXPRESS jobs per hour and about 200 jobs per hour in classes A through D. During such peak periods the CPU time available on the 360/75 (after removal of overhead and RJE service requirements) is about 2000 CPU seconds per hour. That is, about 2000 seconds per hour can be processed (billed) versus a demand of 5000 seconds per hour. The result is rapid growth of the job queue, deterioration of turnaround time and the necessity to revise job selection to run only the smallest jobs.

Assuming 2000 available seconds per hour on a new system, but with effective reduction of demand from 5000 to 1000-1500 seconds by acquisition of increased CPU speed, this problem could be solved with some room for growth in this aspect of service. If a multiprocessor system were used, the effect would be to have  $2000 \times N$  seconds per hour available where N is the number of processors. Turnaround for those jobs in the range of 0-60 CPU seconds on the 360/75, should average 15 min with a 90th percentile of 30-40 minutes. In all but the worst peak times, CSO would also be able to run jobs of even larger size throughout the working day.

A second major problem in present turnaround time problems is the memory dependence of the 360/75. Since it is a non-virtual system with single-level storage running multiprogramming with relatively small memory, there is a strong dependence of turnaround time on job memory requirements. Many jobs in class C and

above must be held completely during busy periods of the day because of the severe negative impact of their memory requirements on multiprogramming capability and therefore on job queue length.

The third major bottleneck in the present system is in the setup queue. A job is entered in the setup queue and requires operator intervention if it uses mountable media such as magnetic tapes or private disks. New systems under consideration include major increases in permanently mounted data space, thus providing relief from setup delay by moving some data on-line, improving turnaround time for jobs dependent on it, and for other setup jobs by reducing competition for available facilities.

#### IV. PROPOSED SERVICE PLANNING APPROACH

CSO maintains liaison with the major computer equipment vendors and is in the process of securing definitive information with respect to the capabilities of currently available machines. However, the principal service commitments of CSO are already established. Any major change in equipment might affect the University research and instructional program adversely unless these basic commitments are continued. The plans being considered evolve from the substantial base already available in terms of both language/applications facilities and service delivery via RJE and timesharing.

Proposed levels of service involve the following target objectives:

1. Reduction of turnaround time for all of the current daytime load to an average of 15 minutes with an increase in the types of jobs which can be processed during the day and in the number of jobs.
2. At least a 4-fold increase in the capacity for large scientific calculations over the total capacity for such jobs at all facilities presently used by CSO.
3. Increased interactive access to a level of approximately 300 concurrently active terminals.

In configuring the system it is assumed that the major portion of computation will be done in the batch mode, although the major portion of human activity, job preparation and study will involve terminals. It is assumed that approximately 40% of all terminal activity will be related to preparation and study of batch related work. The other 60% will be the more classical kinds of timesharing such as interactive program development, computer assisted instruction and interactive applications. These estimates assume a distribution ranging from very small interaction to quite sophisticated timesharing use by faculty engaged in research. It is hoped that the close tie between batch processing and card/paper media can be reduced by more extensive use of terminals for editing and scanning.

Experience to date on the DECsystem 10 has shown that these assumptions are reasonable, in the short run at least. It is found that a large majority of the work on the system involves the research program of the faculty. To support this timesharing activity it is planned that CSO would provide approximately 128 terminals in public areas and a dialup network for the support of an additional 128 to 175 terminals.

Analysis of the current workload shows that some fraction of our workload greater than 10% but less than 30% (depending on the vendor) is specifically tied to IBM service. This is due to special software and system facilities

where conversion is not feasible or very costly. Accordingly it will be necessary to make explicit plans to provide continuity of IBM compatible service for such applications.

Other assumptions are that the number of remote job entry stations will remain at its present level but there will be regular budget provisions for worn out components such as card readers. A final assumption in budgeting is that the staffing level at CSO will not increase over the life of any new machine.

## V. PRESENT STATUS OF PROCUREMENT PLANS

With the cooperation of major mainframe manufacturers, CSO has run preliminary benchmark programs which model the essential features of the Urbana campus workload. The results indicate that the service objectives described above are realistically attainable with currently available computers of several vendors. Since a competitive procurement situation exists, CSO and the campus purchasing division have invited vendors to submit bids responsive to the campus service needs as described above.

The competitive bidding procedure is unconventional in basing the procurement specifications on general service requirements rather than on detailed technical specifications. Vendors are asked to quote prices on equipment which they propose to meet the CSO computing requirements. Evaluation of vendor responses will be based in part on the demonstrated performance of proposed equipment using benchmark programs prepared by CSO.

The performance benchmark is designed to address the following four aspects of the service requirement:

1. *High Intensity Batch Stream*--This test consists of an arrival rate of 750 jobs per hour with a composition in which the student and research peaks occur concurrently. The actual CSO profile for these peaks has been increased in both core and time requirements. Turnaround is the measure of system performance.
2. *Large Scale Batch Processing*--This test consists of large jobs as measured by CPU time, memory and input/output requests. Both single and double precision jobs are included. Total capacity and turnaround time are the measures of system performance.
3. *Terminal Support of Batch Processing*--Scripts representing editing input for entry to the batch stream and scanning of output are tested. The measures are response time and connect hours required.
4. *Timesharing*--This test involves a separate set of scripts representing interactive computing but including more extensive program development and debugging as well as running prepared programs. Nontrivial amounts of computation and input/output are included. The response time and connect time requirements are the measures of the system performance.

Each of these benchmarks represents an extrapolation from the current CSO user profile and incorporates actual user jobs except in the case of the editing scripts.

The financial response is due January 22, 1976 with benchmarks continuing for another 5 weeks. Additional detail on the bidding approach is given in the

prefactory statement from the bid request which appears as Appendix B. Copies of the complete bid request are available if more detailed information is of interest.

DEM/ps  
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Appendix A begins on page 8.



## CURRENT PERFORMANCE MEASURES

The data shown in the following graphs (Figs A.1 through A.4) provide the most sensitive available measures of present service quality, as it affects the user's ability to progress on a computer related problem.

The normal working day for most academic users spans a period of at most 10 to 12 hours, with the afternoon being common to almost everyone's schedule. There is a direct relationship between the turnaround time, the way in which the user incorporates the computer in his activity, and progress on the user's projects. Once turnaround goes beyond 15-30 minutes, the user will leave the RJE terminal. Once it goes beyond 2-3 hours, he is reduced to a couple of runs per day. When it reaches 7-8 hours, the effect is once a day turnaround unless the user extends his working day.

It is critical that turnaround time be as small as possible, but it is even more critical that it be stable if users are to be able to develop effective work habits. From the following graphs it can be seen that under currently prevailing circumstances, neither of these conditions is met at the 90th percentile, nor at lower percentiles, nor on the average.

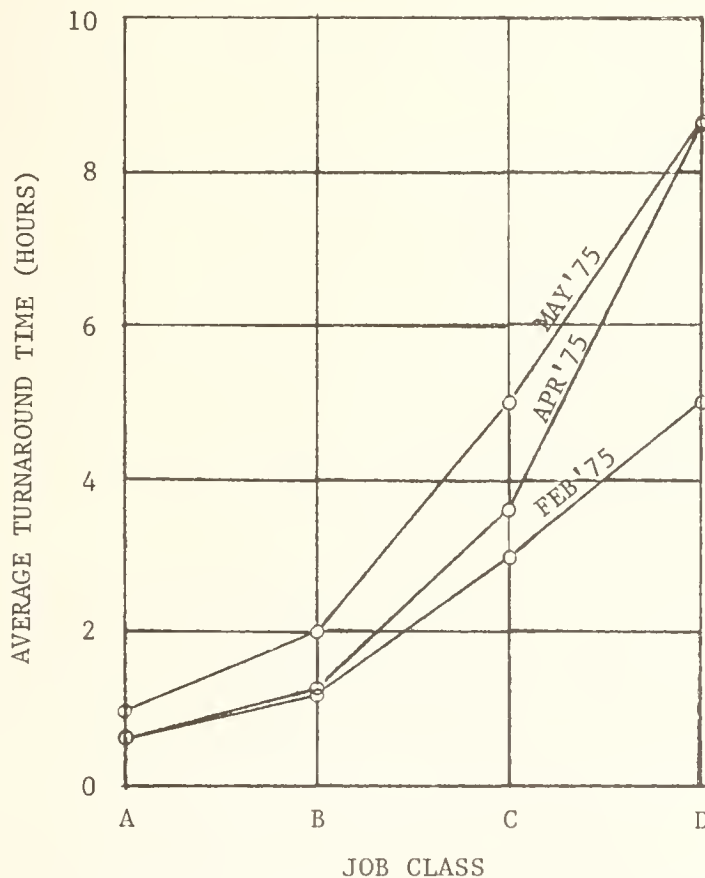


Fig. A.1 Variation of average turnaround time (hours) with job class and phase of the academic calendar.

*Comment:* The increase in average turnaround time as the semester progresses is apparent. However, since these are average values, a substantial fraction of users see a much longer turnaround time than shown here. The distribution of turnaround times is indicated in Figure A.3.

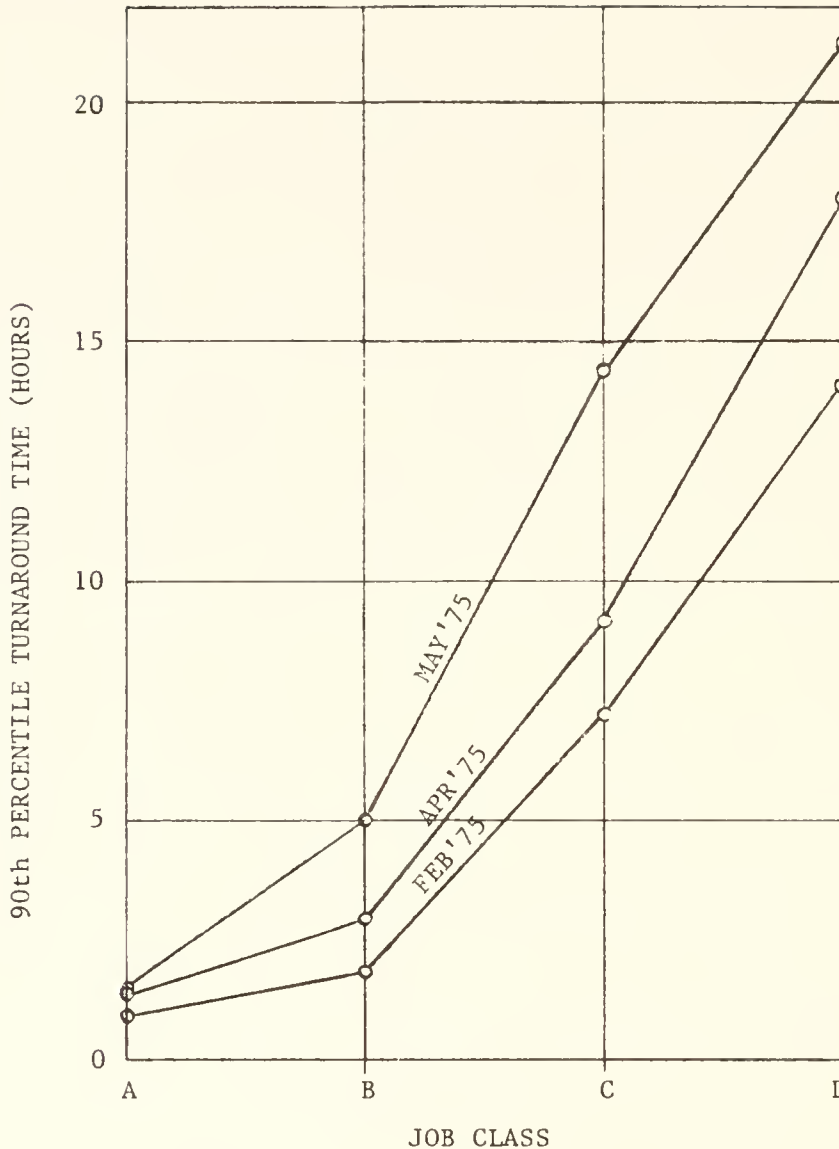


Fig. A.2 Variation of 90th percentile turnaround times with job class and phase of the academic calendar. For each job class the 90th percentile time ( $t_{90}$ ) is computed on a monthly basis (i.e. for a given month, 90% of all jobs submitted of that class were returned within the time,  $t_{90}$ ).

*Comment:* For the next generation of service, CSO believes that turnaround time should be good at the 90th percentile for each class of service. Turnaround should be stable with respect to the phase of the academic calendar for all but the largest jobs.

"Good" is dependent on the relation of intellectual effort to computer effort. Part of the task of maintaining stable turnaround times involves user access control policy rather than computer processing capacity. The demand generated via the resource allocation system must be consistent with campus service objectives and available processing capacity.



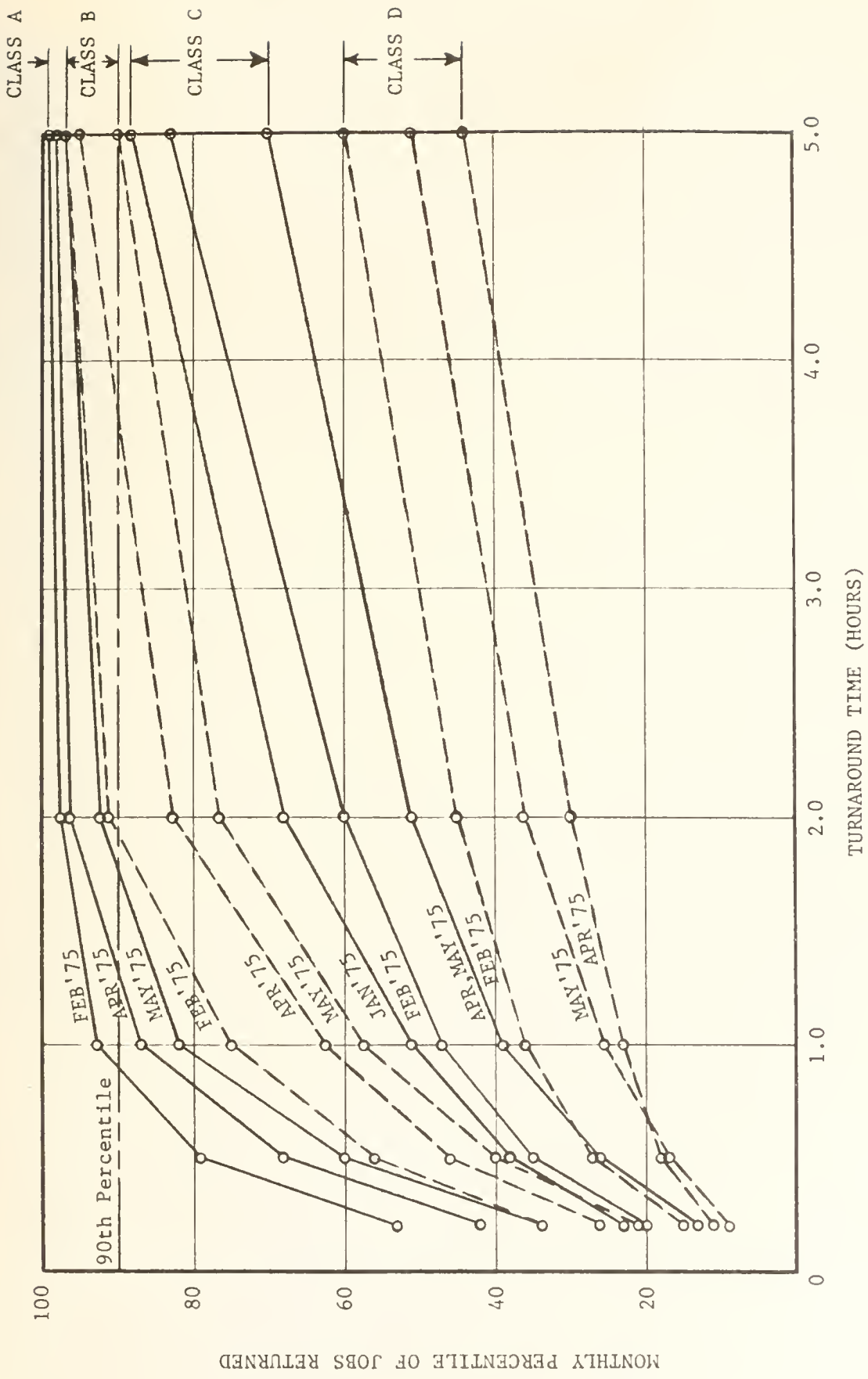


Fig. A.3: For service classes A, B, C, and D, variation of turnaround time with monthly percentile of jobs returned. Seasonal degradation is indicated by curves for different months.

*Comment: Service degradation with the phase of the academic calendar is approximately equivalent to reduction to the next lowest service class (i.e. a class A job in May runs about like a class B job in February).*

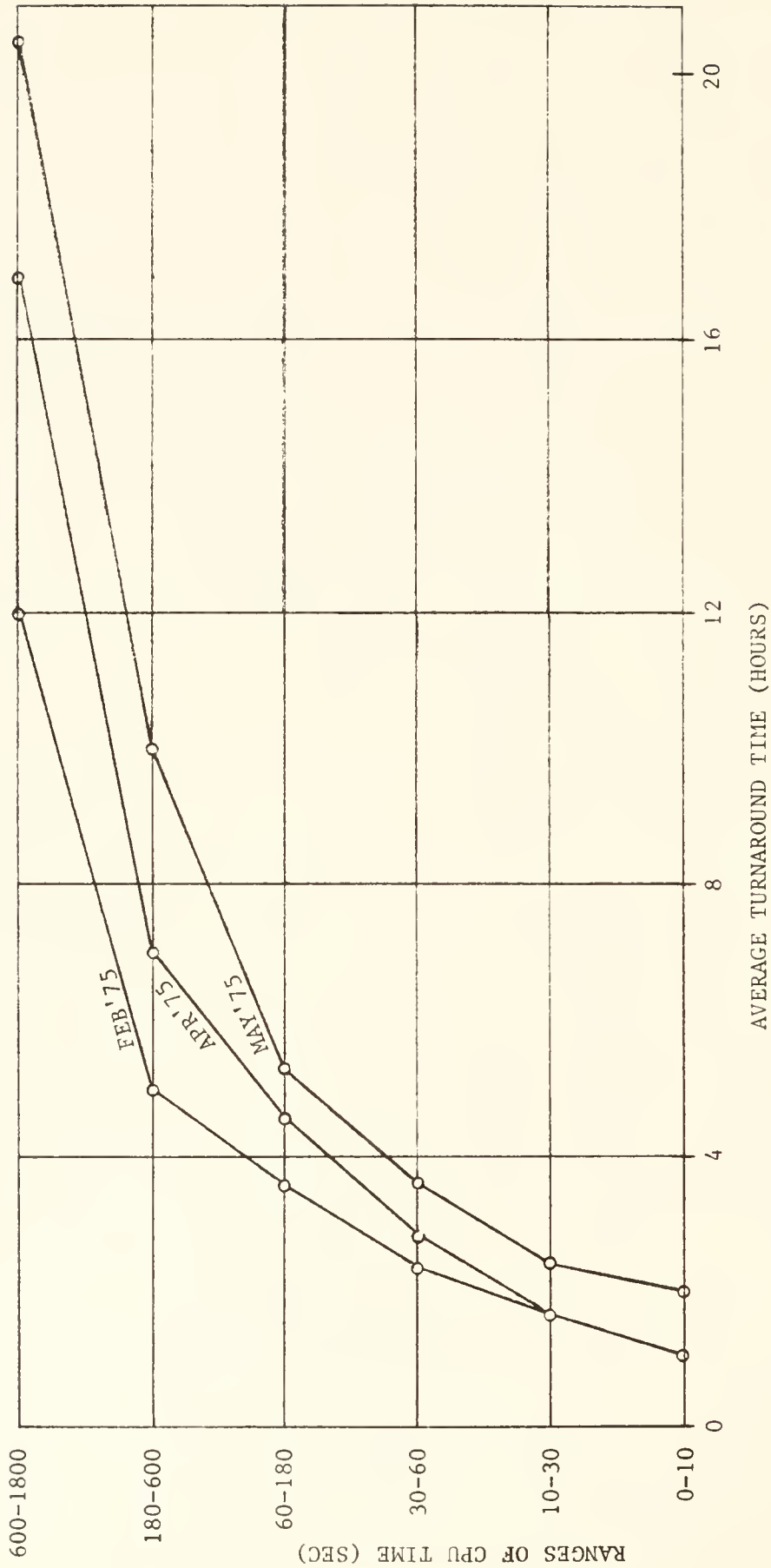


Fig. A.4: Variation of average turnaround time with the range of job CPU time requirement.

Comment: As with Fig. A.1, these are average values. For each range many users will see much longer turnaround time than shown here.

SCOPE

A new large computing system is being sought for research and instructional (R/I) service support by the Computing Services Office (CSO) at the Urbana campus of the University of Illinois. The requirements are for a complete system consisting of all hardware and software component parts with local maintenance and repair provided. The magnitude of the resulting system shall be such as to offer a minimum improvement of 4:1 over our present capabilities (using large computations and concurrently active terminals as measure), along with a major reduction of turnaround during high traffic periods.

Since a large computing system is composed of major hardware parts such as processors, memory, disk, magnetic tape and communications, and since it is quite common for research and instructional computer installations to have large configurations wherein the major parts are supplied by different vendors, we have decided to offer this invitation for bid to all of these vendors simultaneously.

CSO will study plans involving distributed computing and mini computers if they can be shown to have financial and service advantages. The relationship to the central facility is critical in this study, and vendors should describe their capability to participate in a network.

In addition to the current services we are interested in possible acquisition of a very large data base system, e.g. a trillion bits, to remove the dependence on mountable media. Both hardware and software capability should be described.

BACKGROUND AND METHOD

Approximately three years have been spent in preparation for the acquisition of a new large computing system for the R/I portion of the Urbana campus computing. A technical committee first started contacting mainframe vendors in late 1972. In 1973 and 1974 a task force under the direction of Professor Daniel Slotnick interviewed potential computer system suppliers resulting in a report dated May, 1975. In July, 1975 a request for conversion data and a description of our present system were sent to mainframe vendors. Results have been compiled and comparisons have been made by CSO using the returns from the July request. Throughout this time CSO personnel have interacted with vendors in efforts to measure available systems and compare technical facilities.

Because of all of these concentrated technical activities, CSO has decided that, rather than specify exactly a large computing system required to do the campus R/I work, we will describe the circumstances in such a way as to allow the vendors to give their best financial response to our computing requirements. We will construct sample systems configurations as alternative solutions so as to provide frameworks into which vendors can insert their replies. The extension of benchmarks beyond the bid period is to allow evaluation of such configurations.

The evaluation of vendor replies will be made by CSO, using the financial data, performance results from benchmarks, and technical summaries. The final configuration will consist of one or more computer mainframes, possibly from different vendors, with possible choices of still other vendors for memory, disk, tape and communications. Much care and attention will be paid to compatibility and communications between systems. Choices of alternative vendors will be made only after there is proof of price/performance advantages.



# Off - Line

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OFF-LINE is the newsletter of the Computing Services Office at the University of Illinois at Urbana-Champaign. OFF-LINE is printed every two weeks except for interruptions due to holiday schedules or lack of news. Articles may be reprinted provided that the source of the article is noted. CSO operates an IBM 360 model 75 with one million bytes of fast core and two million bytes of slow core, under HASP and OS, and a dual-processor DECSYSTEM-10 with 256K words of core, under TOPS-10, serving up to 80 simultaneously active terminals.

POLICY

Lost Output Traceback Procedure

In response to recurring user complaints, CSO has implemented a new lost output traceback procedure at all remote job entry stations.

There are two phases of the procedure, record-keeping and search. First, a traceback form is filled out for each lost output reported. This ensures that an accurate history is kept of the lost output rate, and that the user can be located if the output is uncovered later.

Next, a thorough physical search around the RJE site is done. If this does not succeed, the system log is checked to determine whether the job successfully entered and left the system, and what jobs came before and after it in the output stream. The output from these jobs is checked to see if the missing output is still attached to one of them (not burst properly).

Upon completion of the search, whether successful or not, the user is notified of the results.

Users who have questions or who wish to see a copy of the traceback procedure may contact any member of the operations staff.

Tape Traffic to Chicago

Persons who wish to send tapes to the Chicago Circle Campus, or to retrieve them, may see Debbie Weller, room 179, DCL.

DEC-10 SYSTEM NOTES

6.02 Monitor on DECsystem-10

The 6.02 release of TOPS-10 has been installed on the DECsystem-10. No system problems have been encountered to date, although differences in some programs, particularly LOGIN, have been reported.

The 6.02 Monitor contains bug fixes, a more efficient TTY interface, a less efficient but more equitable scheduler, a new save file format (.EXE files), and the ability to run DEC's new, more efficient batch and spooling package, GALAXY. (GALAXY is not yet released, but may be running by the time this issue appears; information on GALAXY appears below.)



Improved Control-T in 6.02

To the user, the most noticeable change in the monitor may be the information returned by ^T (Control-T). Most people who ^T will have noticed the asterisk after the state code, for example, RN\*. This means that the user's job was actually running (not just in a queue to run) when the ^T was done.

Also, ^T may return up to two lines of additional information. If the job is in an I/O wait, a line is typed detailing the activity and the device and file in use. If the job is using virtual memory, a line is typed showing the number of page faults since the last ^T, both in the working set (overhead page faults), and not in the working set ("useful" page faults). The paging rate in pages per second and the virtual core used are also displayed. An example of ^T output with all the extra information is:

```
DAY: 2.30 RUN: 0.35 RD:112 WR:0 NEWDDT 4+OP DI* PC:777777
FAULTS - IW: 0 NIW: 0 VIRT CORE: 69P+OP PAGE RATE: 78.80
INPUT WAIT FOR DSKBO:NEWDDT.EXE[10,37] BLOCK 245
```

This example shows an important special case. When a job is attempting to run a program, either while loading the program or doing lookups to find it, the PC is 777777. The user can often shorten the time in this state by saving files in the new .EXE format (see below).

The Faults line is produced only for users with the virtual memory privilege, and then only when a program is actually running virtual (partially core-resident).

Note that when a program must go virtual to be loaded, it is paged onto the swapping space, hence the zero page fault counts, but the non-zero page rate. The page rate is expressed in page-ins or -outs per second. Since usually a page must go out so another can come in, the page rate is most often twice the number of page faults divided by the run time shown by ^T.

EXE is New Save File Format

Files with extension .EXE are a 6.02 Monitor innovation. Briefly, they combine the functions of the previously existing .HGH, .LOW, .SHR, and .SAV files.

An .EXE file has several advantages over the other formats. It is the first looked for by the monitor on any GET, R, or RUN command; if an .EXE file exists for the program, only one lookup need be done, as opposed to the two to four required by the old formats. All .EXE files can be loaded by the monitor; the GET program is not required, even for programs running virtual. The programs can be moved into core faster, as no expanding is required.

The disadvantage of the new format is that .EXE files are larger than the old format files. This is because .EXE files begin with a page directory, and the data is zero-compressed pagewise; that is, all-zero pages are not stored, but no other compression is done. The gains in efficiency are such, however, that the .EXE format will likely become the default for

saves at some future time. Meanwhile, users can create the new format files by using the NSAVE (New SAVE) and NSSAVE (New Sharable SAVE) commands.

To convert an existing save file to the new format, simply GET the program and NSAVE or NSSAVE it, as appropriate. Then, delete the old format file.

### GALAXY Batch and Spooling Subsystem Coming

The GALAXY program product is a spooling (PRINT, UOI, etc.) and batch subsystem which runs under the 6.02 monitor with the virtual memory option. GALAXY will be installed on the DECsystem-10 in February. Free test time will be offered on at least one Sunday prior to installation.

The primary advantage of GALAXY is increased efficiency. Under the current system, a simple listing of the queues can take several minutes (with ^C disabled). This is because the queues are kept in disk files. In addition, the overhead costs of running spooling programs and BATCON are substantial, as they must read the queues each time they awaken, looking for work.

Under GALAXY, all system programs involved with queues communicate via the Inter Process Communications Facility (IPCF) to QUASAR, a central queue and message handler. QUASAR keeps all queues in (virtual) core, where access is fast and cheap, and sends the other system programs only the information they need.

The effect to the user is that the queueing programs, such as QUEUE, PRINT, SUBMIT, and UOI, handle requests much faster, particularly when the system is heavily loaded.

In addition to the performance improvements, several new features have been implemented: Jobs can now be canceled by the /KILL switch even after a spooler or BATCON has begun to process them. The /KILL function now reports the number of jobs killed or canceled.

Under GALAXY, data written to spooled devices, most noticeably LPT:, is no longer put in a file in the user's area. Instead, it is put in the system queue area, and by default queued immediately. The effect is as though LPT: were a real line printer for every user.

This also means that KJOB need no longer search the user's disk area for files to queue, and logging out is much faster than before.

There are some disadvantages to this approach. One can no longer inspect LPT: files before sending them off to print, nor can switches be specified for them. (In particular, there is no way to request the /EJECT switch.) The default print destinations and the LPT command, however, work as before.

Something of the former effect can be obtained by using the SET DEFER command. The options are:

```
SET DEFER
SET NODEFER
```

While DEFER is in effect, data written to spooled devices is not queued until logout. Deferred data may be deleted before queuing by the /KILL/DEFER switch. For example, the monitor command .PRINT/KILL/DEFER will throw away all deferred LPT: output for the job. Deferred output may be queued prior to logout by the /CREATE/DEFER switch. For example, the monitor command .QUEUE/CREATE/DEFER will queue all deferred output.

All deferred output for a single device, such as LPT: or XXO:, is concatenated into a single job. The /KILL/DEFER option will return the number of jobs (devices whose output is) killed, and the number of files in the jobs. Note that the list of deferred output for a job cannot be obtained unless it is queued first.

While DEFER may be helpful, it is not exactly the facility available before, and the user is advised to steer clear of I/O to spooled devices until his or her habits have had time to change. Assigning DSK: the logical name LPT: will make most system programs (SYSTAT, CREF, etc.) write a .LST file, which can be later explicitly printed by the PRINT command.

Another functional difference is that /DISP:RENAME is not supported by GALAXY. If used, /DISP:DELETE is substituted.

GALAXY was released by DEC in the January software distribution, which we have not yet received. Some local modifications will be required to support the link to the IBM 360, but we anticipate no major problems.

### IBM System Notes

#### Final UIM Disk Backup

On February 10, all CSO user datasets on disk at the Medical Center will be copied to tape. CSO will not be responsible for data sets at UIM after that date.

Persons who wish to move their data from UIM to another center may contact Ed Krol, at room 166 DCL, phone 3-6133.

The date when the new Administrative Data Processing center will be available is still uncertain.

Accessing Disk Data from EXPRESS

EXPRESS now permits access to existing private data sets on public disk volumes.

The data sets are referenced via Job Control Language DD cards, as they are for a non-EXPRESS job. The JCL is compatible in the sense that nearly any DD statement acceptable to HASP will also be accepted by EXPRESS, but not all HASP features are available.

The following restrictions should be noted:

1. Disk data sets used from EXPRESS must already exist. DISP=NEW is not permitted.
2. DD names with side effects on HASP or OS have no special meanings on EXPRESS. In particular, JOBLIB, STEPLIB, SYSABEND, SYSUDUMP, SYSCHK, and SYSIN do not invoke the usual features.
3. With WATBOL, PL/I, and SPITBOL, only the DD names USRDD01 through USRDD15 are allowed.
4. Concatenated data sets are not supported.
5. EXPRESS scans some JCL keywords for syntax, but not meaning. These are generally keywords which EXPRESS ignores because it will only use the information which is recorded with the existing data set. For example, "DCB=(SOME,JUNK)" and "DCB=(BLKSIZE=80)" are equally acceptable to EXPRESS.
6. The DCB and SPACE subparameters are ignored, except for syntax.
7. DD cards for WATFIV, PLC, WATBOL, and PLICKR must precede the compiler input.

This short list of restrictions implies that many Class A jobs will run unchanged on EXPRESS. Since EXPRESS is both fast and cheap, users can feel reasonably free to experiment when they are in doubt about compatibility.

As generally useful applications of this new facility become known, they will appear in later issues of OFF-LINE. A one-page reference guide on the new Express is available at CSO RJE's.

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# Off-Line

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POLICYCSO Facilities - Summer Schedule

For the summer session, the hours of operation and consulting at CSO facilities are as follows.

CSO NORTH [LOCAL] ..... 129 DCL (333-6203)

RJE Hours (333-6203)

7:30am - 2am, Mon-Fri

7:30am - 12mid, Sat

12noon Sun - 2am Mon

System Consulting Hours (166 DCL; 333-6133)

9am - 5pm, Mon-Fri

9am - 1pm, Sat

CSO SOUTH [COM] ..... 70 Commerce West

RJE Hours (333-4500)

8am - 12mid, Mon-Thu

8am - 8pm, Fri

2pm - 12mid, Sun

System Consulting Hours (83 C.W.; 333-4747)

9am - 12noon, 1pm - 5pm, Mon-Fri

Statistical Consulting Hours (84 C.W.; 333-2170)

9am - 12noon, 1pm - 5pm, Mon-Fri

(closed 12noon - 2:30pm Wednesdays)

AGRICULTURE [AGRIC] ..... W-515 Turner Hall (333-8170)

8:30am - 10pm, Mon-Fri

CHEMISTRY [CHEM] ..... 154 Noyes Lab (333-1728)

8am - 5:30pm, Mon-Fri

FAR [FAR] ..... Florida Avenue Residence Halls (333-2695)

(RJE closed for the summer session.)

ISR [ISR] ..... Illinois Street Residence Halls (333-0307)

10am - 10pm, Mon-Fri

1pm - 10pm, Sat-Sun

Consultant/Operator on duty

at all hours.

MECHANICAL ENGINEERING [ME] ..... 32 Mechanical Engineering Building  
(333-2072)

8am - 5pm, Mon-Fri

PSYCHOLOGY [PSYCH] ..... 453 Psychology Building (333-7531)

8am - 5pm, Mon-Fri

SOCIAL SCIENCE [LH] ..... 202 Lincoln Hall (333-6750/333-0309)

9am - 5pm, Mon-Fri

The following locations are not RJE's, but do contain terminals for connection to the DECsystem-10:

PAR ..... 22b Pennsylvania Ave. Residence Halls (333-2950)

(PAR closed for the summer session.)

SNYDER HALL ..... Counseling Office, Snyder Hall (333-2394)

Get key to computer room from office. Office open weekdays from

7am-4pm.

## Tape Protection

Currently, the main method of protecting data on users' tapes is the write ring, which the operators will not insert unless explicitly requested to do so, via the SETUP card, and only after double checking the rack or tape name with that on the SETUP card. If a discrepancy is found or if a program attempts to write on a tape when a tape ring has not been requested, the job is cancelled with an explanatory message to the user. Nevertheless, mistakes are made sometimes and on the basis of complaints received, it would seem that about once every 1000 or 2000 tape mounts somebody loses data. At this level of failure (a few times a year) it is very difficult to institute safeguards that do not cause more trouble than they are worth.

One commonly received suggestion is that we allow reading from any kind of tape, but allow writing only to standard labelled tapes. However, since many users use tapes solely to transmit data to non-IBM machines such a policy would inconvenience more people than it protected.

There are, however, some guidelines which may be observed to reduce the chances of tape catastrophe:

1. Use standard labelled tapes whenever possible. If you have to transmit a non-labelled tape, assemble that data on a standard labelled tape first, then copy it to a non-labelled tape. This ensures that you always have a backup copy.
2. Specify the rack number and the tape name on the SETUP card. The chance of operator error is much reduced because they check both names for consistency.
3. Label your tapes clearly and meaningfully. Humans are wont to gloss over indecipherable names.
4. If something does go wrong notify us promptly rather than persevering on your own. Although we periodically check the tape inventory, sometimes tapes are misfiled or lose their labels.

In any event, we want to know as soon as possible so we can get to the source of the trouble and correct it while the problem is still fresh in your mind and ours. We might even be able to help you make up the lost time!

Princeton Print Train Arrives

Princeton print trains have arrived and have been installed on the printers at CSO NORTH (DCL). These trains give printing capabilities which are now supported by GN, DK and TN trains. The trains have upper/lower case, numerals, normal IBM punctuation characters and the special graphics [ , ], i, j, ~, , ¢, \, ^ . The GN, DF and TN trains were returned on June 15, 1976.

Software support for the Princeton train takes three forms. Usual Princeton (UP), Link Princeton (LP) and IBM Princeton (IP). UP replaces the GN train as default and supports all normal characters plus a limited number of graphics. LP replaces the DK train and supports the character set which is normally available on the DEC-10. IP replaces the TN train and supports a large portion of the character set available via the TN train and the IBM 360. The characters lost are superscript characters, <, >, ≠ and unusual characters. A full description of the exact character sets for each form may be found in reference guide RF-1.12 - Princeton Print Train.

Normally, LP support will be required when printing is done from the DEC-10. Where /FORMS:DK was formerly used use /FORMS:LP. For IP support, replace TN by IP on the /\*ID FORMS= card. I.e:

/\*ID FORMS=TN becomes /\*ID FORMS=IP.

Expiration Date For Fall Class PS#'S

The expiration date for fall class PS#'s will be January 12, 1977. The earliest date that you may apply for new fall class PS#'s is July 1, 1976.

DEC-10 SYSTEM NOTESUOI & 360 Batch Job Routing Changes

On July 1 the following changes will be made to the DEC-10 - 360 job submittal system:

Immediately following the 360 JOB card and FILES: file log ID cards, the UOI command will insert an ID card of the form:

```
/*ID NAME='<DECNAM> (<PROJ>, <PROG>)', PRINT=<RJE>, BIN=<BIN>
```

where:

<DECNAM> is the DEC-10 JOB name

<PROJ>, <PROG> is the PPN creating the request

<RJE> is: (in order of decreasing priority)

1. The OUTPUT side device name.
2. The argument of the LPT switch to login or LPT monitor command.
3. LOCAL by default.

<BIN> is the bin number associated with the PS number funding the PPN creating the request.

What this means:

1. It means that 360 printout will follow the same rules of routing as DEC-10 print jobs with the following exception:
  - a. Any jobs flushed will still go to the proper bin rather than bin 21.
  - b. The message produced after a queue request is

```
$360NAME JOB QUEUED(DEC:60NAME, BIN:nn, PRINT:LOCAL, FILES:xx, BLOCK:yy)
```

where BIN & PRINT are those ID parameters as generated by the UOI command. They do not take into account other ID cards which override these parameters. xx and yy are the number of files and the number of blocks submitted, respectively.

- c. A /BIN: switch has been added to the command to set the bin #.

Examples:

.UOI COM:=PROG		submit file prog & route to Commerce West.
.LPT DCL	}	submit file prog & route to DCL
.UOI PROG		
.LOGIN 1234,5677/LPT:LPT015	}	submit file prog & route to Lincoln Hall
.UOI PROG		

Change to PSINQ

PSINQ has been added as a monitor level command. It now takes three forms.

PSINQ (CR) gives the same response as R PSINQ did.

PSINQ PS#(CR) or PSINQ PS#.USER#(CR) gives accounting information for PS#.

PSINQ [p,pn](CR) gives accounting information for p,pn.

The command may also be used when not logged-in. See HELP PSINQ for full details.



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# Off-Line

VOL. 4, NO. 6 AUGUST, 1976

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OFF-LINE is the newsletter of the Computing Services Office at the University of Illinois at Urbana-Champaign. OFF-LINE is printed every month. Articles may be reprinted provided that the source of the article is noted. CSO operates an IBM 360 model 75 with one million bytes of fast core and two million bytes of slow core, under HASP and OS, and a dual-processor DECSYSTEM-10 with 256K words of core, under TOPS-10, serving up to 80 simultaneously active terminals.

## POLICY

IBM 360 On-Line Disk Policy

In January, 1975 CSO doubled the amount of on-line disk space available to users for storing private datasets. However, it is already difficult to find on-line space at short notice, except on the MERLIN pack. This is partly because users tend to keep their data on-line when they no longer need it just in case they need it again or simply forget to scratch their datasets when done with them. The likelihood of sufficient disk space being available to any user would be increased if disk space were "turned over" faster. With this in mind, the following disk policy has been formulated. Items which are new have an asterisk beside them.

Users may store data on-line in the following ways:

1. They may store data which is in constant use more or less permanently on the public packs.
  2. They may use the MERLIN pack for temporary storage.
  3. They may rent an entire 3330 spindle.
  4. They may store data on-line at Chicago Circle. Please see the consultants for details.
- A. Public Packs
1. All datasets on the public packs must adhere to the standard naming conventions. The name should be of the form
 

USER.Pnnnn.anything

where nnnn is the user's PS number, and anything is any name of the user's choosing that complies with OS rules. Example:

USER.P1234.BINGO

Class datasets may have names of the form

USER.classname.anything

where classname is the name of the class. Example:

USER.CS101.BINGO
  2. Datasets that:
    - . have not been accessed for 30 days
    - . belong to cancelled PS numbers
    - \*. belong to PS numbers which have been inactive for 7 days

. have names which do not conform to the conventions in (1) above

\* will be dumped to tape and scratched every weekday in the evening. The tape will be saved for six months. These datasets may be re-stored by the consultants upon request, at a charge of five service units per dataset.

3. The charge for space on the public packs is 0.01 service units per track per day. Charges are calculated daily at about midnight.
4. All datasets must be catalogued. CSO reserves the right to move datasets from pack to pack.
5. ISAM and unmovable datasets are not allowed.
6. All public packs are backed up to tape daily at about midnight, at no charge to the user. Daily backup tapes are saved for one week; backup tapes taken on Mondays are saved for one month; backup tapes taken on the first Monday of the month are saved for three months.

#### B. MERLIN

1. Every dataset on MERLIN is scratched at about 1200 hours each Sunday.
2. MERLIN is not backed up in any way whatsoever. Users must recreate their own data if it is lost on MERLIN for any reason.
3. Datasets on MERLIN need not be catalogued.
4. Datasets on MERLIN must adhere to the naming conventions outlined in A.1.
5. The charge for space on MERLIN is 0.0067 service units per track per day. Charges are calculated daily at about midnight; users who scratch their datasets before Sunday will thus save themselves money.
6. Datasets of more than 700 tracks may be scratched without notice if MERLIN becomes full during the week. No refunds will be given in this case.

#### C. Renting a 3330 Spindle

1. A user or consortium of users may rent a 3330 spindle and one disk pack for a period of not less than 12 months for \$800 per month real money. Users may not use research board funds to rent a spindle.
2. The spindle will not be used as a setup spindle, so the consortium of users must share one disk pack.
3. Normal naming conventions for datasets on private packs must be followed. Please see the consultants for details.

4. CSO will not back up the data on a rented spindle in any way, nor take any responsibility for it. It is up to the user(s) to maintain the pack.
5. CSO will maintain the spindle in good mechanical and electrical order.
6. CSO reserves the right to choose the physical and logical position of the spindle. In the unlikely event of serious mechanical trouble, for instance when an entire channel is out of service, CSO reserves the right to take the rented spindle off-line in order to provide effective service to the bulk of CSO users.

#### Cover Charge Rebates

Beginning on July 1, 1976, jobs submitted to the IBM 360/75, IBM 370/158 or IBM 370/168 from the DEC-10 will have ten cents (10¢) of the cover charge rebated. Jobs run on the IBM machines and printing to a file on the DEC-10 will have fifteen cents (15¢) of the cover charge rebated. Jobs doing both will thus receive a total of 25 cents rebate on the cover charge as well as not being charged for "cards read" or "lines printed".

Thus, an "average" 100 card, 200 line EXPRESS job that costs about 90 cents using real cards and real line printer paper would typically cost about 35 cents if it used the DEC-10 as a card reader and line printer. An "average" 200 card, 400 line Class A job that cost about \$1.80 using real cards and real line printer paper would typically cost about 95 cents using the DEC-10 as a card reader and line printer. You can cause a job to print into a DEC-10 file by using a

```
/*ID PRINT=DEC10,NAME='filename(proj#,prog#)
```

The output can be found in filename.D78 of your disk.

It should be remembered, however, that the usual DEC-10 charges (about \$5.00 per co-nect hour) will be incurred while looking at the output file, although no disk charges will be incurred unless the output file is left on the disk overnight.

Portions of the edited print file can be printed on the line printer by using the PRINT command which will incur a 25¢ cover charge plus 80¢ per 1000 lines printed.

This measure is being introduced to help reduce the cost of consumables and card reader and line printer maintenance. Its use is recommended primarily for debugging runs with short output.



### Additional DEC-10 Charges

Beginning July 15, 1976, users with disk space on the DEC-10 will be charged for that space. The rate of two cents per block per month is applied to the amount of disk space in use and not to the amount of disk space allocated to the user's PPN. User tape mounts which require operator intervention to mount the tape on the DEC-10 are charged \$1.00 per tape mount request. Paper tape generation on the DEC-10 is charged at the rate of \$15.00 per 1000 feet.

### Use of Computing Facilities at UWC

Although CSO provides the ability to send work to the 370/168 UWC system, the routine weekday workload there generally precludes the daily running of jobs submitted through CSO facilities. As a consequence, typical turnaround time for Class A jobs can be as long as seven days. As a consequence, CSO is discouraging use of UWC except for those users who can profitably use the kind of service that requires large amount of computer time with no turnaround guarantees.

If you are considering using UWC please see the consultants first. They will advise you on the best machine to suit your needs.

### System Consulting at CSO South

The Systems Consulting Office at CSO South (Room 83 Commerce West) will close at the end of the summer session. From that time on, the Statistical Services Office (Room 84 Commerce West) will provide systems consulting for users who require it.

### Short Courses for CDC CYBER 175

There will be introductory short courses intended to acquaint users with the basics of using the CDC CYBER 175 beginning in early September. These courses will cover the fundamentals of using the batch and timesharing capabilities available on the CYBER 175. Delays involved with installation of the hardware and software may necessarily postpone the courses. Registration will begin one week prior to the start of courses. Further information about the courses will be published at that time. A list of tentative course topics follows.

<u>COURSE</u>	<u>TIME ALLOTTED</u>
COMPASS (Assembler Language)	6-12 hours
RECORD MANAGER	6 hours
BATCH-TIMESHARING-EDITOR	4-6 hours
FORTRAN DIFFERENCES (FROM IBM + DEC-10)	3 hours
CDC LOADER	4-6 hours
FORTRAN CONVERSION TO CDC	1 hour
TAPE CONVERSION (IBM to CDC)	2 hours
MATH LIBRARIES FOR ALL 3 MACHINES	6 hours

## SYSTEM NOTES

University of Iowa Prescan Package

The University of Iowa JCL Prescan Package has been installed on the 360/75. With this code a job's JCL is scanned as soon as the job is read in, and if the job has a JCL error, it is queued directly for print. Thus, the user does not have to wait for normal turnaround to find he has made a JCL error. If the job has no JCL error, it is queued for execution.

If a job has a JCL error, the following message appears in its HASP log:

```
HH.MM.SS JOB XXX *****JOB NOT RUN - JCL ERROR *****
```

The actual JCL error will appear in the job's system message block as before.

Setup jobs will go into setup hold after JCL scan, so setups with JCL errors will print immediately without going into setup. EXPRESS, HASP-to-HASP, SYSTEM=PRINT and SYSTEM=PUNCH jobs are completely unaffected.

Class N jobs will go into N hold before JCL scan; if an N job has a JCL error the user will not learn this until the job is selected for execution. N users are expected not to make JCL errors!

Occasionally a job will abend the reader/interpreter in such a way that the job goes directly to purge. It will then have no output.

Currently jobs in user hold, that is, /\*ID HOLD=YES, will wait in the pre-execution queue. The JCL will be scanned when the job is released.

Note well: JCL errors which cause the job to fail, such as duplicate dataset name on volume, do not show up in JCL scan, and jobs with this type of error will not be flushed before execution.

## LANGUAGES

FMT

A new version of FMT, a text preparation package for the IBM 360, will be installed August 10, 1976. This new version corrects many errors of the current version, plus adds additional features. Documentation for the new version is available in the CSO Systems Consulting offices.

A major difference in this new version is that it requires more core storage. Suggested region specifications begin at 200K.

To use the new version:

```
/*ID REGION=200K
// EXEC FMT,REGION=200K
```

To use the old version:

```
// EXEC FMT
//STEPLIB DD DSN=SYS8.FMT,DISP=OLD
```

### Argonne Codes Available

The following programs from the Argonne National Laboratory Code Center are available through CSO for the University of Illinois faculty and staff:

1. EISPACK II - Eigen system routines developed by NATS for IBM 360/75
2. EISPACK I - Eigen system routines developed by NATS for DECsystem-10
3. FUNPACK - Special functions packet developed by NATS for IBM 360/75
4. EPISODE - Byrne and Hindmarsh differential equation solver for the IBM 360/75

The Argonne Code Center will distribute only one copy of each program to the U. of I. campus. Anyone wanting to copy any of the programs above may call Mary Ann Berg (333-6133).

### SPECIAL INTEREST

#### Computers and the Four Color Theorem

K. Appel

Professor Wolfgang Haken and I recently completed a proof of the Four Color Theorem. The theorem states that if you want to color the regions of a planar map such that any two regions with common border of more than a finite number of points have different colors, you need at most four colors.

I would assume that the possible interest to a reader of OFF-LINE is that the proof used - and seemed to essentially require - a great deal of computer time and may give the first example of a mathematical theorem of the type which cannot be proved by the usual theoretical techniques.

To prove the theorem by mathematical induction one only has to prove that there is no number  $n$  with the property that some map of  $n$  regions requires five colors and no map of fewer than  $n$  regions does. We will call a map with the property that it requires five colors but no map with fewer regions does, a minimal five chromatic map.

It has been known for decades that there are many maps - called reducible configurations - which cannot possibly be contained in minimal five chromatic maps. Thus if one could show that every map contained a reducible configuration the theorem would be proved.

There were two major difficulties at the beginning. First, it is rather tedious to show that a configuration is reducible; many configurations had been known to take several hours of computer time each. Second, we knew that it would take a reasonably large set of such configurations to guarantee that every map contained at least one. Our first guess was that somewhere between 10,000 and 10,000,000,000 would be required.

We knew a rather complicated technique, based on a method similar to discharging an electrical network, for finding sets of maps with the property that they were unavoidable in the sense that at least one element of the set was contained in every planar map. We also knew a criterion, called geographical goodness, which seemed to be possessed by all reducible configurations (but did not imply reducibility) and could be checked in a few milliseconds. So we asked the Research Board for computer money.

Our first task was to find out whether we could find a reasonably small unavoidable set of geographically good configurations. Since the parameters in the discharging algorithm were very critical for this job, we had to experiment with a great many possibilities. Since each possibility might take a few months by hand, a computer program was called for. This program, discussed in OFF-LINE, April, 1973, eventually grew to 6000 lines of FORTRAN and was constantly improved for three years to take advantage of the things we learned from it. Eventually it produced a method so good that we could do it by hand with the certainty of getting under 10,000 configurations with less than a year's work. Our final version had fewer than 2000 configurations.

Now we attacked the problem of checking reducibility. Here the methods were standard, although complicated, and efficiency was paramount. We could not afford several hours each on several thousand configurations. Dr. John Koch investigated reducibility problems in his thesis at the U. of I. and wrote an extremely efficient assembly language program for doing the most time consuming part of the job. He used this program along with a complex of equally efficient programs in his investigations and we modified his program to handle our work. Even so the time for checking reducibility for over 2000 configurations ran to several hundred hours, a significant part of which was run time on the ADP 370-168.

We think of our proof as a simple idea involving ten billion case distinctions. We conjecture that no essentially simpler proof of the four color problem will be found and that computers have entered pure mathematics in a new and different way, as an essential tool in the proofs of certain theorems.



## OTHER

Printer Paper Bargain

Office Supply has on hand a limited supply of three and four part printer paper which it wants to eliminate from its inventory. The carbon in this paper gives low quality copies, so perhaps it could be used where only one good copy is needed. The specifications and price are as follows:

32 cartons (650 per carton) 14 7/8 x 11 - 15 16 lined 4 part printer paper  
\$2.00 per carton

60 cartons (850 per carton) 14 7/8 x 11 - 15 16 lined 3 part printer paper  
\$3.00 per carton

If anyone is interested in this printer paper, please contact Bob Soloman at 333-1040.

DECwriter Ribbons

Office Supply stocks DECwriter II ribbons (stock number 11-68-9600). These ribbons are available in units of one dozen and cost \$56.00 per unit.

Acquiring CDC Documentation

On page 9 you will find an order form for some recommended CDC manuals. We urge that you order your manuals now. Beginning September 1, CSO will attempt to maintain a supply of manuals; however, we cannot guarantee an adequate stock of all manuals. After September 1, unusually large orders will be handled on a special basis.

All forms received by us by August 10 will become a part of our next order.

The CDC "instants" should be very useful; they are condensed, pocket-sized manuals which outline particular languages or utilities. Copies of some of these documents are available in the Consulting Office for review.

The sale of CDC manuals is limited to students, faculty and staff of the University of Illinois or others having a valid PS#.

Please complete the form, fold it and place it in campus mail. When the manuals arrive, we will notify you by mail. If you need further information about purchasing these items, call the Accounting Office (3-6760); for technical information, call the Consultants (3-4747 or 3-6133).





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	REFERENCE MANUAL (BASIC) 19983900	6.75	
	REFERENCE MANUAL V3 (COMPASS) 60492600	9.35	
	REFERENCE MANUAL V1 (FORTRAN) 60497800	10.00	
	REFERENCE MANUAL (SORT/MERGE) 60497500 V4 & 1	4.40	
	GIM (GPSS V/6000) 84003900	2.55	
	TIMESHARING REFERENCE MANUAL 60434400	3.70	
	USERS GUIDE (CYBER RECORD MANAGER) 60495700	5.95	
	TERMINAL USER INSTANT 60435800	1.70	
	INSTANT (COMPASS) 60361000	1.60	
	INSTANT (FORTRAN) 60357900	1.35	
	INSTANT (V4) (SORT/MERGE) 60344400	1.35	

(1) As of June 15, 1976

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# Off-Line

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PLEASE NOTE: A number of articles in this issue have been reprinted from issues published since June 25, 1976. This was done to give those people who have recently returned to campus a survey of the developments which occurred during the summer.

OFF-LINE is the newsletter of the Computing Services Office at the University of Illinois at Urbana-Champaign. OFF-LINE is printed every month. Articles may be reprinted provided that the source of the article is noted. CSO operates an IBM 360 model 75 with one million bytes of fast core and two million bytes of slow core, under HASP and OS, a dual-processor DECSYSTEM-10 with 256K words of core, under TOPS-10, serving up to 80 simultaneously active terminals, and a CYBER 175 with 131K words of core and 256K words of ECS, under NOS, serving up to 50 simultaneous active terminals.

## POLICY

User Meeting

An open user meeting will be held from 10:00 AM to 12:00 noon on Tuesday, September 7, 1976 in Room 198 of the Coordinated Science Laboratory. The presentation will primarily treat CSO policies and services associated with the CDC CYBER 175.

CYBER 175 Service

The acquisition of the CYBER 175 was made in response to a need to improve the breadth and quality of the services being offered by CSO as opposed to just improving the ones presently available. Of course, a new set of services cannot be implemented overnight. Thus, CSO intends to gradually plan and introduce new services over a period of several years. Readers who see deficiencies in the initial configuration of the CYBER 175 should bear in mind three important intentions:

1. The current configuration of the DEC-10 and the services it provides will be available to users until the end of June, 1977.
2. A slowly diminishing IBM 360/75 configuration and the services it currently provides will be available until June, 1978 unless workable alternatives are found before then.
3. A more up-to-date IBM 370 service will always be available to qualified users who require this important kind of service.

An immediate effect of the commissioning of the CYBER 175 should be a reduction of pressure on, and thus an improvement of, all existing services.

The initial CYBER 175 configuration will contain the following:

1. CDC CYBER 175 processor with 131,072 60-bit words of main memory.
2. 262,144 words of extended core storage.
3. Three 9 track, 1600 bpi tape drives, one 7 track tape drive.
4. Seven modules of disk providing a total of about 1200 million bytes of on-line storage.
5. Data communications equipment supporting 80 terminals (50 dedicated, 30 dial-up) and 10 remote job entry sites.
6. One card reader.
7. One 1400 line per minute line printer.



8. One card punch.
9. Assorted controllers, consoles, and peripheral processors to support the above.

Over a three year period, it is planned to augment this so that:

1. The main memory will total 262,144 words.
2. The extended core storage will total 524,288 words.
3. Disk storage will total 2100 million bytes of on-line storage.
4. The communications system will support 300 simultaneous terminals and 20 remote job entry sites.

A wide range of software will also be provided, which although it will not initially contain a PL/I compiler, will do so before the end of a two year period.

The immediate improvements in service for CYBER 175 users are threefold:

1. Both batch and interactive services will be provided on the same mainframe, with the same compilers and filing system. There will thus be no need to learn and use two machines to prepare and run batch jobs from a terminal.
2. Depending on the kind of job run, the CYBER 175 is between four and eight times faster than the IBM 360/75. On the basis of benchmark jobs used to select the new machine, a 2 CPU hour number crunching job on the 360/75 would typically take only 15 CPU minutes on the CYBER 175.
3. One of the prime concerns of all present IBM 360/75 users is that machine's ability to process the mid-afternoon peak load of about 450 Express, Class A, B and C jobs an hour. A benchmark containing jobs representative of this stream was constructed and submitted at a rate of 750 jobs an hour for one hour to the IBM 360/75 and the final configuration of the CYBER 175 which was concurrently running 300 terminals doing timesharing and preparing batch jobs. The 360/75 could not keep up with this workload, but Class C jobs were turned around in two hours. The CYBER 175 turned all Class C jobs around in less than 10 minutes! On the basis of this benchmark CSO is fairly confident it can offer 10-15 minute turnaround for jobs that would be Class C on the 360/75; 5-10 minute turnaround for Class B, and less than 5 minute turnaround for Class A. This standard of service will be maintained as the workload increases, by extending the machine configuration.

Longer range improvements may include more terminals for batch preparation, and the provision of on-line mass storage removing the need for all disk and many tape setups.

More subtle, but equally important improvements are more easily understood -- JCL and software more oriented to terminal and network use, a wide range of university environment applications and utility programs, and an easier to use, more responsive accounting system.

IBM Service Continuity

An item of emphasis in the service plans of CSO is continuity of IBM-dependent services. There are several types of dependence and part of our plan is appropriate to each.

1. Some portion of our present, and future, workload is dependent on applications, language facilities or other characteristics which do not have a directly comparable counterpart on the CDC system. Our plan for these is to provide IBM service over the entire life of the CDC equipment.
2. A different portion of the workload depends on facilities that will be available in the relatively near future on the CDC system. The primary example of this is PL/I. We do not feel that the present version of PL/I on the CDC system is adequate as a replacement service, but that is expected to be resolved within about 18 months. Our plan is to continue to provide IBM service to all PL/I users until a satisfactory replacement is available.
3. A larger portion of the load has a dependence in the sense of requiring conversion of programs, data, procedures or documentation. For the great majority of this load the conversion is simple and not time consuming. (Our conversion assistance plans are discussed elsewhere in this issue.) Our plan to provide the time necessary for this portion of the conversion to take place without significant impact on courses or research is best reflected in the calendar of machine changes.

Basic Schedule of Machines:

	<u>360/75</u>	<u>DEC-10</u>	<u>CYBER 175</u>
Sept., '76	As Is	As Is	50 ports + 2 RJE Few Users
Jan., '77	Reduce Tape Drives	As Is	80-100 ports + more RJE 30-40% converted
May, '77	Reduce Disk & Printer	As Is Until July 1	Same 50-60% converted Some courses moved
Sept., '77	Continue As Is	Removed	Increase disk, memory, ECS 150-200 ports + most RJE Most courses use for first time
May, '78	Switch to Remote Service	-----	300 ports + all RJE 90% converted
Sept., '78	Remote IBM Service	-----	Same

The plan for the first year involves continued full operation of all present facilities except for some minor peripheral adjustments. During that time conversion assistance will include classes, document distribution and access to the new machine. Special provisions for tape conversion will be announced later.

Courses should not rush onto the new machine, but rather should plan to move in June or August of 1977. This will allow the system to stabilize, and allow time for materials related to computer assignments to be revised.

Research projects should follow a similar schedule, phasing out of the 360/75 at a convenient point. New work should be undertaken on the CDC system.

Two areas have been identified for a deferred conversion schedule, PL/I and SOUPAC. In both of these areas the comparable facility will be available on the CDC system, but not at the time of installation. SOUPAC should be available by late fall, but PL/I is 18 months from a satisfactory replacement. In both cases IBM service on the 360/75 will be available in the interim.

In our review of anticipated conversion problems we found that even after two years there would be an unconverted residual of 6-10% of the present 360/75 load. In addition, there will be new IBM facilities that are desirable.

At the end of school in May, 1978 the 360/75 is planned to be removed. At that time we will continue to support these "IBM" service requirements, as a regular CSO activity, through purchase or barter of time on other machines either internal or external to the U. of I. There is no intention to restrict access to this service on the basis of source of funds or allocations, but rather on the basis of appropriateness and efficiency. It is our intention to provide this service in a timely and supported manner.

It is because of this strong commitment of continuity of "IBM" service, and the fact that it can be provided within a lower total budget that evolution of a new service on a new machine not compatible with System 370 is possible and desirable.

#### Accounting on the CYBER 175

The standard accounting system offered by the NOS operating system is similar in many respects to the three-tiered accounting structures presently being used on CSO machines. The accounting system, based on charge numbers, is structured as follows:

1. The charge number is identical to the current University account number (invoice, research, or class) and may be subdivided into project numbers.
2. Project numbers are roughly equivalent to project numbers on the DEC-10 and PS numbers on the 360/75. These in turn may be subdivided into user numbers.
3. User numbers are similar in some respects to programmer numbers on the DEC-10 and user numbers on the 360/75.

There are, however, two important operational differences:

1. The user number alone identifies the user's file space, and the user's password gives these files security (although each file may have its own password too). A user number may appear in several projects under several charge numbers. Though the user may move from project to project, the unique user number will identify all files created to date under it. In most cases, staff user numbers will be the same as the individual's social security number. Student user numbers will be the same as the first nine digits of the student ID number. Users may set a default project number for charging purposes, or they may override the default if they wish to charge the work to another project to which they belong. Eventually, the privileges available to a user will be associated with each project number, thus they might vary from project to project.
2. Initiation of the projects will be under complete on-line user/department control. CSO will set up and monitor the charge number, but the user/department will have full control over and responsibility for creating projects, assigning funds and users to projects, moving funds and users between projects, setting user and project privileges within the limits of the charge number, taking the necessary action when projects run out of funds, and for compiling whatever reports on their charge numbers and accounts that they deem necessary. All of this can be done on-line by the charge number and project number administrators designated by the user/department. Since the most frequent accounting transactions will be done on-line and within the user's department, the new system should be far more responsive than the present one.

There will be no correspondence between user numbers on the CYBER and user numbers on the 360/75 or programmer numbers on the DEC-10. However, soon after the 360/75 and the CYBER are linked, account administrators may designate a project number on the CYBER to correspond with a PS number on the 360/75. Once a day, PS number usage will be subtracted from the project number, and the resulting project number balance will become the new PS number balance. This new PS number balance will, of course, be carried across to the DEC-10 project number. Thus, some of the benefits of the new accounting system will be carried across to the existing one.

Beginning September 7, 1976, use of the CYBER will be free. CSO will create a charge number and project number for this free period. Those attending short courses may register their user numbers at their course for assignment to this project number. Others may register their numbers at the CSO Accounting Office, 134 DCL, for assignment. Free use is temporary.

A special seminar will be held for those people who are going to manage their user/department's funding on the CYBER. The seminar will cover the details of the accounting procedures and programs which will be in effect. The location and time of the seminar will be announced.



Initial CYBER Operations Schedule

If all goes well with the installation and checkout of the CYBER 175, limited service will begin September 7, 1976. The machine will be available from 11:00 AM to 11:00 PM daily. Access will be available via a card reader at CSO North, terminals\* and dial-up ports\*\*.

However, users should be warned that service provided during September will not be "production service". None of the RJE stations will be connected to the CYBER, nor is it likely that the 360/75 (or the DEC-10) will be reliably connected to the CYBER during that period. Also, those using the CYBER should initially expect such things as frequent interruptions to service, large variations in response and turnaround time, and changes to software systems at short notice.

This early access will give those taking CSO's short courses an opportunity to get practical experience on the machine at the same time that CSO's operators, programmers, and consultants are becoming familiar with its operational characteristics. The System Consultants are answering questions concerning the CYBER 175 to the best of their knowledge at this time.

Complete job limits have not been selected; however, no job requesting more than 15 minutes of CPU time or more than 60K words of main memory will be run without prior arrangement.

---

\*The location of the terminals may be found in CSO Reference Guide 1.10, "Job Entry Sites".

\*\*Dial-up lines will be available for 110 and 300 baud transmissions. The telephone numbers for these lines are not available at this time. When they are available, they will be announced in a NEWS item and an RJE Bulletin.

### Conversion Policy

The conversion of research use of the IBM 360 and DEC-10 to the CYBER 175 will begin early in the fall semester and is expected to take approximately two years. CSO's part in the conversion will consist of consulting support, data conversion support, supplying automated conversion processors, suitable new data media, and instruction in CYBER usage. In addition, CSO will supply some free computer time on the CYBER for program and data conversion and verification.

Consultants will be available, by appointment, outside of scheduled hours to aid our users in the conversion process. During a conversion meeting with a consultant, the user's applications will be reviewed and the conversion of data will be discussed, with the actual conversion being performed by the consultant or the user.

Departmental seminars can be conducted by CSO staff members if interest warrants; in these sessions, processors which are important to the department and guidelines for data conversion will be discussed. Departments with numerous conversion problems will be assigned a consultant who will be responsible for assistance to that department.

There exist many automated conversion aids on the CYBER 175. These aids appear to be very useful in the conversion of both programs and data. Notably, utilities exist to convert IBM FORTRAN to CDC FORTRAN, and IBM binary data to CDC binary data. The operating system will, also, accept EBCDIC tapes without conversion.

This is a summary of the conversion policy. The complete CSO policy regarding the conversion and all necessary forms to initiate conversion are available at the CSO North Consulting Office, telephone 333-6133.

### Use of Computing Facilities at UWC

Although CSO provides the ability to send work to the 370/168 UWC system, the routine weekday workload there generally precludes the daily running of jobs submitted through CSO facilities. As a consequence, typical turnaround time for Class A jobs can be as long as seven days. As a consequence, CSO is discouraging use of UWC except for those users who can profitably use the kind of service that requires large amounts of computer time with no turnaround guarantees.

If you are considering using UWC please see the consultants first. They will advise you on the best machine to suit your needs.



### Link to Chicago Circle Is Up Again

Chicago Circle Computing Center has finished its conversion to the MVS operating system and the link is now open again for those who wish to use the 370/158 in "native mode".

In the past, Circle's main contribution was to ease the load on the 360/75; and consequently, a considerable effort was exerted to make the two services look as similar as possible. Now, because of the planned availability of the CYBER to reduce the load on the 360/75, and the significant differences between the MVS operating system and its predecessor, it is reasonable to use Circle services as they are offered to Circle campus (i.e. in native mode). The main differences are in the PROCs used and the libraries available. People who used this service before the changeover should see the consultants before continuing their efforts there.

The main advantages that Circle provides are the ability to run large region jobs and the availability of large amounts of processor time during some third shifts and weekends for bulk users; however, the Circle service is available to all users prepared to make the necessary changes to their JCL to run there.

Small and moderate sized datasets can be moved back and forth between centers over the link. Tapes are carried back and forth by CSO personnel during weekly or biweekly liaison trips. For the former, see the consultants; for the latter see Debbie Weller, 179 DCL.

### Cover Charge Rebates

Beginning early in September, 1976, jobs submitted to the IBM 360/75, IBM 370/158 or IBM 370/168 from the DEC-10 will have ten cents (10¢) of the cover charge rebated. Jobs run on the IBM machines and printing to a file on the DEC-10 will have fifteen cents (15¢) of the cover charge rebated. Jobs doing both will thus receive a total of 25 cents rebate on the cover charge as well as not being charged for "cards read" or "lines printed".

Thus, an "average" 100 card, 200 line EXPRESS job that costs about 90 cents using real cards and real line printer paper would typically cost about 35 cents if it used the DEC-10 as a card reader and line printer. An "average" 200 card, 400 line Class A job that costs about \$1.80 using real cards and real line printer paper would typically cost about 95 cents using the DEC-10 as a card reader and line printer. You can cause a job to print into a DEC-10 file by using a

```
/*ID PRINT=DEC10,NAME='filename(proj#,prog#)
```

The output can be found in filename.D78 of your disk.

It should be remembered, however, that the usual DEC-10 charges (about \$5.00 per connect hour) will be incurred while looking at the output file, although no disk charges will be incurred unless the output file is left on the disk overnight.

Portions of the edited print file can be printed on the line printer by using the PRINT command which will incur a 25¢ cover charge plus 80¢ per 1000 lines printed.

This measure is being introduced to help reduce the cost of consumables and card reader and line printer maintenance. Its use is recommended primarily for debugging runs with short output.

System Consulting at CSO South

The System Consulting Office at CSO South (Room 83 Commerce West) closed at the end of the summer semester. System questions can be directed to the Statistical Consultants (Room 84 Commerce West) or to the System Consultants at CSO North (Room 166 Digital Computer Lab.).

Short Courses for CDC CYBER 175

There will be introductory short courses intended to acquaint users with the basics of using the CDC CYBER 175 beginning in early September. These courses will cover the fundamentals of using the batch and timesharing capabilities available on the CYBER 175. Delays involved with installation of the hardware and software may necessarily postpone the courses. Registration will begin one week prior to the start of courses. Further information about the courses will be published at that time. A list of course topics follows.

<u>COURSE</u>	<u>TIME ALLOTTED</u>
COMPASS (Assembler Language)	6-12 hours
RECORD MANAGER	6 hours
BATCH-TIMESHARING-EDITOR	4-6 hours
FORTRAN DIFFERENCES (FROM IBM + DEC-10)	3 hours
CDC LOADER	4-6 hours
FORTRAN CONVERSION TO CDC	1 hour
TAPE CONVERSION (IBM to CDC)	2 hours
MATH LIBRARIES FOR ALL 3 MACHINES	6 hours

Additional courses concerning languages and utilities available on the CYBER 175 may be offered late in the semester.

An overview of statistical applications which is relevant to all three machines will be presented by the Statistical Consulting staff early in the fall semester.

## CDC NOTES

CDC Software

The following is a list of the high level software that is available on the CDC CYBER 175:

FTN - an optimizing FORTRAN compiler  
MNF - a fast FORTRAN compiler intended for student use  
COBOL - ANSI standard  
ALGOL  
BASIC  
SIMULA  
LISP  
PASCAL  
SNOBOLC - fast version of SNOBOL  
SNOBOL - a true Bell Labs. SNOBOL  
COMPASS - Assembler language

In addition, a linear programming package, text processors, plotting routines, conversion aids, SORT/MERGE and KWIC, several simulation programs and a full complement of mathematical routines will be available.

Mathematical and Applications Software

Complete information concerning mathematical and applications packages is not yet prepared, however we plan to offer a full complement of such packages.

For mathematical routines, an IMSL library for the CDC, CDC's Math/Science library and a version of EISPACK for eigenvalue problems will be available. Applications packages which will be available are APEX III, for linear and mixed integer programming, and GPSS V, for discrete simulations. Additionally, we expect to obtain a continuous modeling package similar to CSMP. Comments or suggestions concerning mathematical or applications packages should be directed to Mary Ann Berg or Stan Kerr (333-2048).

Statistical Services for the CYBER 175

The Statistical Services Office expects to install the following statistical packages in the early fall:

- SPSS: A batch version compatible with the current IBM version. It is possible that there will be additional procedures available not described in the SPSS manual. These additional procedures are in the area of econometrics.
- SPSS: An interactive version. At least an interactive SPSS program creation and checking facility will be available.
- SOUPAC: A batch version compatible with the current IBM batch version. (late fall)
- SOUPAC: An interactive version providing at least program checking and creation. (late fall)
- MULTIVARIANCE: A CDC version will be acquired and installed.
- FOSOL: An interactive general purpose package with facilities similar to those now found in SOUPAC, SPSS or STP.

The following packages will not be available at an early date, or not available at all, on the CYBER 175:

- SAS: Will not be available but will be continued on IBM service. Though it has a noticeable usage, it is too expensive to convert.
- DATATEXT: Its limited use does not warrant a CDC installation.
- BMD: Will not be available early: Limited usage does not warrant an early installation. If usage or demand warrants, it will be added.
- OSIRIS: Will not be available early because of limited usage.

Until CDC replacements are found, if warranted, these packages will continue on IBM service.

Other software now supported will be implemented on the CYBER 175 either by conversion or acquisition as needed and available. The most demanded programs, on a usage basis, will be implemented or replaced first on the CYBER 175.

Throughout this conversion period all software currently on the 360/75 will be available, but no changes or enhancements will be considered. The conversion period may also be used as an opportune time to remove from service outdated or superfluous software.

No additional statistical software will be implemented on the DEC-10.

Some packages such as TSP, the Box-Jenkins procedures, will be maintained on the 360/75 until CDC versions, or equivalent functions can be found for the CYBER 175.

Statistical Services welcomes user questions and suggestions on conversion and implementation priorities, and suggestions on CDC software of interest. Contact the Statistical Services Consultants at 333-2170.

#### Acquiring CDC Documentation

On page 14 you will find an order form for all CDC software manuals applicable to this installation. We urge that you order your manuals now. Additional order forms are available at the CSO Accounting Office.

The CDC "instants" should be very useful; they are condensed, pocket-sized manuals which outline particular languages or utilities. Copies of most applicable CDC documents are available in the System Consulting Office (166 DCL) for review.

The sale of CDC manuals is limited to students, faculty and staff at the University of Illinois or those having a valid PS#.

Please complete the form, fold it and place it in campus mail. When the manuals arrive, we will notify you by mail. If you need further information about purchasing these items, call the CSO Accounting Office (333-6760); for technical information, call the Systems Consultants (333-6133).



## 370 NOTE

JCL Change at UIC

In addition to the differences in the PROCs and libraries available at UIC, there is one minor change in JCL. Apart from this change, the syntax of EXEC and DD statements is the same in MVS. The change concerns the usage of 800 bpi tapes. Users with a tape which had been created at a density of 800 bpi (bits per inch) can assure that it will be read at the correct density by requesting 'UNIT=TAPE8' on the DD card referring to that tape. For example:

```
//JOBSPSS JOB
/*ID PS=ps#
/*ID CODE=password,REGION=256K
/*SETUP PLEASE MOUNT TAPE TP1234 (NO RING)
// EXEC SPSS
//GO.INBC: DD DSN=XYZ,UNIT=TAPE8,VOL=SER=TP1234,
//          DISP=OLD,LABEL=(1,SL)
//GO.SYSIN DD *
SPSS statements
/*
```

The above example would insure that the tape 'TP1234' would be placed on the proper tape drive prior to reading. For tapes recorded at 1600 bpi, the specification of the 'UNIT' is entered as 'UNIT=TAPE'.



TO: CSO ACCOUNTING OFFICE  
 134 DIGITAL COMPUTER LAB.  
 URBANA, ILLINOIS 61801

FROM: \_\_\_\_\_ (NAME) \_\_\_\_\_ (TELEPHONE)  
 \_\_\_\_\_ (STREET) \_\_\_\_\_ (DATE)  
 \_\_\_\_\_ (CITY, STATE)

PLEASE ORDER THE FOLLOWING CDC MANUALS:

QUANT	TITLE	PUB #	ITEM COST(1)	TOTAL COST
_____	NOS	GEN INFO MAN	60435900 01.20	_____
_____		REF.MAN VOL.1 (FOR	60435400 08.65*	_____
_____		APPLICATION ANALYST)		_____
_____		REF.MAN VOL.2 (FOR	60445300 09.15	_____
_____		SYSTEM ANALYST		_____
_____		APPLICATIONS PROGRAM-	60436000 FREE	_____
_____		MERS INSTANT		_____
_____		SYSTEMS PROGRAMMERS	60449200 02.60	_____
_____		INSTANT		_____
_____		TERMINAL USER INSTANT	60435800 FREE*	_____
_____		TEXT EDITOR REF	60436100 02.35	_____
_____		T-S REF MAN	60435500 04.15*	_____
_____		T-S USER'S GUIDE	60436400 FREE	_____
_____	ALGOL	REF MAN V4	60496600 08.55	_____
_____	APEX III 1	REF MAN	76070000 10.75	_____
_____	BASIC	REFERENCE MANUAL	19983900 06.75*	_____
_____	COBOL	INSTANT	60497000 01.35	_____
_____		REF MAN V4	60496800 11.90	_____
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_____	COMPASS	INSTANT	60492800 01.50*	_____
_____		INSTRUCTION CARD	60493000 00.50	_____
_____		REF MAN V3	60492600 09.35*	_____
_____	CYBER LOADER	INSTANT	60449800 FREE	_____
_____		REF MAN	60429800 06.35	_____
_____	CYBER RECORD	REF MAN	60495700 05.95*	_____
_____	MANAGER	USER'S GUIDE	60359600 09.00	_____
_____		GUIDE FOR USERS OF	60496000 03.70	_____
_____		COBOL		_____
_____	FORM 1	REF MAN	60496200 02.85	_____
_____	FORTRAN EXT	INSTANT	60497900 FREE*	_____
_____		REF MAN V4	60497800 10.00*	_____
_____		DEBUG USER'S GUIDE	60498000 02.60	_____
_____		COMMON LIBRARY MAN	60498200 04.95	_____
_____	GPSS V/6000	GEN INFO MAN	84003900 02.55*	_____
_____	MATH/SCIENCE LIB	GEN INFO MAN	60328900 02.25	_____
_____		USAGE INFO	60329200 05.40	_____
_____		REF MAN	60327500 52.50	_____
_____			MICRO FICHE 13.80	_____
_____	MODIFY	INSTANT	60283000 01.60	_____
_____		REF MANUAL	60281700 02.60	_____
_____	PERT/TIME	REF MANUAL	60133600 02.60	_____
_____	SIMULA	GEN INFO MAN	60251900 02.40	_____
_____		REF MANUAL	60234800 08.30	_____
_____	SORT MERGE	REF MAN	60497500 04.40*	_____
_____		INSTANT V4	60497600 01.30*	_____
_____	SYMPL	REF MAN	60496400 04.20	_____

_____	UPDATE	INSTANT	60450000	01.35	_____
_____		REF MAN	60449900	02.75	_____
_____	8-BIT SUBROUTINE	REF MAN	60495500	03.90	_____
_____	XEDIT TEXT EDITOR	REF MAN	76071000	03.65	_____

(1) AS OF JULY 29, 1976

\* AVAILABLE IMMEDIATELY FROM CSO ACCOUNTING OFFICE, ROOM 134, DCL.

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UNIVERSITY ACCOUNTS

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EDITOR: Richard Chilausky  
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OFF-LINE is the newsletter of the Computing Services Office of the University of Illinois at Urbana-Champaign. OFF-LINE is printed every month. Articles may be reprinted provided that the source of the article is noted. CSO operates an IBM 360 model 75 with one million bytes of fast core and two million bytes of slow core, under HASP and OS, a dual-processor DECsystem-10 with 256K words of core, under TOPS-10, serving up to 80 simultaneously active terminals, and a CYBER 175 with 131K words of core and 262K words of ECS, under NOS, serving up to 50 simultaneously active terminals.

## POLICY

Price Reduction

Over the past two years CSO has applied a concentrated effort to getting increased productivity out of the 360/75 and its associated RJE network. The fruits of this labor are shown in Table I below.

This enormous increase in productivity was brought about by several important programs. Most notable of these were the organized efforts towards production management, particularly in job scheduling, the introduction of a bulk computing service, and the removal of the time-sharing services from the 360/75 to the DECSYSTEM-10. Table II shows that even in April, the worst service month of the year, this improvement was distributed to all types of users. That is, they got more service with faster turnaround, despite the fact that higher job classes also got more service and faster turnaround.

A parallel effort has kept the costs associated with the 360/75 decreasing. Most of these cost programs have not represented any reduction in service quality, although a few reductions in service hours have effected a few users.

Based on this performance improvement and cost control, CSO is able to announce a major price reduction to users of the IBM services, and to users of all reader/printer services.

The following price changes will go into effect October 1, 1976

- . Execution units from \$0.01 to \$0.009
- . Printout from \$0.80 per 1000 lines to \$0.64
- . Cards in from \$1.40 per 1000 cards to \$1.05
- . UICC ratio from .9 to .8
- . UWC ratio from 3.0 to 2.25

A revised edition of "360 Rates/Charge Estimator" is available.

In total these changes are expected to reduce our billing by almost \$300,000 per year, or slightly more than 10 percent.



Table I

## Measures of Relative Productivity (360/75)

	FY'73	FY'74	FY'75	FY'76
1000 Jobs Run	679	710	804	801
100K Execution Units	778	785	805	1149
100K CPU Minutes	221	215	234	349
Millions Lines Printed	401	415	483	596
Millions Cards Read	170	137	163	208

Table II

## 360/75 Relative Performance

Job Class	<u>CPU TIME BILLED</u>			<u>AVERAGE TURNAROUND</u>		
	April '74	April '75	April '76	April '74	April '75	April '76
A	4300	3001	4743	2:09	:30	:27
B	3060	3369	4351	4:58	1:13	1:10
C	2806	3598	3787	7:08	4:44	3:02
D	3260	2425	2447	9:09	8:37	7:51
E	1775	1798	940	9:51	11:04	10:15
F+G+Bulk	2581	7501	10437	24-36	12-14	10-14

April is usually the worst service month.

Temporary Employment File

CSO maintains a file of information forms on those persons who are seeking employment as part-time or temporary programmers, statisticians or numerical analysts. Anyone wishing to be listed as available for such employment should complete an application form in the CSO Accounting Office, 134 DCL. In order to keep the file current, forms are discarded six months after submission. CSO accepts no responsibility for the evaluation and selection of candidates for such positions, when available.

Accounting for CYBER 175

Present plans call for an end to free time on the CYBER 175 on October 3, 1976. Accounting for resources used on the CYBER will begin October 4, 1976.

Watch for NEWS items and RJE Bulletins which will give complete details on the accounting policies and the availability of free time for program and data conversion.

## CDC NOTES

HELP Command on CYBER 175

The HELP command gives the time-sharing user a way to get information about system commands on-line. To use HELP, merely type HELP on your terminal. The system responds with:

FOR MORE HELP TYPE YES, OTHERWISE ENTER COMMAND DESIRED

If the user types YES, a complete list of the options available under HELP is printed, and the system prompts for a selection with a ?. If the user wishes a description of a particular command, at least three characters of the command must be entered to get a description. END at a prompt terminates the HELP session.

CDC Terminal Availability

Time-sharing terminals for the CYBER 175 are available as follows:

- |                    |              |             |
|--------------------|--------------|-------------|
| . CSO North        | 6 DECwriters |             |
| . CSO South        | 6 DECwriters | (Room 83)   |
| . Engineering Hall | 5 DECwriters | (Room 103b) |
|                    | 3 CRT's      |             |

Additional terminals, as listed on the Job Entry Sites reference guide, will be available shortly.

CDC Documentation

The following locally produced documents are available or will be available shortly from the CSO Accounting Office, 134 DCL:

- . Introduction to Batch Processing on the CYBER 175
- . Supplement to NOS Version 1 Time-Sharing User's Guide
- . Condensed XEDIT Guide
- . Fortran Differences (IBM/DEC/CDC)
- . Glossary of Terms for CDC

Comments or suggestions concerning CSO documents should be directed to Richard Chilausky, 166 DCL, 333-6236.

Census Tapes

Will any users who have Fortran programs which process 1970 census tapes please call Ed Krol at 333-2048.

## LANGUAGES

SPSS: Basic Statistics

This article describes how to use SPSS to get the mean, standard error, standard deviation, variance, kurtosis, skewness, range, minimum and maximum for each variable in a set of numeric data without missing values.

Prepare the following deck:

Card	Column 1	Column 16
	↓	↓
1	/*ID SYSTEM=EXPRESS	
2	/*ID PS= <u>ps#</u>	
3	/*ID CODE= <u>codeword</u>	
4	// EXEC SPSSG	
5	VARIABLE LIST <u>var1, var2, var3, ..., varn</u>	
6	INPUT MEDIUM <u>CARD</u>	
7	INPUT FORMAT <u>FIXED (Fi.j, Fk.l, ..., Fm.n)</u>	
8	N OF CASES <u>m</u>	
9	CONDESCRIPTIVE ALL	
10	READ INPUT DATA	
11		
.		
.	m data cards	
.		
m+10		
m+11	FINISH	
m+12	/*	

## NOTES:

Blanks are crucial and must be provided exactly as indicated. Items underlined must be provided by you; other items are mandatory.

- Card 0:        The first card of the deck must be a standard green job card which is available at the card readers.
- Card 1:        This card requests that the job be run on the EXPRESS system which is cheaper and provides faster turnaround than the HASP system.
- Card 2:        Insert your PS number where indicated.
- Card 3:        Insert your codeword where indicated.
- Card 4:        Requests the SPSSG system.
- Card 5:        Beginning in column 16 provide a unique name (beginning with a letter) for each variable of your data. The variable names should be separated by commas.
- Card 6:        Tells SPSSG that your data is on cards.
- Card 7:        Beginning in column 16 describe the format of each variable of your data.  $F_{i.j}$  means that this variable is punched in a field that is  $i$  columns wide and has  $j$  digits after the decimal point. The variable values should be punched in the same order and in the same columns of each data card. If a variable has integer values they should be punched rightmost in their respective fields with leading blanks, if any.
- Card 8:        Beginning in column 16, provide the number of observations in your data.
- Card 9:        Requests basic statistics on all the variables.
- Card 10:       Tells SPSSG that the data cards follow.
- Card 11 to  
Card  $m+10$  :    Insert your data cards here.
- Card  $m+11$ :    End of the SPSSG statements.
- Card  $m+12$ :    End of the job.

Submit the job (remember the green job card). When you get the output look for error messages which are explained towards the end of the output. If your program had an error, check the SPSS manual, see a consultant or ask another user for advice. After repunching the cards in error, submit the job again.

Known SPSS Errors

The following are known errors in SPSSV6, SPSSG, and SPSSM (reprinted from "SPSS Newsletter", No. 10, September, 1976.):

**AGGREGATE.** Standard deviation, skewness, and kurtosis are calculated incorrectly for weighted files. A correction for this error was mailed to all coordinators on July 6, 1976. In version G, values of group variables are printed with an incorrect format. This will be corrected in Release 7.0.

**ANOVA.** Option 9 (regression approach) calculates sums of squares incorrectly and should not be used. In option 10 (hierarchical approach), all covariate effects are adjusted for all other covariates rather than only for those entered earlier in the list as indicated in the manual. Both these errors will be corrected in Release 7.0.

**BREAKDOWN.** In integer mode, BREAKDOWN sometimes miscalculates the number of value labels for which there is space, which can produce a variety of symptoms. The problem can be avoided by always allowing at least 4100 bytes of workspace above what is needed for cell storage. Both varieties of BREAKDOWN will sometimes print negative variances when the variance should be zero, and the FASTBREAK option will produce FORTRAN error messages indicating attempts to take the square roots of negative numbers. These errors will be corrected in Release 7.0.

**CANCORR.** All chi-square statistics are exaggerated by a factor of  $N/(N-1)$  where  $N$  is the number of cases. The number of canonical variates is limited to 5. These errors will be corrected in Release 7.0.

**CONDESCRIPTIVE.** A loop can occur in the printing of the Z-score format table if more than 24 variables are used. A correction for this error will be distributed shortly. The program will fail with an SPSS error 1778 (I/O error) in trying to write the Z-scores from a subfile group in which all variables were missing on all cases. This will be corrected in Release 7.0.

**CROSSTABS.** Arithmetic underflow and overflow messages are sometimes generated by CROSSTABS in general mode when alphanumeric variables are processed. A correction for this problem was mailed to coordinators on July 6. CROSSTABS in general mode will blow up if enough workspace is provided to allow for more than 32766 cells. CROSSTABS in integer mode will fail if more than 32767 cells are required. These errors will be corrected in Release 7.0.

**DATA LIST.** Although the input format constructed by DATA LIST can be up to 1600 characters long, only the first 800 characters are printed. This error will be corrected in Release 7.0.

**DISCRIMINANT.** A one-dimensional scatter plot, rather than a histogram, is produced by option 7 when there is only one discriminant function. Classification of data groups does not work when the discrimination is on one variable only. Classification function coefficients are not printed when METHOD=DIRECT is used. It is not known at this point whether these errors will be corrected in Release 7.0



DO REPEAT. No check for unequal numbers of variables is made on the last list of variables. No message is produced, and the transformations included inside the DO REPEAT can generate garbage if the last list is short. This will be fixed in Release 7.0.

END REPEAT. A blank card following the END REPEAT will cause a spurious error message. This will be corrected in Release 7.0.

FREQUENCIES. The program will loop in printing histograms if any value has a frequency greater than 2 billion (which can happen in weighted files). In integer mode, the program will fail if a value range (maximum value - minimum value + 1) exceeds 32767. In general mode, it will fail if more than 32767 values are encountered for all variables. These limitations will be checked in Release 7.0 and processing will be skipped if they are violated.

INPUT FORMAT. In a BINARY format specification, no number greater than 249 will be interpreted correctly. A correction for this was mailed to coordinators on July 6.

LIST FILEINFO. If more than 200 value labels have been entered for a variable, the first 199 and the last variable entered are printed. In Release 7.0, this will be changed so that the last 200 are printed (since those will be saved if a SAVE FILE is done).

ONEWAY. When orthogonal polynomials are requested and the cell sizes are not equal, the sums of squares for deviation from the polynomial terms are incorrect (in fact, they can be negative). The sums of squares for the polynomial terms themselves are correct. Significance levels for range tests are limited to .001 through .20. The program can compute negative sums of squares because of precision limitations and does not protect itself very well, so it can generate FORTRAN error messages about negative square root and logarithm arguments. The program will fail if more than ten contrasts are specified. These errors will be corrected in Release 7.0.

OSIRIS VARS. Large or negative missing values are not correctly interpreted. The constructed input format is limited to 800 characters rather than 1600. Both these will be fixed in Release 7.0.

PEARSON CORR. This subprogram will fail if more than 32767 pairs are specified. The correlations produced are slightly less precise than those from REGRESSION or PARTIAL CORR because some of the intermediate calculations are done in single precision. These errors will be corrected in Release 7.0.

REGRESSION. The standardized residuals are calculated by dividing the residuals by the standard deviation of the dependent variable, rather than to their own standard deviation. Hence their variance is 1-R squared, rather than one. A division by zero may occur if there are no non-missing cases, or if the number of variables exceeds the number of cases. This will be corrected in Release 7.0.

SAMPLE and \*SAMPLE. An argument of 1 will be treated as .01. This will be corrected in Release 7.0.

SAVE FILE. If more than 200 value labels have been defined for a variable, the first 199 and the last one will be saved. In Release 7.0, the last 200 will be saved.



SCATTERGRAM. The program will fail if only one variable is specified in a variable list. This will be corrected in Release 7.0.

Transformations (IF, COMPUTE). The sequence "-0" will produce an SPSS error message indicating a missing operator. This will be corrected in Release 7.0.

VALUE LABELS. The keyword ALL is not accepted. This will be corrected in Release 7.0.

WRITE FILEINFO. The program will fail, usually with an SPSS error 1773 (attempt to read past the end of a data set), if it tries to process a DOCUMENT which originally occupied a number of cards evenly divisible by 10. A correction for this will be distributed shortly. The program also destroys any tabular alignment used in DOCUMENT cards. This will be corrected in Release 7.0.

General Errors. If a FREQUENCIES specification does not start with INTEGER or GENERAL, or if a CROSSTABS or BREAKDOWN specification does not start with VARIABLES= or TABLES=, any OPTIONS or STATISTICS card following the procedure card will cause SPSS error 1 (unrecognized control field). GET ARCHIVE does not work properly with EDIT. The program will fail if a READ INPUT DATA card is encountered without a prior VARIABLE LIST and INPUT FORMAT card or DATA LIST. These problems will be fixed in Release 7.0. SAVE ARCHIVE, when used after a permanent SELECT IF, gives unexpected results. Active variables are handled correctly, but incorrect values will be saved for other variables. SAVE ARCHIVE will be disabled after SELECT IF in Release 7.0.

#### A New Version of FUNPACK

Six new special mathematical functions have been added to the FUNPACK package for the IBM 360/75 and have been placed in FORTUOI. They are:

1. Modified Bessel functions of the first kind of order zero for real arguments ( $I_0$ )
2. Modified Bessel functions of the first kind of order one for real arguments ( $I_1$ )
3. Bessel functions of the first kind and order zero for real arguments ( $J_0$ )
4. Bessel functions of the first kind and order one for real arguments ( $J_1$ ).
5. Logarithmic derivative of the Gamma function (PSI).
6. Bessel functions of the second kind and non-negative real order for real positive arguments ( $Y_{nu}$ ).

The modified Bessel functions of the second kind ( $K_0$ ,  $K_1$ ) have been improved over the FUNPACK I package subroutines.

This version of FUNPACK is available only at NATS test sites until released for general distribution by Argonne National Laboratory, and are proprietary until that time. These codes have been carefully tested and we would like to encourage usage for on-the-site applications. Tests demonstrating accuracy of the programs are available.

To get documents:

```
/*SETUP UNIT=UIMATH
```

```
// EXEC MATHLIST,T=FUNPACND,R= { BESIODOC
                                { BESILDOC
                                { BESJODOC
                                { BESJ1DOC
                                { BESKODOC
                                { BESK1DOC
                                { BESYDOC
                                { MCNERDOC
                                { PSIDOC } ,OUT=A
```

The programs are compiled and in the FORTUOI library. To use them just call from a Fortran program as described in the subroutine documentation. They will be automatically loaded using UOI procs.

Please refer all comments and questions to Mary Ann Berg, 167 Digital Computer Lab., 333-6133 or 333-2048.

FUNPACK is not available on the DECsystem-10.

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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RETURN TO:

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134 Digital Computer Laboratory  
University of Illinois at Urbana-Champaign  
Urbana, Illinois 61801



# Off-Line

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OFF-LINE is the newsletter of the Computing Services Office at the University of Illinois at Urbana-Champaign. OFF-LINE is printed every month. Articles may be reprinted provided that the source of the article is noted. CSO operates an IBM 360 model 75 with one million bytes of fast core and two million bytes of slow core, under HASP and OS; a dual-processor DECSYSTEM-10 with 256K words of core, under TOPS-10, serving up to 80 simultaneously active terminals; and a CYBER 175 with 131K words of core and 256K words of ECS, under NOS, serving up to 50 simultaneously active terminals.

## POLICY

Organizational Changes

The following announcement was received from Dean George A. Russel, Vice Chancellor for Research.

Administrative responsibility for two principal computer-related units on this campus has been transferred to the Vice Chancellor for Research. The units involved are:

1. Computer-based Education Research Lab. (CERL)
2. Computing Services Office (CSO)

Directors of these units and the Director of the Center for Advanced Computation (CAC) will report through a newly created position of Associate Vice Chancellor to the Vice Chancellor for Research. As in the past, the internal management of each unit will continue to be administered by its respective Director.

The position of Associate Vice Chancellor for Research has been accepted by Professor Dillon E. Mapother. George F. Badger, formerly Associate Director of CSO, has been appointed Director of CSO. Professor Donald L. Bitzer continues as Director of CERL. Professor Hugh Folk has resigned as Director of CAC and a search is in progress to determine his successor. In the interim, Professor Mike Rieber is serving as Acting Director of CAC.

Charges on the CYBER 175\*

The charge mechanism currently in use on the CYBER 175 is based on a parameterized algorithm which accounts for a variety of resources used. The bulk of the charges is for CPU, memory and I/O usage, connect time, and printouts. Charges are given in terms of the System Resource Unit (SRU), an index of computer usage. Each SRU is charged at .01 service units (\$0.01).

The basic SRU formula is:

$$\text{SRU} = 10(\text{CP} + \text{IO} + .06(\text{CP} + \text{IO})\text{CM}) + 64$$

where CP = CPU time in seconds

CM = central memory in K words

IO = parameterized PRU transfer count

There are three basic intentions in the present charge mechanism.

- . Charge fairly on the basis of resources used.
- . Set prices so that most jobs cost the same (or less) as on present systems.



. Recovers costs.

The charge algorithm and prices have been calibrated so that charges will be about equal for jobs on which the CYBER is five to six times as fast and memory use converts six to seven bytes equalling a word. These have proven to be relatively conservative estimates. I/O is much more difficult to calibrate and we are collecting data on actual utilization for comparison.

There is a conflict between pricing and costs because of the cost effectiveness of the CYBER. This conflict will be resolved by price reductions as the load on the CYBER increases. The first review of prices will be for January 1, 1977. We request that you tell us about relative costs for identical jobs for use in establishing pricing policy.

---

\*Complete information on CYBER charges may be found in the reference guide RF 3.1 - "CYBER 175 Rates".

#### Establishing an Account on the CYBER 175

An account on the CYBER 175 consists of a charge number and project number. The project number is a PS number on the 360/75 and the charge number is the department which controls this number. To establish an account, a user must:

- . Have a PS number on the 360/75
- . Complete a CDC ACCOUNTING REQUEST form
- . Complete a CDC PROJECT REQUEST form

If a user does not have a PS number on the 360/75, a PS number must be created. Forms for all accounting requests can be obtained from the CSO Accounting Office, 134 DCL. It takes 24 hours to establish an account on the CYBER 175.

Once an account has been established, a time-sharing user responds to the "RECOVER/CHARGE:" prompt as follows:

CHARGE,dept,project#

Example: CHARGE,CSO,PS0001

A batch user inserts a charge card as follows:

CHARGE(dept,project#)

Example: CHARGE(CSO,PS0001)

Departmental control of charge and project numbers will not be available for approximately two months. A special seminar will be held for those people who are going to manage their user/department funding on the CYBER

when the control mechanism is complete.

#### Refunds

CSO does not give refunds for time-sharing jobs, 360 jobs which cost less than two service units, or CYBER batch jobs which cost less than two hundred system resource units (SRU's). The actual cost of a portion of a time-sharing session is too difficult to calculate and too open to dispute to allow the adoption of a uniform and fair policy, except that of not giving refunds at all. CYBER refunds will be given in the usual way. (The refund is given to the charge number, i.e. the 360 PS#.)

#### CSO Document and File Preparation Service

CSO is developing a document and file preparation service, located at 1208 W. Springfield Avenue in Urbana. In addition to the present keypunch service, it will include key-to-disk file preparation, final copy preparation on a printer with a Diablo print head, and consulting in the area of file preparation and the use of text formatter programs.

A major effort is currently under way to acquire a suitable text formatter program for installation and use on the CYBER 175. Potential users who have an interest in this selection process are urged to contact Ed Dewan, phone 333-8253. Also, comments and suggestions will be welcome concerning other aspects of this new service.

## CYBER

Will We Have FORTUOI on the CYBER?

People who have been using the FORTUOI library of local routines on the 360/75 will want to know what routines from that library will be available on the CYBER 175. This article provides a list of which routines from FORTUOI will be converted, and, for those not being converted, a list of routines from IMSL or MSL (Math/Science Library) which do (as nearly as possible) the same thing. If a routine is not being converted, but the user wants to have that particular routine and no other, he can be supplied with source code to effect his own conversion of that routine (assuming the routine is written in FORTRAN!).

For reference, the basic collection of FORTRAN-callable routines which will be available to users of the CYBER (aside from those described in Chapter 8 of the CDC FORTRAN Extended Manual) consists of:

1. IMSL Library

A leased library of mathematical, statistical and utility routines produced by International Mathematical and Statistical Libraries, Inc.

2. Math/Science Library (MSL)

A leased library of mathematical and statistical routines produced originally by the Boeing Corporation in 1968 and currently marketed by CDC under contract to Boeing.

3. EISPACK

An eigenanalysis package developed since 1970 by the National Activity to Test Software (NATS) and currently distributed by the Argonne Code Center at Argonne National Laboratory. The University of Illinois is a test site for NATS developed software.

4. FUNPACK

A special function package developed by NATS.

The current list of FORTUOI routines which will be directly converted to the CYBER is as follows:

DIFSUB	GQU3Z	GQU4Z	GQU5Z	GQU6Z	GQU7Z	GQU8Z	GQU9Z
GQU10Z	GQU11Z	GQU12Z	SQUANK	RANBZ	RAN3Z	COPYZ	SWAPZ
ZEROZ	BSCJZ	BSLJZ	BSLIZ				

In the next section, all FORTUOI routines are covered by subject area. If a routine is to be converted, this is indicated; otherwise correspondents for that routine in IMSL, MSL, or EISPACK are given, wherever possible. In some cases, there are several correspondents, indicated by a list of names separated by commas. Occasionally, the correspondent for a routine consists of a series of calls to more than one routine; this is indicated by a list of names separated by plus signs ("+" ). The remark "not exact" means that a routine does not do quite the same thing as the FORTUOI routine it corresponds to, or that the algorithm used is different from that of the FORTUOI routine.

Detailed documentation on the IMSL and MSL routines is available, as follows: For IMSL, there are CDC IMSL manuals in the Consulting Office in 166 DCL, in the manual rack in the keypunch room at DCL, at the Chemistry RJE, and at the SOUPAC Office at Commerce West, as well as forthcoming procedures for using on-line IMSL documentation; for MSL, there is presently only one copy of the complete MSL Manual in the Consulting Office, 166 DCL. On-line documentation for EISPACK and FUNPACK will be available.

### Linear Algebra (Not Including Eigenvalue Problems)

<u>FORTUOI</u>	<u>IMSL EQUIVALENT(?)</u>	<u>MSL EQUIVALENT(?)</u>
DOTP	VIPRFF	VIP, VIPD
HOUSEZ	EHOUSS	(NONE)
INV1Z	LINV2P	PDITRM
INV3Z	LINV1P	PDLSOM
MINVZ	LINV1F	INVERS
ORT3Z	LINV2F (not exact)	
ORT4Z	LINV1F (not exact)	DCBHT + BSUBHT
XINVZ	LINV1F (not exact)	INVERS
MDETZ	LINV3F	DECOM + DETERM
CHOL1Z	LEQT2P	PDITRM
CHOL3Z	LEQT1P	PDLSOM
CHOL4Z	LEQ1PB	BLESOM (not exact)
DGELGZ	LEQT1F	GLESOM
GAUSZ	LEQT1F	GLESOS
SCSLEZ	LEQT1C	CGLESM

### Eigenvalue Problems

None of the FORTUOI eigenvalue routines (except EISPACK) will be in the standard subroutine libraries on the CYBER. All calls to FORTUOI eigenvalue routines other than EISPACK should eventually be converted to calls to EISPACK routines.

For documentation on EISPACK, see Mary Ann Berg or Stanley Kerr.

For those users who insist on using the same FORTUOI eigenvalue routine on the CYBER, a private copy of the source for any such routines can be supplied for the users individual conversion.

No table of correspondents is given here, since handling an eigenvalue problem usually requires calling a series of routines; we would have to give a series of FORTUOI routines for a specific problem, on one hand, and a corresponding series of IMSL, MSL, or EISPACK routines, on the other. It would be best to consult EISPACK documentation for handling of a particular eigenvalue problem, or see Stanley Kerr or Mary Ann Berg for help.

### Test Matrices

At the present time, we are not planning to convert any of the test matrix routines in FORTUOI, nor do we know of any equivalents in IMSL or MSL. Let us know if this affects you.

Zeros of Polynomials

<u>FORTUOI</u>	<u>IMSL EQUIVALENT(?)</u>	<u>MSL EQUIVALENT(?)</u>
RSSR	ZPOLR, ZRPOLY	PROOT
TRAUBZ	ZCPOLY	HELP, MULLP, CPOLRT

Simultaneous Non-Linear Equations

<u>FORTUOI</u>	<u>IMSL EQUIVALENT(?)</u>	<u>MSL EQUIVALENT(?)</u>
BROWNZ	ZSYSTEM	NONLIQ, QNWT, RQNWT
NOLINZ	ZSYSTEM (not exact)	NRSRG, NEWT

Ordinary Differential Equations

<u>FORTUOI</u>	<u>IMSL EQUIVALENT(?)</u>	<u>MSL EQUIVALENT(?)</u>
DGEARZ	DVOGER (not exact)	
DIFEQZ	DVOGER	
DIFSUB:	to be converted (but the CDC version will be single precision)	

Partial Differential Equations

<u>FORTUOI</u>	<u>IMSL EQUIVALENT(?)</u>	<u>MSL EQUIVALENT(?)</u>
ADIPZ	no correspondent	no correspondent

Quadrature (Numerical Integration)

<u>FORTUOI</u>	<u>IMSL EQUIVALENT(?)</u>	<u>MSL EQUIVALENT(?)</u>
FSER1Z	DCADRE (not exact)	ROMBG, QUAD (not exact)
GQU3Z:	to be converted	
GQU4Z:	to be converted	
GQU5Z:	to be converted	
GQU6Z:	to be converted	
GQU7Z:	to be converted	
GQU8Z:	to be converted	
GQU9Z:	to be converted	
GQU10Z:	to be converted	
GQU11Z:	to be converted	
GQU12Z:	to be converted	
PWNZ:	no correspondent	
QUA1Z	DCADRE (not exact)	GMI (in some cases)
QUA2Z	DCADRE (not exact)	GMI (in some cases)
QUA3Z	DCADRE (not exact)	GMI (in some cases)
SQUANK:	to be converted	

Random Number Generators

<u>FORTUOI</u>	<u>IMSL EQUIVALENT(?)</u>	<u>MSL EQUIVALENT(?)</u>
----------------	---------------------------	--------------------------

RANBZ: to be converted

RAN3Z: to be converted

Sorting

<u>FORTUOI</u>	<u>IMSL EQUIVALENT(?)</u>	<u>MSL EQUIVALENT(?)</u>
----------------	---------------------------	--------------------------

FSORTZ                VSORTP

ISORTZ                VSORTP (not exact)

SORTZ: Use the FORTRAN-to-SORT/MERGE interface routines described  
in Chapter 8 of the FTN Manual.

Miscellaneous Utility Routines

<u>FORTUOI</u>	<u>IMSL EQUIVALENT(?)</u>	<u>MSL EQUIVALENT(?)</u>
----------------	---------------------------	--------------------------

COPYZ: to be converted

COREZ: no correspondent

SWAPZ: to be converted

ZEROZ: to be converted

FIO99Z: use encode and decode statements

FCNVZ: use encode and decode statements

Special Functions

<u>FORTUOI</u>	<u>IMSL EQUIVALENT(?)</u>	<u>MSL EQUIVALENT(?)</u>
----------------	---------------------------	--------------------------

BESK0: part of FUNPACK, will be available

BESK1: part of FUNPACK

BSCJZ: to be converted

BSLIZ: to be converted

BSLJZ: to be converted

DEI: part of FUNPACK

DELIPE: part of FUNPACK

DELIPK: part of FUNPACK

DDAW: part of FUNPACK

Printer Plotting

<u>FORTUOI</u>	<u>IMSL EQUIVALENT(?)</u>	<u>MSL EQUIVALENT(?)</u>
----------------	---------------------------	--------------------------

PLOTEZ                USPLH, USPLX

YPLOT, XYPLOT

PLOTZ                 USPLH, USPLX

YPLOT, XYPLOT



Arithmetic and Logical Operations

<u>FORTUOI</u>	<u>IMSL EQUIVALENT(?)</u>	<u>MSL EQUIVALENT(?)</u>
DIAZ	no correspondent	no correspondent
IANDZ:	This function is performed by a CDC FORTRAN built-in function.	
IORZ:	This function is performed by a CDC FORTRAN built-in function.	
IXORZ:	This function is performed by a CDC FORTRAN built-in function.	
NOTZ:	This function is performed by a CDC FORTRAN built-in function.	

Complex ArithmeticFORTUOI

DIMAGZ: no correspondent; CDC FORTRAN has no double precision complex  
 DREALZ: no correspondent; CDC FORTRAN has no double precision complex

Operations on Polynomials and Power Series

<u>FORTUOI</u>	<u>IMSL EQUIVALENT(?)</u>	<u>MSL EQUIVALENT(?)</u>
ECON1Z	no correspondent	no correspondent
POLVAZ	no correspondent	EVREAL

Interpolation

<u>FORTUOI</u>	<u>IMSL EQUIVALENT(?)</u>	<u>MSL EQUIVALENT(?)</u>
DVDIFZ	no correspondent	no correspondent
POL1Z	no correspondent	AITKEN (not exact)
POL2Z	no correspondent	AITKEN (not exact)
SPL1Z	ICSICU	UNCSPL

Curve and Surface Fitting

<u>FORTUOI</u>	<u>IMSL EQUIVALENT(?)</u>	<u>MSL EQUIVALENT(?)</u>
CFIT3Z	no correspondent	MINRAT, CFOME
ORT1Z	LLSQAR	????
ORT2Z	LLSQAR	????
RAMEZ	IRATCU	no correspondent
WLSQZ	LLSQAR	FLSQFY

Minimizing or Maximizing a Function

<u>FORTUOI</u>	<u>IMSL EQUIVALENT(?)</u>	<u>MSL EQUIVALENT(?)</u>
BROMNZ	ZXMIN	no correspondent
FLPOMZ	ZXMIN	no correspondent

CYBER Allocations

With the installation of the CYBER 175 the computing capacity of CSO was greatly increased. Later articles will explain how allocations and prices will be affected. For the immediate future users should be aware of the following:

1. Research Board emergency allocations for use of the CYBER during the present allocation period (until December 31, 1976) can be requested by writing to:

Linda S. Wilson  
330 Administration Building  
Campus

These requests should be made at the departmental level, as departmental allocations are exhausted, or in anticipation of their becoming exhausted. These should reflect work done or to be done on the CYBER, since the capacity of other machines is rather fully committed.

2. Research Board allocation requests for the next period (January 1, 1977 to June 30, 1977) may be expanded to reflect work to be done on the CYBER. Information is contained in the solicitation letter. Priority for all increases will go to those planning their work for the CYBER.
3. The service unit, as a defined amount of work, will remain relatively constant over the life of the machine, and between machines. The dollar price of service units, which affects only real money users, will be reduced periodically as utilization grows. This means internally funded users will grow via increased allocations of service units, while externally funded users will grow via the number of service units a dollar will buy.
4. Conversion funding, via an internal CSO allocation, is available through the Consulting Office.

Comments on Short Courses?

As of November 11, 1976 we will have completed our first semester of short courses devoted to using the CDC CYBER 175. We will give the same courses beginning again in the spring semester, at which time we hope to add a few more topics. In the interim, we would appreciate any comments you have about the courses that were offered, and what you would like taught that has not yet been offered.

Please include any of your opinions about the length of courses, the hours and days they were offered, and the presentations by the instructors.

Please forward any responses to:  
CSO Short Courses  
187 Digital Computer Lab.  
Campus

Thank you for your help.

## LANGUAGES

### Mixed Integer Programming

The contract for the Mixed Integer Programming (MIP) package on the IBM 360 expires on December 31, 1976. The contract will not be renewed.

## MISCELLANEOUS

### CSO Staff Office Changes

The Keypunch Service (Norma Jenkins), Documentation Services (Ed Dewan) and the Manager of RJE Services (Bob Skinner) have moved from the Digital Computer Lab. to 1208 West Springfield. The phone numbers for these areas are as follows:

. Norma Jenkins	333-6184
. Ed Dewan	333-8253
. Bob Skinner	333-4488



# Off-Line

VOL. 4, NO. 11 DECEMBER, 1976

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## SPECIAL ISSUE

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OFF-LINE is the newsletter of the Computing Services Office at the University of Illinois at Urbana-Champaign. OFF-LINE is printed every month. Articles may be reprinted provided that the source of the article is noted. CSO operates an IBM 360 model 75 with one million bytes of fast core and two million bytes of slow core, under HASP and OS, a dual-processor DECsystem-10 with 256K words of core, under TOPS-10, serving up to 80 simultaneously active terminals, and a CYBER 175 with 131K words of core and 262K words of ECS, under NOS, serving up to 50 simultaneously active terminals.

## Introduction

With the successful installation of the CYBER 175, many of the plans for the coming year are becoming much firmer. This special issue of OFF-LINE is intended to update information on a variety of topics related to the services offered on the CYBER and the phasing out of the services offered on the DECsystem-10 and the IBM 360/75. The basic schedule, as given below, remains the same. The DEC-10 will be removed in late June with the 360/75 scheduled to be removed approximately one year later.

However, the details of the configurations will be changing and some of the services now offered on the older systems will be replaced by similar or identical services on the CYBER. In addition to this special issue of OFF-LINE, we plan to conduct two user meetings near the beginning of school in January. One session will treat statistical, mathematical and other packages; the other, languages and utilities. The location and time of these meetings will be announced approximately two weeks in advance.

### Basic Schedule of Machines

	<u>360/75</u>	<u>DEC-10</u>	<u>CYBER 175</u>
Jan., '77	As Is	As Is	80-100 ports + more RJE's 15-20% converted
Feb., '77	Reduce Tape Drives	As Is	Same
May, '77	Reduce Disk and Printer	As Is	Same 50-60% converted Some courses moved
Sept., '77	Continued As Is	Removed	Increase disk, memory, ECS 150-200 ports + most RJE's Most courses use for first time
May, '78	Switch to Remote Service	-----	300 ports + all RJE's 90% converted
Sept., '78	Remote IBM Service	-----	Same



### Allocation of Funds and Pricing of Services

With the conversion to a much more cost-effective computing system an extensive review of the allocation process and the pricing of services was done.

There are three types of funds used for purchasing services from CSO:

- . Campus funds allocated through the Research Board to departments;
- . Campus funds allocated through the Committee on Instructional Computer Use for support of course work;
- . External funds which are a part of grants and contracts.

The Research Board has been under pressure for several years because of the limited amounts of resources available. They have released additional funds through emergency allocations in the six month period ending December 31 and for the coming six month period have allocated approximately 50% more than in the past. These allocations were not given on an across the board basis but through a systematic review of applications down to the level of projects, The instructional funds have not yet been reviewed for the coming semester but that review will have taken place by the time this issue reaches you. Externally funded users are not directly affected by the allocation process but rather by the pricing policies which are reviewed later.

All allocations are given in terms of service units. A decision has been made to define the service unit as a uniform amount of work independent of the system on which it was run. This has been discussed with the Research Board without any objection on their part. This means that when the amount of work processed on a new system exceeds the work processed on earlier systems, allocations of service units will be increased to handle the demand. Also, the new system will not be fully committed at the beginning of its life but rather an orderly growth through the allocation process will preserve a good level of service over the entire life of the machine.

Aside from the initial increase of approximately 50% for the initial six month period, the allocations can grow by approximately 10% each six month period reaching saturation of the machine after the end of its seven year projected life.

For those who deal with CSO in terms of campus allocations, this growth will occur without their having to take the price of a service unit into account. For those who deal with CSO in terms of external funds, it means that a frequent lowering of prices will occur so that a financial balance of expenses and income is achieved. This price decrease would approximately match the increase in allocation that is going on in general since the projected budget is identical for each year. At the same time, we will attempt to maintain equal costs for a unit of work accomplished on any machine. Since each machine is most cost-effective doing certain things, this is an objective rather than something we will achieve. We certainly expect people to find some services which are most cost-effective for their own application on a particular machine.

In October of this year CSO announced a number of price decreases which amounted to a reduction in costs of approximately 12% to 15%. These affected all users whether they were campus funded or externally funded. This reduction was accomplished by lowering individual prices on line printer output, etc., and by changing the definition of an execution unit. This kind of price change was a one time occurrence and is not consistent with the method we plan to use in the future.

#### REDUCED MEMORY PENALTY

Historically, CSO has placed very heavy emphasis on memory utilization. Thus, the use of a large region on the 360/75 could raise the hourly rate by a factor of four to five over the use of a very small region. Effective January 1, 1977, we are reducing the emphasis on core on the CYBER. We have done this in such a way that the composition of work under the new equation yields exactly the same billing as the old equation. Though there is a discontinuity in definition, there is an equivalence of results so that when we present information on the number of service units produced there will be comparability over the last several years.

A revised billing algorithm for the CYBER will be the first place which reflects the reduced emphasis on core and that will be available by January 1, 1977. In addition, there will be some reduction in the I/O portion of the charges on the CYBER to better align I/O charges on the CYBER with present 360/75 I/O charges. Based on the data we gathered during the last few months, we feel that this adjustment is necessary to realize our attempt to maintain equal prices for a unit of work on both machines.

#### Equipment and Software Conversion Plans

We will begin to discontinue services at the earliest opportunity on the other machines as services which are direct replacements become available on the CYBER.

A few of the services to be discontinued during the next few months, with tentative schedules, are given below. If you have evidence that these schedules will interfere with your own work, please let us know so that we can either resolve the problem or modify our schedules.

The seven track tape drive on the 360/75 will be discontinued as of February 1, 1977. We have contacted all those who have used it during the past three months and feel that the CYBER replacement will be adequate.

Batch submission by means of editing on the DEC-10 and submission over the link will be discontinued on March 1, 1977. A complete replacement of this facility does exist with the completion of the BOSS editor which resembles SOS on the DEC-10, installation of TIELINE between the CYBER and 360/75 so that output can be routed to all of our Remote Job Entry sites (RJE's) and installation of an adequate number of

terminals so that the work currently done on the DEC-10 can indeed be completed on the CYBER. There will be a short course offered in February on how to use the TIELINE facilities for those who have used the SOS/UOI combination. Again, we have lists of those PS numbers which have been major users of this facility and will be contacting them.

The BASIC language facility will be removed from the DEC-10 on February 1, 1977. A more extensive facility already exists on the CYBER.

The PASCAL processor is being considered for removal approximately February 1, 1977. A PASCAL processor is available on the CYBER with comparable facilities.

In addition to removal of these facilities there will be minor changes in configuration. These will be announced only when they represent a discontinuation of an entire service rather than when, for example, the number of disk drives is reduced from ten to nine.

Comments on these changes should be sent to George F. Badger, Jr., Director of CSO, Room 150 DCL.

#### CYBER Accounting Modifications

CDC's accounting system is being modified to distribute more control to the departments and users. By the middle of the spring semester we hope to provide the following changes:

- . Validations limits (such as time, file space, etc.) will be established at the project level rather than the user level. Presently, if a user belongs to several projects, he must have his limits set large enough for the worst case. Under the new system, the limits will be determined by which project he logs in under.
- . The enrollment of users under projects will not need to be done by CSO. Optionally, a project can have a designated manager with authority to add users and set their validation limits.
- . File space will be accounted for on the basis of which project a user was logged into when a file was created.

The first two changes will drastically reduce the paperwork processed by CSO and will give the managers of projects firm control of project fund usage.

In the future, further changes will be made:

- . Projects will not necessarily be associated with a 360/75 PS number and department managers will be able to create projects themselves.
- . Programs will be provided which users, project managers and department managers may use to generate their own usage reports.

### Full Schedule

On January 12, 1977, the CYBER will be placed on a full operating schedule. The precise hours will be announced. Weekday service will begin at 8:00 AM and will continue until at least midnight.

### TIELINE

TIELINE is the program which drives the link between the CYBER and the 360/75; currently it can send jobs (card images) in both directions, and it can receive printed and punched output from the 360/75.

Although the card readers and printers at the RJE's are presently connected to the 360/75, it is possible to use them to send and receive jobs from the CYBER (see HELP files). However, the present method for printing CYBER jobs at RJE's is rather clumsy and a project is underway to provide these capabilities more naturally.

The new version of TIELINE takes files out of the CYBER print queue and sends them to the 360/75, routed for print at the proper RJE. This TIELINE is being tested and should go on the system around the beginning of January, 1977. There will be no 360/75 execution queue delay for this service.

Towards the end of the summer of 1977, it is expected that RJE stations will begin to be linked directly to the CYBER which will pass jobs on to the 360/75 and collect output.

### Conversion to the CYBER

Early in the fall of 1977, CSO sent letters to all the prime users of the 360/75 explaining our conversion policy and the procedure to follow to initiate conversion to the CYBER. At that time the consulting staff began writing a set of conversion aids. We now have a program to convert IBM FORTRAN to CYBER FORTRAN, a program to convert double precision FORTRAN to single precision, a program to convert binary data, and a conversion aids document. These aids are available, and we have gained more experience on the CYBER and know how to process user programs and data at a faster pace.

Since less than 5% of the user community has begun the conversion process, we anticipate that requests for consultant help will increase rapidly as the time for the removal of the DEC-10 approaches. We have encountered no major conversion difficulties and, in fact, have acquired many satisfied CYBER users. Additional short courses on the CYBER will be offered in January and February. These courses will be beneficial for people converting to the CYBER. Any questions regarding conversion should be directed to Carmen Governale (333-2048).



### Statistical Packages

Presently SPSS, SPSS/ONLINE and MULV are available on the CYBER; however, complete documentation, conversion facilities and full consulting services for SPSS and SPSS/ONLINE will not be available until early in the spring semester. Users with data on cards may find a considerable cost advantage in using MULV on the CYBER now, but those with data on disk and tape are urged to wait until next semester when data conversion processes are better developed at CSO South.

Work continues on converting and testing SOUPAC to run on the CYBER. It is expected that a subset containing MATRIX, TRANSFORMATIONS and BALANOVA will be available sometime during the spring semester.

### CYBER Software Status

The following languages and processors are or will be available on the CYBER:

<u>Language or Processor</u>	<u>Status</u>
ALGOL60	On the system
ALGOL68	On the system on a trial basis
APEX-III (linear programming)	On the system
BASIC	On the system
CALCOMP	To be installed in February
COBOL	On the system
COMPASS (assembler language)	On the system
FTN (optimizing FORTRAN compiler)	On the system
GCS (plotting)	To be installed in January
GPSS-V (general purpose simulation)	On the system
LISP	To be installed in January
MNF (fast FORTRAN compiler)	To be installed in February
PASCAL	To be installed in January
SIMULA	On the system
SNOBOL	To be installed in January
SORT/MERGE	On the system
SPURT (discrete simulation)	To be installed in February
SYMPL	On the system





OFF-LINE's Mailing List

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Check one: ( ) New subscriber  
( ) Removal request  
( ) Address correction

New address: NAME \_\_\_\_\_  
ADDRESS \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
CAMPUS or Zip Code \_\_\_\_\_

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

COMMENTS:

RETURN TO:

OFF-LINE  
134 Digital Computer Laboratory  
University of Illinois at Urbana-Champaign  
Urbana, Illinois 61801



# Off-Line

VOL. 5, NO. 1 JANUARY, 1977

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OFF-LINE is the newsletter of the Computing Services Office at the University of Illinois at Urbana-Champaign. OFF-LINE is printed every month. Articles may be reprinted provided that the source of the article is noted. CSO operates an IBM 360 Model 75 with one million bytes of fast core and two million bytes of slow core, under HASP and OS, a dual-processor DECSYSTEM-10 with 256K words of core, under TOPS-10, serving up to 80 simultaneously active terminals, and a CYBER 175 with 131K words of core and 262K words of ECS, under NOS, serving up to 50 simultaneously active terminals.



On-line peripheral charges are based on one Service Unit (\$1.00) or 100 SRU's as follows:

Tape drive (setup)	100 SRU's per volume mounted
Card reader	105 SRU's per thousand cards read
Card punch	500 SRU's per thousand cards punched
Line Printer	64 SRU's per thousand lines printed
Disk storage**	2 SRU's per PRU per month (for indirect files actual use is charged, for direct files the multiple of 227 PRU's allocated is charged)

\* Note that these are weighted counts rather than integrals over memory size.

\*\*Charge will become effective about March 1, 1977.

#### Student Funds on the CYBER

Each semester the academic departments of the University train a large number of students in the use of computers. However, outside of regular course work, students do not have access to those facilities which they have learned to use. This restricts the students in their efforts to become a competent user of computers.

A new accounting mechanism on the CYBER identifies each user uniquely by University ID number. Therefore, each time a student takes a course that has a computer allocation the same identification is used, although different accounts are charged based on the department offering the course. At the end of the course the departmental allocation is no longer associated with the student, and he can accumulate no further charges against it. In order to allow access to the CYBER outside of courses, a general charge number will be available for use by students. The general charge will be associated with students as long as they are registered at the University.

The charge number will be reset to 3000 service units each week. The usage limits on the CYBER will be:

<u>Quantity</u>	<u>Limit</u>
CPU time	8 seconds/job
Memory	25K words
Cumulative file size	64 blocks
File size	16 blocks
Number of files	16
Direct file size	0
Number of printed lines	512
Number of cards punched	0

No individual user may accumulate more than 250 service units in a six month period unless granted special permission. The privilege of individual students to use other than the very limited amounts of the allocation

to the general charge number will be restricted. To obtain larger amounts will require approval on a case by case basis.

## CYBER

### Printing CYBER Files

There is a new program called PRINT which allows you to print multiple files. The files are copied to a local file named PPPRINT, and this local file is disposed to the print queue. The file specified in the print command are not deleted. An eject is issued between files and at each end of section, EOS (or end of record, EOR) and end of partition, EOP (or end of file, EOF). A summary of the files printed follows the print listing. Assumptions made:

- . Files specified are local.
- . Files are rewound before and after being copied.
- . A blank is inserted in front of each line to be used as carriage control.
- . Each eject skips three lines.

Options which can be specified for each file:

- . /G do a GET on file if not local
- . /A do an ATTACH on file if not local
- . /CC do not insert a blank at the front of each line -- assumes carriage control characters are already on the file
- . /NR do not rewind the file before or after use

Options which apply to all files:

- . /EJ skip to new page at each eject (default is to skip three lines to save paper)
- . /COP=n to generate n copies of the print output -- this actually replicates all the files n times in the local file PPPRINT before disposing to the print queue.

Examples:

```
PRINT,TEST/G,DATA,OUT/CC/EJ
```



The files TEST, DATA and OUT are printed after the following actions are taken:

- . A GET is done on file TEST if it is not at local.
- . The addition of blanks to the beginning of each line of file OUT is suppressed.
- . Page eject carriage control characters are added between files and at all end of sections (EOS) and end of partitions (EOP).

```
PRINT,RESULT/COP=2
```

Prints two copies of RESULT.

Additionally, there is an option for specifying a remote site where you want your output printed. You specify this as /RJE=<remote site>. Valid remote names are the two to six character mnemonic as described in the CSO Reference Guide, "Job Entry Sites" RF-1.10. For example:

```
PRINT,MYPROG,MYDATA/RJE=COM
```

will print the two local files MYPROG and MYDATA at Commerce West (COM). The bin number will be the last two digits of your University ID number.

Also, specifying only PRINT/RJE=<remote site> simply flags the file OUTPUT to print at the remote site specified. It does not print the file OUTPUT immediately. Batch users will find this convenient for specifying where the output from the batch job is to print at completion of the batch job. The command can be issued at any time during the batch job. At termination of the batch job, the output, which is in the file OUTPUT, will print at the specified remote. For example:

```
PRINT/RJE=LH.
```

will flag the file OUTPUT to be printed at Lincoln Hall (LH) when the batch job terminates. The bin number will be 00. In the near future, the bin number for such jobs will be the last two digits of your University ID number.

### Control Language Procedures on the CYBER

This is the first of two articles about CYBER procedures and Control Language. The second article will appear in the February issue of OFF-LINE.

The CYBER has facilities for creating and using procedure files. A procedure file contains a series of batch control statements as would be used when submitting a job through the card reader. This file can be "called", meaning that the sequence of batch commands in the file is executed. Substitutions for names appearing in the control statements in the file can also be performed. Due to the general simplicity of CYBER batch control statements, it is relatively easy to write procedures. As an example, a FORTRAN program has been read through the card reader and stored in a file.

The lines of this program do not begin with line numbers which are required when running a FORTRAN program under the FTNTS time-sharing subsystem. To run it at a terminal, the BATCH subsystem must be used. The control statements must be entered as follows:

```
FTN,I=MYPROG,L=0,ER,T,D=MYPROG,REW.
LGO.
```

The ER, T, and D parameters are included since the program may still need bugging. This pair of control statements must be entered each time the program is run after it is modified. Instead, create a procedure file, say MYPROC, containing these two statements in it on separate lines. To execute these two statements enter only:

```
-MYPROC
```

or,

```
CALL,MYPROC
```

-MYPROC is allowed only in timesharing, as a convenience in typing. CALL,MYPROC can be used from cards, but a terminal period must be included:

```
CALL,MYPROC.
```

This procedure is more useful than it looks. All the various names which appear in it (FTN, I, MYPROG, L, ER, T, D, REW, LGO) can be replaced when MYPROC is called. For instance, the call

```
-MYPROC(MYPROG=OTHER)
```

would result in the following control statements being executed:

```
FTN,I=OTHER,L=0,ER,T,D=OTHER,REW.
LGO.
```

Thus, the procedure that was created to handle one case can be used for many other similar situations as well.

The basic idea is that any sequence of control statements which are repeated frequently should be put in a procedure file. The CDC documentation on procedures is in Chapter 4 of the "NOS Version 1 Reference Manual". The "Applications Programmer's Instant" has summary information on procedures in Chapter 2. The remainder of this article concerns additional features of the control language and of procedure handling.

#### PROCEDURE RETRIEVAL

Normally, the distinction between permanent and local files must be carefully observed. Therefore, before using or processing a permanent file, it must be made local by the GET or ATTACH command. There are a few exceptions to this rule and calling procedures is one of them. When a procedure is called, the system first looks for a local file of the same

name as the procedure. If the procedure file is not already a local file, the system does a GET (it will not do an ATTACH - a procedure file is assumed to be a small indirect-access file). If a procedure file can not be found among your permanent files, the system scans a system library and then scans the permanent files from user number LIBRARY, which is a common storage area for publicly accessible but non-CDC produced files. At this installation, procedures which are felt to be of universal interest will be stored in user number LIBRARY.

#### USEFUL CONTROL STATEMENTS

A procedure does not have to consist of a set of control statements which are always executed sequentially. It is possible to alter the flow of a procedure. The basic means of controlling the flow are the GOTO and IF control statements, which function like FORTRAN GOTO and IF statements.

The format of a control language GOTO is:

```
GOTO,<label>.
```

where <label> must be the label of a control statement. A control statement can be labelled implicitly by the name of the statement itself, or by preceding the statement with a name which starts with a digit and has up to seven letters and digits, followed by a comma. For example, in the following two control statements, the label of the first one is FTN, and the label of the second one is 10:

```
FTN,REW,I=FILE,L=0.
10,LGO.
```

These statements could be transferred to by processing control statements GOTO,FTN and GOTO,10, respectively. However, there is no rule against several control statements having the same label. GOTO transfers control to the first statement (from the top of the procedure in time-sharing and from the top of all your control statement when running a batch job from cards) with the specified label. If two statements have the same label, only the one which occurs first can be reached. It is also possible to do a GOTO when you call a procedure, by specifying what statement to start at (S=<label>). Suppose the above statements are in a file PROCA. Then the call

```
-PROCA,S=10
```

or,

```
CALL,PROCA,S=10
```

would cause the LGO statement to be executed first. The S= facility could be used to bypass certain control statements which have already been processed and do not need to be processed again.

The basic format of a control language IF statement is:

```
IF(<logical expression>)<control statement>
```

For example, the following are valid IF statements:

```
IF(NUM(PARM))GOTO,FTN.
```

```
IF(R1.EQ.10)COPY,A,B.
```

```
IF(OT.EQ.TXO)GOTO,10.
```

```
IF(.NOT.FILE(MYFILE,AS))GET,MYFILE.
```

To properly explain the use of IF requires examining a number of special symbols and functions available within the CYBER Control Language. The functions allow one to perform arithmetic tests on alterable quantities called job control registers (denoted R1, R2, R3); to test certain properties of local files (e.g. whether the files exists, whether it is indirect- or direct-access, whether it is a tape); to test certain properties of the job (e.g. whether it is a time-sharing job or a job running non-interactively from cards), and to test whether a procedure parameter was given as a pure string of digits.

The job control registers are three (18-bit) quantities which are kept for the entire execution of a job (or during an entire terminal session). These registers can be changed by a control language SET statement or by special calls from within running programs. There are no CDC-produced programs (including system commands) which change them other than the SET statement. The format of a SET statement is:

```
SET(<register>=<value>)
```

where <register> may be either R1, R2, or R3, and <value> may be any arithmetic expression involving the control registers and the special symbols as operands and addition (+), subtraction (-), multiplication (\*), and division (/) as operators. The following are valid SET statements:

```
SET(R1=100)
```

```
SET(R2=R2-1)
```

```
SET(R3=OT)
```

The SET statement can be used to communicate a value to a program which interrogates the job control registers, or to make a repetitive "loop" of control statements, as follows:

```
SET(R1=10)
REWIND,A,B.
5,COPY,A,B.
REWIND,A.
SET(R1=R1-1)
IF(R1.NE.0)GOTO,5.
```

This loop makes 10 copies of a file A in file B, with an end-of-partition (EOP) mark between copies. Two routines, SETJCR and GETJCR, are going to be added to the local FORTRAN library which will allow a FORTRAN program to change or interrogate the control registers.

The FILE function can be used to determine the status of any local file. Its general form of usage is:

```
FILE(<lfm>,<expression>)
```

where <lfm> is the name of a local file and <expression> is any valid control language arithmetic expression. The result of FILE may be used as either an arithmetic or logical quantity, in a SET or IF statement. The expression used in invoking FILE may involve certain pre-defined symbols (which are exhaustively detailed in Chapter 4, Volume 1 of the NOS Reference Manual) for checking attributes of a file. For instance, to determine if a local file of a given name exists at all, use the following reference:

```
FILE(<lfm>,AS)
```

Used as an arithmetic expression, it is 1 if <lfm> exists as a local file and 0 otherwise; used as a logical expression, it is "true" if <lfm> exists as a local file, and "false" otherwise. This might be used as follows:

```
IF(.NOT.FILE(XYZ,AS))GET,XYZ/ND.
IF(.NOT.FILE(XYZ,AS))ATTACH,XYZ.
```

When the first statement is processed, if XYZ is not a local file, a GET for XYZ is done. The ND specifies that if the GET failed (because XYZ does not exist or because it is a direct-access rather than an indirect-access file), proceed to the next control statement instead of aborting the procedure (or job). When the second statement is processed, if XYZ is local, proceed to the next control statement. If it still is not local, then the GET must have failed, so an ATTACH on XYZ is tried. If the ATTACH fails, the procedure or job is aborted. One peculiarity of file processing must be kept in mind. If a file is local, but has nothing in it, FILE will say it exists, but some programs which try to use the file will fail with the message FILE NOT FOUND.

It is also possible to get more specific information about a local file (e.g. is it the primary file, is it a non-primary working file, or is it a direct-access permanent file). In the following statements, R1 is set to 1 if XYZ is the primary file, R2 is set to 1 if XYZ is a non-primary working file, and R3 is set to 1 if XYZ is direct-access; otherwise each is set to 0:

```
SET(R1=FILE(XYZ,PT))
SET(R2=FILE(XYZ,LO))
SET(R3=FILE(XYZ,PM))
```

Also it is possible to find out whether a local file is a disk or tape file. The following invocation returns "true" if XYZ is a file on a 7 or 9 track tape drive:

```
FILE(XYZ,MT.OR.NT)
```



The NUM function can be used to test whether a procedure parameter has been given as a string of digits. NUM<name> is true if <name> consists only of digits, and false otherwise. Suppose MYPROC contains the following line:

```
IF(NUM(G))GET,F.
```

If the call is -MYPROC(F=XYZ), then the following statement will actually be processed:

```
IF(NUM(G))GET,XYZ.
```

and the GET will not be processed because G is not a string of digits. If, on the other hand, the call is -MYPROC(F=XYZ,G=1) then the following statement will be processed:

```
IF(NUM(1))GET,XYZ.
```

and the GET will be done. If a parameter is given as numeric, the value may be saved as follows:

```
IF(NUM(PARM))SET(R1=PARM)
```

This would be useful if the procedure contained a loop, and it was desired to control the number of times the loop was processed by giving the loop count as a parameter.

The DISPLAY statement is used to display the value of an expression in the dayfile. Its use is as follows:

```
DISPLAY(<expression>)
```

In the BATCH time-sharing subsystem, DISPLAY entered as a command directly at the terminal will result in the expression being displayed at the terminal as well as in the dayfile. This is because, in the BATCH subsystem, the last line that went into the dayfile as a result of doing a command or calling a procedure is echoed at the terminal. For example, the statements

```
DISPLAY(R1)
DISPLAY(FILE(XYZ,AS))
```

cause the value of R1 to be displayed in the dayfile (in both decimal and octal), and the value of FILE(XYZ,AS) (0 or 1) to be entered as well. If these were entered in time-sharing in the BATCH subsystem, the values would be displayed at the terminal. The DISPLAY statement is useful in learning things about SET and FILE at the terminal, or as a means of recording the progress or actions of a procedure in the dayfile for later inspection.



## IBM 360/75

Off-Line Plotting from the 360/75

CalComp 1163 plotter is available for off-line plotting. This plotter offers advantages over the CalComp 763 plotter which is on-line with the 360:

- . Three active pens
- . Wider paper for plotting
- . Better resolution

However, since the plotter is off-line, turnaround time is increased substantially (usually overnight). Plotting instructions may be generated for the 1163

- . Using CSO modified CalComp routines
- . Using pure CalComp routines

The CSO modified CalComp routines are documented in CSO's CalComp User's Guide and are the routines used with the on-line plotter with one addition and one exception.

Since the plot must go into hold so that it may be despoiled to tape, SPECIAL=YES must be specified as a plotting parameter, and a special handling card must be submitted for the job. For example,

```
// EXEC FORTLDPT,PARM.GO='SPECIAL=YES'
```

The routine, CCP1PN, provides a way to control the three pens available on the 1136. It is accessed as follows:

```
CALL CCP1PN(n)
```

where n=0 means pause  
 n=1 means select pen 1  
 n=2 means select pen 2  
 n=3 means select pen 3

There are no default pens on the 1136. Each pen to be used must be defined on the special handling card associated with the job. For example:

```
Pen 1 -- red ink
Pen 2 -- green ink
Pen 3 -- blue ink
```

The pause allows redefining the pens presently active. Instructions for pen changes at a pause must be given on the special handling card.

A call to CCP1M2 will cause the job to be incorrectly despoiled and should not be used with the 1163 plotter.

The default paper width is 11 inches. A width of 29 inches may be used. Avoid problems by specifying the width desired on the special handling card. Since the CalComp monitor controls the plot generation, neither the increased widths (vertical plotting widths of 11 and 34 inches) nor the increased resolution (smaller step size) are available when using the CSO routines.

The pure CalComp routines are documented in a CalComp reference manual available in the CSO North Consulting Office, Room 138 DCL. These routines are used to create a tape which has the plotter instructions on it. An example of the JCL to create such a tape is:

```

/*SETUP TAPE=PLOTAP,RACK=R240 RING PLEASE
// EXEC FORTLDGO,LIBFILE='SYS1.PLOTLIB'
      CALL PLOTS(0,0,8)
<program containing plot routine calls>
      CALL PLOT(0.0,0.0,999)
      STOP
      END
//GO.FT08F001 DD UNIT=TAPE,VOL=SER=PLOTAP,LABEL=(1,BLP),
// DCB=(RECFM=VS,BLKSIZE=368,PEN=2)

```

The unit number associated with the tape (nn in FTnnF001) is used in CALL PLOTS (in the example 8) to open the data set. The CALL PLOT with the required value 999 closes the output device. The tape must be 9-track, 800 BPI with DCB exactly as given in the example. To avoid problems, the dataset should be the first one on an unlabelled tape.

To have the information from the tape plotted, fill in a special handling card. Include the tape name and rack number as well as the definition of the pens and paper size.

NOTE: The use of these routines require more CPU time than the CSO routines and every origin reset results in a pause.

Pens currently available are red, blue, green, and black ballpoint and black India ink sizes .3, .4, .5, .6 and .8 mm.

The plot output is placed in the special tray at the south end of the Routing Room because the paper is too wide to fit conveniently in the plot bins. Ask at the Routing Room for the plot. Plots from tapes created by calls to pure CalComp routines will be identified by a written job name (if you created one for the special handling card) or by a written tape name or your name, whatever is unique for the plot. Other plots are identified by job name.

If problems are encountered using the off-line plotter, contact Darrell Nance, Room 194 DCL, telephone 333-2888, or the consultants, Room 138 DCL, telephone 333-6133.

OFF-LINE's Mailing List

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Check one: ( ) New subscriber  
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OFF-LINE is the newsletter of the Computing Services Office at the University of Illinois at Urbana-Champaign. OFF-LINE is printed every month. Articles may be reprinted provided that the source of the article is noted. CSO operates an IBM 360 Model 75 with one million bytes of fast core and two million bytes of slow core, under HASP and OS, a dual-processor DECsystem-10 with 256K words of core, under TOPS-10, serving up to 80 simultaneously active terminals, and a CYBER 175 with 131K words of core and 262K words of ECS, under NOS, serving up to 50 simultaneously active terminals.

## POLICY

### Conversion to the CYBER

CSO offers three types of assistance for converting to the CYBER:

- . Conversion aids
- . Conversion funds
- . Conversion consulting

The conversion aids are:

- . A program to convert IBM FORTRAN to CYBER FORTRAN
- . A program to convert double precision FORTRAN to single precision
- . A program to convert binary data
- . An IBM/CDC/DEC FORTRAN Differences document
- . A FORTRAN Conversion Guide
- . A Data Conversion Guide

Ample conversion funds are available for converting programs and data. These funds are available through CSO specifically for conversion.

Conversion consulting is available on an individual basis. A consultant will convert one working program to the CYBER and any tapes which are necessary. The consultant will then discuss the steps necessary to complete your conversion and will assist you with any problems that arise.

If you desire either conversion consulting or funds complete the conversion form on page 11 and return it to the Consulting Office, Room 138 DCL.

Since less than 20% of the user community has begun the conversion process, we anticipate that requests for consultant help will increase rapidly as the time for the removal of the DEC-10 approaches. We have encountered no major difficulties and, in fact, have acquired many satisfied CYBER users. Additional short courses on the CYBER will be offered in February. These courses will be beneficial for people converting to the CYBER.

### Open User Meetings

Two user meetings will be presented during the second week in February. The first meeting will be held on Monday, February 7 from 2:00 to 3:30 PM at 114 David Kinley Hall; the second, Thursday, February 10 from 2:00 to 3:30 PM at 198 Coordinated Science Lab. All interested persons are encouraged to attend.



### CSO Accounting Office Changes

The CSO Accounting Office is in the process of reorganizing. The user community will be informed of changes via OFF-LINE and CSO User Meetings.

The first changes to take place, by February 1, 1977, are:

- a. CSO Accounting will send only the following information to the prime user and department:
  - . Information sheet for new PS# requests
  - . Warning information sheets when account funds are 90% depleted
- b. Users or departments will no longer receive:
  - . Warnings when PS#'s or accounts are being deleted for non-use
  - . A xerox copy of submitted PS or account forms
  - . Any notice at all for PS/ACCOUNT/PPN changes (Use PSINQ to determine your PS/user status.)
  - . A copy of CDC forms submitted

### Tape Storage

Due to a lack of storage space, unused or infrequently used tapes cannot be stored. All departments which have tapes stored in Room 194 DCL are requested to remove their tapes from February 7 through February 11.

### Tape Cleaning

Tape cleaning is being scheduled for the week of February 14. If you do not wish to have your tape cleaned call 333-2888 and give the name and rack number of your tape.

### 360 Job Submission from the DEC-10

Batch submission by means of editing on the DEC-10 and submission over the link will be discontinued on March 1, 1977. A complete replacement of this facility does exist with the completion of the BOSS editor on the CYBER, installation of TIELINE between the CYBER and 360/75 so that output can be routed to all of our Remote Job Entry sites and installation of an adequate number of terminals so that the work currently done on the DEC-10 can indeed be completed on the CYBER. There will be a short course offered in February on how to use the TIELINE facilities for those who have used the SOS/UOI combination.

PL/I Checkout Compiler to Be Discontinued

Over the past few months, use of the PL/I Checkout compiler has declined and now it accounts for only a few percent of all PL/I compilations. The cost of the Checkout compiler is greater than that of the almost functionally identical Optimizing compiler which accounts for most PL/I compilations.

Because this disparity between cost and utilization is so great, CSO will discontinue the Checkout compiler on May 31, 1977. If this causes undue hardship, please let us know.

## CYBER

NOS Version 1 Reference Manual

A revised edition of the CDC NOS Version 1 Reference Manual, Volume 1, is now available in Room 164 DCL. The old edition can be exchanged for the revised edition free of charge.

Printing CYBER Files

The following functions have been added to the PRINT command on the CYBER. These functions are now being tested and should be available as documented by February 10, 1977. PRINT applies only to jobs sent from the CYBER to a 360 RJE for printing.

## . BIN NUMBER

The default bin number is the last two digits of the University ID. The bin number may be changed by specifying BIN=<bin number> where <bin number> may be a 1 or 2 digit number. For example:

```
PRINT,MYFILE/RJE=COM/BIN=99
```

will send the file MYFILE to print at Commerce West with the bin number 99.

## . JOBNAME

The default jobname for a file, including OUTPUT, is the name of the file. If more than one file is printed, the jobname is the name of the first file. For example:

```
PRINT,MYFILE,MYDATA/RJE=COM
```

will send the files MYFILE and MYDATA to print at Commerce West with a jobname of MYFILE.

The jobname may be changed by specifying JOBNAME=<chosen jobname> where <chosen jobname> may be from 1 to 7 characters long. For example:

```
PRINT,MYFILE,MYDATA/RJE=LH/JOBNAME=MYPRINT
```

will send the files MYFILE and MYDATA to print at Lincoln Hall with the jobname MYPRINT.

. SPECIAL FORMS

The default is the standard forms used at the print destination. All forms options are described in the CSO reference guide RF 1-1, "ID Cards" and may be used by specifying FORMS=<parm>, where <parm> is one of the parameters specified in RF 1-1. For example:

```
PRINT,MYFILE/RJE=LOCAL/FORMS=REVERSE
```

will send MYFILE to CSO North to print on reverse forms at 8 lines per inch.

. PROGRAMMER NAME

The default name is the CYBER user number. The name may be changed by specifying NAME=<name>, where <name> may be up to 7 characters long. For example:

```
PRINT,MYFILE/RJE=COM/NAME=FLASH
```

will send MYFILE to print at Commerce West with the programmer name of FLASH.

### Control Language Procedures on the CYBER

This is the second of two articles on using procedure files on the CYBER. The first article appeared in the January issue of OFF-LINE and discussed the basic use of procedures as well as some of the control statements and functions which enhance their utility (GOTO, IF, DISPLAY, FILE).

An error was made in the discussion of the FILE function (Page 8). In the example:

```
IF(,NOT,FILE(XYZ,A))GET,XYZ/ND
```

the ND should be NA to prevent aborting the job or procedure if the GET failed.

This part discusses some of the procedures which are in user number LIBRARY for general use. Your suggestions for procedures to be added or changes to existing procedures are welcome. Detailed instructions on the use of individual procedures can be had by issuing a "HELP" command while logged in, and then responding with the procedure name when queried by HELP. The descriptions below are not intended to be exhaustive.

USERLIB allows easy creation and maintenance of binary subroutine libraries. If you have a number of routines which are used heavily and changed seldomly, they should be separated from your main programs and made into a library. This procedure makes maintenance of such a library relatively easy.

TIDYPRC simplifies use of TIDY, a program used for renumbering, editing and general tidying of FORTRAN source programs. TIDY also converts simple IBM FORTRAN programs to CDC FORTRAN.

CONVPRC provides straightforward use of the locally written FORTRAN conversion utility, which should be used in conjunction with TIDY.

FILES provides a compact listing of the names of local files. It is usually more convenient to use than STATUS,F.

IMSLDOC is used to obtain individual writeups of CDC IMSL routines.

PAS simplifies the use of PASCAL, since PASCAL is currently stored in a private area and requires retrieval of both the compiler and the subroutine library.

FIXMODE automatically changes file permission on all public-access files from "write" to "read". This procedure was created because the natural way of making a file public-access

CHANGE,<filename>/CT=PU

allows everyone write permission on the file. The way to make a file public-access with read permission only is

CHANGE,<filename>/CT=PU,M=R

Procedures, projected but not yet written, concern easy access to math libraries when running programs, simplified use of packages such as SPSS, and easy access to assorted documentation. If you have ideas for procedures to write, or suggestions about how they ought to work, please contact the consultants.

In the next OFF-LINE, there will be a discussion of the operation of procedures which you may find useful, and of some changes to procedure handling which are being borrowed from other installations or developed here.

## LANGUAGES

Statistical Package Courses

CSO South and Social Science Quantitative Lab. are offering a series of non-credit workshops on the computer use of statistical packages. The emphasis will be on the use of programs and their functions rather than on statistics. It is expected that participants will have learned their statistics in traditional courses. The workshops to be offered this semester and the times are as follows:

Elementary SOUPAC: Tuesdays, 7:30-9:30 PM, Feb. 1 - Mar. 8  
Advanced SOUPAC: Tuesdays, 7:30-9:30 PM, Mar. 22 - Apr. 5  
SPSS: Wednesdays, 7:30-9:30 PM, Feb. 2 - Mar. 30  
MULV: Thursdays, 7:30-9:30 PM, Feb. 3 - Mar. 10

All workshops are open to U. of I. faculty, graduate students and staff. If you wish to enroll please obtain a registration form at CSO South (Room 84 Commerce West) or SSQL (Room 208 Lincoln Hall). Classroom assignments will be provided at that time. For further information call 333-2170 or 333-6750.

CYBER SPSS Documentation

Many facilities exist in the CYBER SPSS system which are not described in the burgundy SPSS manual. A brief description of manual differences can be obtained at no cost in the CSO Distribution Center (Room 164 DCL), the CSO South Consulting Office (Room 84 Commerce West), and the Social Science Quantitative Lab. (Room 208 Lincoln Hall). The SPSS user may wish to obtain the complete CYBER SPSS documentation which is available at the CSO Distribution Center. A description of documents and price schedule is as follows:

SPSS Manual	\$11.50
SPSS/ONLINE	1.50
MANOVA	2.45
RELIABILITY	1.60
A packet containing:	3.50
VER 6.5 BULLETIN	
ANOVA	
G3SLS	
JFACTOR	
NONLINEAR	
NPAR TESTS	
PLOT	
REGRESSION	
SUMMARY TABLES	
TETRACHORIC	

Status of SOUPAC on the CYBER

At present, Purdue University has completed the conversion of the SOUPAC monitor, matrix transformation, and approximately 50% of the statistical routines to their CDC machine. The CSO Statistical Services staff is at work installing portions of the Purdue version as they become available. Some of the difficulties encountered are a result of the differences between Purdue's operating system (their own) and ours (NOS). Additionally, we are implementing SOUPAC on the CYBER utilizing the CDC FORTRAN Extended compiler while they are utilizing a different FORTRAN compiler.

We expect to be able to offer the matrix capabilities of SOUPAC around the first week in February. At that time handouts will be made available giving instruction in the use of this feature of SOUPAC on the CYBER. As other portions of SOUPAC become available, we will announce them and provide handouts when appropriate. It is expected that a complete CYBER SOUPAC will be available sometime late this summer.

If you have any questions concerning this matter or concerning Statistical Services in general, please call 333-2170. Our offices are located in Room 84 Commerce West.

CYBER SPSS Errors

The following is a list of known errors in the CYBER SPSS batch and SPSS/ONLINE systems. These errors will be fixed in a new release which will be made available in May.

## CYBER SPSS BATCH ERRORS

COMPUTE,IF COUNT,RECODE	If more than 5000 data transformations are requested only the first 5000 are done correctly.
CONDESCRIPTIVE FREQUENCIES	Does not allocate memory correctly when the input record length is very large.
CROSSTABS (integer mode)	When a list of variables is specified (e.g., A BY B BY C,D,E), partial gammas are computed incorrectly for all tables involving the second through nth variables in the list.
CONDESCRIPTIVE	When Z-scores are requested for fewer than three variables they are not computed correctly.
MANOVA	The residual sum of squares matrix is not initialized with matrix input.
DO REPEAT	A workspace of 800 words is allocated for storing the stand in variable names and the statements within the DO REPEAT task. Program does not terminate correctly when the 800 word workspace is filled.



SCATTERGRAM	If SCATTERGRAM runs out of memory and Option 8 (sampling) is not selected, the file is left positioned after the last case which has been read. This means that the file is not positioned correctly for subsequent procedures.
CROSSTABS (general mode)	When an alphabetic variable is the column variable the program fails with a Mode 2 error if either Statistic 4 or 5 is requested.
CROSSTABS (general mode)	Under certain circumstances, CROSSTABS ignores missing value indicators with the result that missing values are not excluded from the table.
CYBER SPSS/ONLINE ERRORS	
PLOT	The PLOT procedure cannot be accessed. An attempt to execute PLOT will result in the error message:  BAD SPSS PROCEDURE NAME
BREAKDOWN	If Statistic 2 (test for linearity) is requested with an alphabetic variable, the program will terminate with a Mode 2 error.
CROSSTABS	Statistic 10 is incorrectly labelled ETA SQRD rather than ETA.

#### STATISTICAL CONSULTING

##### Consulting Available for Statistical Problem Formulation

Assistance with statistical and mathematical problems is provided to members of the University community by the Mathematical and Statistical Consulting Committee. Problem areas include building statistical models, analyzing data, and designing experiments; but help can also be offered in other probabilistic and mathematical areas.

The committee, formed from members of the Department of Mathematics and many other departments, consists of statisticians and probabilists interested in application.

Anyone seeking assistance with a statistical or mathematical problem is encouraged to contact the current (1976-1977) chairman, Stephan Portnoy, Room 303 Altgeld Hall, 333-9673.

## TEXT EDITING

CSO Document and File Preparation Service

As announced previously in OFF-LINE, CSO is now offering a document and file preparation service, at 1208 West Springfield Avenue in Urbana (one block east of DCL - phone 333-8253). This service includes keypunching, key-to-computer file entry, final copy rendering on a Diablo-type hard-copy terminal, and consulting in the use of text editors and formatters.

One of the objectives of this service is to enable departments and individuals to automate the preparation of manuscripts, thus eliminating large amounts of finish typing and re-typing, which can be very time consuming, and which often leads to a fresh generation of errors on each correction cycle. With a dial-up, desk-top terminal the user can generate all the preliminary documentation via the upper/lower case printer at CSO North, and have it delivered within 24 hours to any of the several Remote Job Entry sites on campus (located at Commerce West, Turner Hall, Noyes Lab., FAR, ISR, Mechanical Engineering, Psychology and Lincoln Hall). Also, several of these RJE's feature DECwriters, which are 30 character-per-second, upper/lower case hardcopy terminals.

Users can format their documents either by typing the text into a file exactly as they wish to have it reproduced, using the BOSS text editor, or they can use one of the text formatter programs mentioned below. In either case, documentation and instruction are available from CSO.

## THE DIABLO TERMINAL

The Diablo terminal produces typewriter-quality, carbon ribbon output. CSO currently has available print wheels in Elite 12 or Courier 10 character sets (OFF-LINE is produced in Elite 12). Other print wheels are available from the manufacturer (including OCR-A, General Scientific 10, Gothic in Pica 10 and Elite 12, APL 10, and British Pica 10), and will be acquired by CSO if sufficient interest is expressed by users.

Rates for use of the Diablo terminal will be established at some future date. In the meantime, users are encouraged to make use of the facilities.

## TEXT FORMATTERS

UCFMT

After an extensive search for CYBER-compatible text formatters, CSO has purchased the UCFMT program from the University of Calgary. UCFMT is based on the FMT program now operational on the IBM 360/75. It will be installed on the CYBER primarily for those 360/75 users who are using FMT. However, users should be cautioned that UCFMT does not have all the features of FMT. Installation and documentation will be announced in a future issue of OFF-LINE.

RNF

RNF is a text formatting program written by CSO for the CYBER, which is similar to the RUNOFF program available on the DEC-10. RNF has many of the features of DEC-10 RUNOFF and, in addition, features a free-format command syntax as well as a macro capability. It will be fully supported by CSO, and a short course in its use will be given the first week of March. OFF-LINE subscribers will be notified of the short course by means of a special mailing as soon as the program is complete and documentation is available.

MISCELLANEOUS

Vistars for Sale

CSO has four new Infoton Vistar GT Terminals for sale and immediate delivery. The price is \$1,123.00 each. Contact Mr. Stanley Rankin, CSO's Business Manager, at 333-6530 for further information.



## Application for Conversion

Name \_\_\_\_\_ Phone \_\_\_\_\_ Dept. \_\_\_\_\_

Address \_\_\_\_\_

University ID \_\_\_\_\_

## Program Conversion:

<u>Language/Processor</u>	<u>Number of Programs</u>	<u>Total No. Lines of Code</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

(Attach list, if necessary)

## Data Conversion:

# 360 Disk files to be converted \_\_\_\_\_

# 360 Data tapes to be converted \_\_\_\_\_

(Any nonzero responses this section complete reverse side)

## Do you wish:

to discuss the conversion with a consultant?

Yes No Maybe

help with program conversion?

Yes No Maybe

help with data conversion?

Yes No Maybe

a scratch tape to use in transferring your disk files?

Yes No

-----  
(CSO use only)

Con \_\_\_\_\_ Date Ass \_\_\_\_\_ Date Comp \_\_\_\_\_

CPS# \_\_\_\_\_ Amt \_\_\_\_\_

## Tape/Diskfile Conversion Request

## Tapes

(List only those to be replaced or converted by CSO)

<u>Old Tapename</u>	<u>New Tapename</u>	<u>Conversion Help Required</u>	<u>Keep 360 Tape</u>
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

## 360 Diskfiles

(List only those to be moved or converted by CSO)

<u>Public Pack</u>	<u>Dataset Name</u>
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

## DEC-10 Files

(List only those to be moved by CSO)

<u>Filename</u>	<u>PPN</u>	<u>Language</u>	<u>Conversion Help</u>
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

(Attach supplemental lists as necessary)



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Check one: ( ) New subscriber  
( ) Removal request  
( ) Address correction

New address: NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

\_\_\_\_\_

CAMPUS or Zip Code \_\_\_\_\_

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

Comments:

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# Off-Line

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OFF-LINE is the newsletter of the Computing Services Office at the University of Illinois at Urbana-Champaign. OFF-LINE is printed every month. Articles may be reprinted provided that the source of the article is noted. CSO operates an IBM 360 Model 75 with one million bytes of fast core and two million bytes of slow core, under HASP and OS, a dual-processor DECsystem-10 with 256K words of core, under TOPS-10, serving up to 80 simultaneously active terminals, and a CYBER 175 with 131K words of core and 262K words of ECS, under NOS, serving up to 50 simultaneously active terminals.

## POLICY

### 360 9-Track Tape Drive To Be Removed

As part of our planned conversion from the IBM 360/75 to the CYBER 175, one 9-track tape drive will be removed from service on April 1, 1977. Users using three or less tape drives simultaneously should not see an appreciable change in service. Those using four tape drives simultaneously should convert their programs to use three drives, and to run on the CYBER now.

If the tape setup load permits, we plan to remove another IBM drive in May, thus leaving only two drives remaining. Users with jobs using more than two drives simultaneously should plan their conversions now.

If these removals cause undue hardship, please let us know.

## CYBER

### Passwords

Passwords on the CYBER which begin with numeric characters should be avoided. Such a password is processed properly when running a time-sharing job but is treated as a CYBER Control Language statement label when running a batch job. The batch job will be aborted since no password is available.

### ALGOL

ALGOL60 will be removed from the CYBER on April 1, 1977. ALGOL68 will be available as the CYBER version of ALGOL.

### Time-Sharing Charging System

The charges shown at the end of a CYBER time-sharing job include a cover charge and do not include the charge for connect time. Before the job is actually charged to the PS#, the cover charge is deducted and the connect time charges are added.

## DEC-10

Transferring Files from the DEC-10 to the CYBER

Although the link for batch submission of 360 jobs from the DEC-10 has been discontinued, the link for transferring DEC-10 files to the CYBER remains. A program which transfers all but DEC-10 specific files from a PPN is available. Every file from your area with an extension other than:

.REL	.EXE	.SAV
.HGH	.LOW	.SHR
.MAC	.TMP	.TEM

is sent. Files with the extension .BAS are sent with BASIC line numbers preserved. UFLIP files are sent as they are. The individual files within the library may be removed using BOSS.

The program does not handle the following types of DEC-10 files:

- . long line files (more than 80 characters per line)  
The long lines are truncated.
- . upper/lower case files  
128 character set is converted to 64 character set.
- . very large files (greater than 500 blocks)  
The file will not be copied on the CYBER. A direct access file must be defined for large files.

To use this program, enter the following:

RU CON:CYTRAN

Be sure your limits on the CYBER are adequate to accept all of your files.





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: ( ) New subscriber  
 ( ) Removal request  
 ( ) Address correction

New address: NAME \_\_\_\_\_  
 ADDRESS \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 CAMPUS or Zip Code \_\_\_\_\_

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

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OFF-LINE  
 193 Digital Computer Laboratory  
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 Urbana, Illinois 61801



# Off-Line

VOL. 5, NO. 4 APRIL, 1977

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## POLICY

### Public Pack UIPUB4 Removed

Since conversion to the CYBER reduced the demand for on-line disk space on the IBM 360/75 and since general economy is required, UIPUB4 was removed on April 3, 1977.

The datasets on UIPUB4 were moved onto one of the other public packs and recatalogued.

### Turnaround on the 360/75

Several people who will complete their work by May have complained about increased turnaround times on the 360/75. It is not CSO's intention to handicap those people who have no reason to convert from the 360/75 to the CYBER. On the other hand, no encouragement will be provided for people to stay on this machine. For that reason, we are trying to maintain turnaround at last year's levels, (about 20 to 40 minutes for Class A and B jobs and less than 4 hours for Class C and D jobs). The following table of average turnaround times compares February, 1976 to February, 1977 for each class.

	A	B	C	D	E	F	G
Feb., 1976	0:24	0:37	1:34	4:04	7:35	7:53	9:07
Feb., 1977	0:26	0:39	1:31	2:37	3:09	7:21	7:22

As you can see, overall turnaround times have improved, and Class A and B turnaround was not significantly slower than last year. However, the service has become far more variable than last year. Class A turnaround often fluctuates between a few minutes and more than an hour. The fluctuations on the 360/75 are caused by two factors:

- . A reduced but far more variable workload.
- . The difficulty in adjusting initiators quickly and precisely enough to meet the changing load.

CSO is developing methods to make the 360/75 respond more rapidly to load changes in order to achieve uniform and predictable turnaround times.

## CYBER

Printing 360/75 Jobs on the CYBER

To get the printout of an IBM 360/75 job to the CYBER, you add the following ID cards:

```
/*ID PRINT=CYBER
/*ID NAME='<filename>(<account number>'
```

where

- . <filename> is any 1 to 7 character filename (excluding ERRLOG).
- . <account number> is either your University ID (9 digit number) or your user number (7 character identification).

The output generated goes into a fetch queue on the CYBER. The output will stay in the fetch queue until either you retrieve it, or until it has been in the queue for 4 days. If you haven't retrieved it after 4 days, the output will be printed on the CYBER line printer at DCL.

To determine if you have any output in the fetch queue, sign on the CYBER and enter the command:

```
FETCH.
```

The CYBER will respond with a list of any files you have in the queue.

To then retrieve a file from the fetch queue, enter the command:

```
FETCH,<filename>.
```

or,

```
FETCH,<filename1>,<filename2>,...,<filenamen>.
```

where the number of filenames must be less than or equal to 5.

This makes the file <filename> or the files <filename1> through <filenamen> local files. This also removes the files from the fetch queue. It is now your responsibility to save, destroy, or print the file(s) fetched.

The fetch command is available either in batch or the batch subsystem under time-sharing.

The file name you specify on the IBM ID card should not be ERRLOG. A file by this name is entered into your fetch queue if for some reason the output generated cannot be stored in the fetch queue. You can then issue:

```
FETCH,ERRLOG.
```

to get a local copy of the error log. You can then list this local file to determine why the output wasn't placed in the queue. This also removes ERRLOG from the fetch queue.

The following restrictions would cause an entry to be placed in ERRLOG:

- . You can have at most 5 files in the fetch queue at one time.
- . No output file in the fetch queue can exceed 512 PRU's (approximately 50 printed pages).

You can specify the same filename on multiple print requests to the CYBER on the /\*ID NAME= card. You can retrieve these one at a time. The fetch command retrieves the first file in the queue by the specified name. Thus, via multiple fetch and rename commands, you can make all of the printouts local files with different names. If you were to retrieve them all at the same time, you would only get the last one.

#### CYBER Terminals

CSO provides a total of 79 terminals which may be used to access the CYBER at 16 locations on campus. The locations and number of terminals available at each location is as follows:

<u>Location</u>	<u>Number</u>
127 Digital Computer Lab.	13
166 Digital Computer Lab.	4
83 Commerce West	6
70a Commerce West	2
16 Wardall Hall (ISR)	6
9 Oglesby Hall (FAK)	6
21 Saunders Hall (PAR)	3
515 Turner Hall (AGR)	3
103b Engineering Hall	7
65a Mechanical Engineering Bldg.	6
233 Electrical Engineering Bldg.	4
154 Noyes Lab.	4
453 Psychology Lab.	5
202 Lincoln Hall	6
104 Snyder Hall	2
Basement, Sherman Hall	2

In addition to these public facilities there are 30 dial-up ports.

#### Automated FORTRAN Conversion

Two programs for automated FORTRAN conversion are available. MIMI, written locally, converts a major portion of IBM FORTRAN to CDC FORTRAN. TIDY, written at Northwestern University, does general tidying of FORTRAN programs



and some conversion. The documents describing these programs and their use are:

- . FORTRAN Conversion Guide
- . TIDY: A Program for Renumbering and Editing FORTRAN Programs

These documents are available at the CSO Distribution Center, Room 164 DCL.

#### RNF Available

RNF is a text formatter, written locally, which resembles RUNOFF on the DEC-10 in many ways. RNF is available on the CYBER and documentation of the formatter may be obtained at the CSO Distribution Center, Room 164 DCL.

#### IBM 360/75

#### 7-Track Drive Removed

The 7-track tape drive for the 360/75 was removed on February 1, 1977. A reminder: Be certain that any tape(s) to be used on the 360/75 which are acquired from other installations are 9-track tape(s).

#### STATISTICAL SERVICES

#### Summer Office Schedule

This summer will be a very active period for the Statistical Services staff. Statistical Services will move to CSO North for the summer to work more directly with the Systems Consultants and Systems Programmers. By re-locating, the staff will be able to more efficiently:

- . Complete the implementation of SOUPAC on the CYBER.
- . Produce statistical documentation for the CYBER.
- . Help statistical users with their conversion to the CYBER.

The CSO South Office (Room 84 Commerce West) will be closed and an office at CSO North (Room 136 DCL) will be opened on May 16.

The office hours at CSO North will be the same as they currently are at CSO South, as follows:

9:00 AM - 12:00 Noon

Monday through Friday

1:00 PM - 5:00 PM

The consulting phone number (333-2170) will remain the same during this period. The CSO South office will reopen on August 15, 1977, to help those users who are preparing courses.

We realize that this move may represent an inconvenience for some of our statistical users who are located closer to CSO South. However, we believe that this temporary relocation will result in major service improvements and extensive conversion by fall.

All other services at Commerce West will continue as planned.

#### Statistical Programs and Packages on the CYBER

CSO Statistical Services has been looking for statistical packages and programs for the CYBER. Some have already been installed. The following is a list of statistical programs and packages, and their status with respect to the CYBER.

SOUPAC	We are currently working to complete the Matrix portion of SOUPAC on the CYBER. It should be available for use in the near future. Thereafter, we will complete other portions of SOUPAC. We hope to have the entire package installed, tested and documented for use on the CYBER by the end of the summer.
SPSS	Batch SPSS and On-line SPSS have been installed on the CYBER and are currently being used. We expect a new release of SPSS sometime in May. This release should correct most of the errors we have mentioned in a previous OFF-LINE article (CYBER SPSS Errors, February, 1977).
Interactive SPSS	SPSS has not yet announced the release of the new Interactive SPSS package for the CYBER (not expected for several months). We will consider it for installation on the CYBER. The package would be a separate entity from Batch SPSS and SPSS.
MULV	Both a large and small version of MULV have been installed on the CYBER and are currently being used.
FOSOL	Within the next few weeks we will consider the FOSOL package (an interactive or batch statistical package featuring both matrix and transformation capabilities) for possible installation on the CYBER.

- MPOS                   The Multi-Purpose Optimization System (MPOS) is an integrated system of computer programs to solve optimization problems for the CYBER. We are currently testing this package on the CYBER and will soon release it for use.
- LISREL III             This program provides an "Estimation of Linear Structural Equation Systems by Maximum Likelihood Methods". It was authored by Karl G. Joreskog and Dag Sorbom. We are currently testing this program on the CYBER and will soon release it for use.
- COFAMM                 This program provides a "Confirmatory Factor Analysis with Model Modification". It was authored by Karl G. Joreskog and Dag Sorbom. We are currently testing this program on the CYBER and will soon release it for use.

#### OSIRIS-SPSS Interface on the CYBER

If you presently use the OSIRIS statistical package on the 360/75, and wish to submit OSIRIS dictionary files to CYBER SPSS, you should be aware that, at the moment, CYBER SPSS (unlike IBM SPSS) expects to receive OSIRIS dictionary information on a file containing:

- . A record size of 80.
- . A block size of 1600.

If your OSIRIS dictionary file differs from this, CYBER SPSS will most likely not recognize the information contained in the file.

If you are planning to use OSIRIS dictionary information of the CYBER, please contact the Statistical Services Consultants at Room 04 Commerce West (333-2170) for further details.

#### SPSS System File Conversion

A procedure is now available for converting IBM SPSS system files to CYBER SPSS system files. The IBM system file must be on tape, but the CYBER system file can be stored either on disk or tape. The program will work on any system file as long as the following conditions are met.

- . All alphabetic variables must be specified as Type A in a PRINT FORMATS statement.
- . All numeric type variables, except integers, must also have an associated PRINT FORMATS. The number specified in the PRINT FORMATS for each variable will be used during conversion as the number of digits to the right of the decimal point.

- . If a variable does not have a PRINT FORMATS it will be truncated and converted as an integer.

A user can determine the PRINT FORMATS which have been saved in the IBM system file by running an SPSS program on the 360/75 which does:

```
GET FILE          <file name>
LIST FILEINFO    VARINFO
FINISH
```

Users who need to insert PRINT FORMATS into their IBM system file before conversion can do this by running the following SPSS program:

```
GET FILE          <file name>
PRINT FORMATS    <appropriate specifications>
SAVE FILE        <file name>
FINISH
```

Archive files (files with more than 500 variables) must be divided into multiple files of less than 500 variables using IBM SPSS. The user should be aware of the fact that numeric values will not be converted exactly. For example, a missing value code of 999.9999 may be stored in the CYBER file as 999.9998. A subsequent program which does a RECODE, IF, SELECT IF or COUNT on the 360/75 missing value will fail to find that code in the data. A user can resolve this problem by recoding such values before the file is converted, or by modifying the data transformations in the CYBER program. The values will be consistent, however, so that the values as converted will be treated as missing.

The conversion program must be retrieved from user number LIBRARY with the following statement:

```
GET,SPSSCV/UN=LIBRARY.
```

The normal mode of conversion is to accept the IBM system file from local file GTFILE and produce the equivalent CYBER system file on local file SVFILE. The local file names can be changed by us/G=<lfm> or /S=<lfm>, respectively for the SPSSCV call statement (see last example). Neither the input nor output files are rewound before or after conversion.

The following topics describe various procedures for converting to a CYBER system file. Use only those sections which are applicable to your file. When running the sample jobs, all items in lower case letters, enclosed in angle brackets, must be supplied by you; all other items must be typed exactly as written. The meanings of the conventions used in the sample jobs are as follows:

```
<tapibm>          The name of the tape which contains or will
                  contain the IBM system file.

<rackibm>        The rack number of the IBM tape.

<sdsn>           The DSN of the system file on disk.

<jobname>        A 1 to 7 character job name.
```

<uid>                   Your University ID number.

<password>               The password associated with the <uid>.

<psn>                    The PS number to be charged for the CYBER run.

<dept>                   The department code associated with the <psn>.

<tapcdc>                 The name of the tape which will contain the CYBER system file.

<rackcdc>                The rack number of the CDC tape.

<cdcfile>                A 1 to 7 character file name for the disk file which will contain the CYBER system file.

#### IF IBM SYSTEM FILE RESIDES ON DISK

If the system file is on a disk it needs to be copied to tape before it can be converted. The following job will copy a system file which is catalogued on disk to the first file of an unlabelled tape. It should be run on the 360/75.

```

/*ID <normal ID cards>
/*SETUP TAPE=<tapibm>,RACK=<rackibm>,RING
// EXEC COPY
//SYSUT1 DD DSN=<sdsn>,DISP=OLD
//SYSUT2 DD UNIT=TAPE,VOL=SER=<tapibm>,
// DISP=(,KEEP),LABEL=(,BLP)
/*

```

Now follow the example in the section on converting unlabelled tapes.

#### IF IBM SYSTEM FILE RESIDES ON UNLABELLED TAPE

The following job will read an IBM system file from the first file of an unlabelled tape and create a CYBER system file on the first file of a CYBER standard labelled tape. It should be run on the CYBER.

```

<jobname>.
SIGNON,<uid>.
<password>.
CHARGE,<dept>,PS<psn>.
GET,SPSSCV/UN=LIBRARY.
RESOURC(NT=2)
LABEL(GTF1LE,F=S,LB=KU,NT,VSN=<tapibm>-<rackibm>,CV=EB,PO=R)
LABEL(SVILE,D=1600,NT,VSN=<tapcdc>-<rackcdc>,SI=<tapcdc>,PO=W,W)
SPSSCV.

```

## IF IBM SYSTEM FILE RESIDES ON LABELLED TAPE

The following job will read an IBM system file from the first file of a labelled tape and create a CYBER system file on the first file of a CYBER standard labelled tape. It should be run on the CYBER.

```
<jobname>.
SIGNON,<uid>.
<password>.
CHARGE,<dept>,PS<psn>.
GET,SPSSCV/UN=LIBRARY.
RESOURC(NT=2)
LABEL(GTFILE,F=L,LB=KL,NT,VSN=<tapibm>-<rackibm>,CV=EB,PO=R)
LABEL(SVFILE,D=1600,NT,VSN=<tapcdc>-<rackcdc>,SI=<tapcdc>,PO=W,W)
SPSSCV.
```

## IF CYBER SYSTEM FILE IS TO BE STORED ON DISK

The following job will read an IBM system file from the second file of a labelled tape and create a CYBER system file on CYBER disk. It should be run on the CYBER.

```
<jobname>.
SIGNON,<uid>.
CHARGE,<dept>,PS<psn>.
GET,SPSSCV/UN=LIBRARY>
LABEL(GTFILE,F=S,LB=KL,NT,VSN=<tapibm>-<rackibm>,CV=EB,PO=R)
SPSSCV.
REPLACE,SVFILE=<cdcfile>.
```

## IF /G= AND /S= ARE USED ON SPSSCV CALL

The following job will read an IBM system file from the first file of an unlabelled tape and create a CYBER system file on the first file of a CYBER standard labelled tape. It should be run on the CYBER.

```
<jobname>.
SIGNON,<uid>.
<password>.
CHARGE,<dept>,PS<psn>.
GET,SPSSCV/UN=LIBRARY.
RESOURC(NT=2)
LABEL(INFILE,F=S,LB=KU,NT,VSN=<tapibm>-<rackibm>,CV=EB,PO=R)
LABEL(OUTFILE,D=1600,NT,VSN=<tapcdc>-<rackcdc>,SI=<tapcdc>,PO=W,W)
SPSSCV/G=INFILE/S=OUTFILE.
```

If you require assistance, contact the Statistical Services Consultants at Room 84 Commerce West (333-2170).



## MISCELLANEOUS

Documentation - Notice to Instructors

If you plan to use any of the documents produced by CSO for a class, please notify Mr. Don McCabe in Room 164 DCL (Telephone: 333-6203) four to six weeks in advance so that a sufficient stock is on hand.

You should notify the bookstores to stock any documents necessary for your class which are not produced by CSO.

Help Wanted

As a service to the CSO User Community, a "help wanted" sections will be added to OFF-LINE. Written requests to publish information about openings (full or part-time) which relate to computer applications may be sent to:

Editor, OFF-LINE  
193 Digital Computer Lab.  
University of Illinois  
Urbana, Illinois 61801

Each request will be published once in OFF-LINE.

Availability of CSO Computer Network

The hours of scheduled downtime are reflected in the schedule below. Barring unforeseen problems, all other times are production hours.

	SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.	
0200								0200
	++++	++++	++++	++++	++++	++++	++++	
	++++	++++	++++	++++	++++	++++	++++	
	++++	++++	++++	++++	++++	++++	++++	
0600	++++	++++	++++	++++	++++	++++	++++	0600
	****	****	****	****	****	****	****	
0800	****	****	****	****	****	****	****	0800
	****					XXXX	++++	
1000	****					XXXX	++++	1000
	****							
1200								1200
2400								2400

+ Some machines may be unavailable for systems maintenance, systems development, or for other purposes. See daily announcements for details.

\* All machines unavailable

x All machines unavailable on first Friday of each month only.

OFF-LINE's Mailing List

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Check one: ( ) New subscriber  
( ) Removal request  
( ) Address correction

New address: NAME\_\_\_\_\_

ADDRESS\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

CAMPUS or Zip Code\_\_\_\_\_

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Comments:

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193 Digital Computer Laboratory  
University of Illinois at Urbana-Champaign  
Urbana, Illinois 61801



# Off-Line

VOL. 5, NO. 5 APRIL 1977

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AT URBANA-CHAMPAIGN

## SPECIAL ISSUE

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1	Conversion Progress
2	Research Board Allocations for Computing Services
3	CYBER Purge Policy

OFF-LINE is the newsletter of the Computing Services Office at the University of Illinois at Urbana-Champaign. OFF-LINE is printed every month. Articles may be reprinted provided that the source of the article is noted. CSO operates an IBM 360 Model 75 with one million bytes of fast core and two million bytes of slow core, under HASP and OS, a dual-processor DECSYSTEM-10 with 256K words of core, under TOPS-10, serving up to 80 simultaneously active terminals, and a CYBER 175 with 131K words of core and 262K words of ECS, under NOS, serving up to 110 simultaneously active terminals.

## IBM COMPATIBLE SERVICES

At the time the CYBER 175 was selected, CSO included a commitment to provide continued IBM service for those seriously inconvenienced by a change of vendor. This was a budgetary commitment rather than a specific plan for providing the service.

The original estimates of IBM compatible service requirements appear to be correct, based on our experiences to date. Additionally, there are services which can best be provided using the EXPRESS system or other local services.

For these reasons, CSO has sought a plan to retain the 360/75 within the original budget commitment. A plan has been developed which allows a minimum of a four year continuation of a 360/75 configuration at CSO. The configuration, for CSO users, will include mountable disk drives, magnetic tape drives and the Routing Room reader/printer/punch system. RJE access to the 360/75 and interconnection to the CYBER 175 will be continued.

This continuation of the 360/75 involves purchasing those components not presently owned. The appropriate requests for Board of Trustees approval will be made either in May or June.

The commitment to provide IBM service for later years (1981-1984) is still valid, and none of the budgetary commitment for this acquisition affects it. Whether we will again choose to utilize the 360/75 at that point is not known because of the expected changes in the market, the improved access to outside services, and the uncertainty of maintenance costs in the future.

At the present time, we expect to share the 360/75 with the Library Circulation System. This system will begin operation in approximately one year and will utilize about half of the resources of the system. The other half will be available to CSO users via the normal allocation system. We do not expect to divide allocations by system unless there is a serious imbalance in demand. We are currently studying the effect of this decision on conversion to the CYBER, and identifying users who can be best served through continued use of the 360/75. We are also studying the problem from the point of view of using 360/75 service to strategically reduce CYBER 175 loading in ways that make that service most effective.

In future issues of OFF-LINE, we will explain how this decision will effect our plans in areas such as PL/I, EXPRESS, RJE network, applications software, etc. It should be clear that with a local 360/75 the scope and volume of services available will exceed our original plans.

## CONVERSION PROGRESS

CSO collects various data which indicate the progress of conversion and the growth of CYBER service.



Revenue generated by systems is of primary interest, and in March the breakdown was:

	<u>March, 1976</u>	<u>March, 1977</u>
IBM 360/75	77%	49%
DEC-10	15%	14%
CYBER 175	-	36%
Chicago	8%	1%

Total revenue for March was up 22% from last year despite several price cuts. This growth occurred in both Class and Research Board allocated use.

By March, about 35% of all active PS numbers were utilizing the CYBER for their normal work.

During this semester, the CYBER has performed about 1.5 times as much time-sharing as the DEC-10, measured by terminal hours, and about half as much batch computation as the 360/75. The conversion of small 360/75 batch jobs into CYBER time-sharing jobs and a blurring of the distinction between time-sharing and batch users are emerging trends on the CYBER. The latter is due to the single system approach and the computational power available on the CYBER for the terminal user.

#### RESEARCH BOARD ALLOCATIONS FOR COMPUTING SERVICES

##### Deadline for Departmental Requests for Research CSU Announced

The Research Board has announced the next semi-annual deadline for departmental requests for allocations of computer service units for faculty research and dissertation research. Departmental requests are due April 21, 1977.

##### Purpose of Allocations

The Research Board allocations are intended to provide support for those for whom external funds for computer time are unavailable, for those who need internal support in order to obtain external funds to support their research needs for computer services, and for those whose computer research needs exceed the support available from external funds. Research Board allocations should not be used to supplant external funds for computer services.

##### Allocation Process

The Research Board makes semi-annual allocations of computer service units to the departments in response to the individual faculty requests they present. Departments are responsible for suballocation of the computer time awarded and are expected to accommodate the needs of the faculty within the amount awarded.

### Supplemental Allocations

The difficulties of predicting computer service needs for the entire allocation period are recognized. Departments are urged to develop a flexible system for accomodating unanticipated needs. If such needs cannot be met within the department's allocation, a supplemental allocation may be requested. Supplemental allocations should not be requested for an individual faculty member if the departmental allocation for the period will not be exhausted. In fairness to all, supplemental allocations should not be used to obtain a major increase in the department's allocation.

### Keypunching Services Allocations

After June 30, 1977, Research Board allocations of computer service units can no longer be used for keypunching services. A modest amount of funds (consistent with current usage patterns) has been set aside to provide for keypunching services for research. Requests for under \$50 should be directed to George Badger, CSO, and ordinarily can be handled in two days. Larger requests should be directed to the Research Board and should provide a description of the research for which keypunching services are needed, the amount requested, the basis for the estimate of the amount, and the period during which keypunching services will be required. Requests (four copies) may be submitted at any time, must be signed by a faculty investigator or supervisor and by the department chairman, and will normally be acted upon within two weeks.

### CYBER PURGE POLICY

CSO has a policy of purging any files which have not been accessed for 30 days. Previously, this policy applied only to the 360/75 and DEC-10. As of April 3, 1977, the policy is in effect for all CSO computing systems.

Purges on the CYBER will be based on the LAST ACCESS date. A purge will be done on the first Sunday of the month between the hours of 0000 - 0800. Purged files will be kept on backup tapes for three months.

Please do not restore files for which there is not a definite need.

CSO regrets that this notice was not available prior to the first purge and apologizes for any inconvenience which it may have caused.

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# Off-Line

VOL. 5 NO. 10 SEPTEMBER, 1977

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OFF-LINE is the newsletter of the Computing Services Office at the University of Illinois at Urbana-Champaign. OFF-LINE is printed every month. Articles may be reprinted provided that the source of the article is noted. CSO operates an IBM 360 Model 75 with one million bytes of fast core and two million bytes of slow core, under HASP and OS, and a CYBER 175 with 196K words of central memory and 256K words of ECS, under NOS, serving up to 190 simultaneously active terminals.

SYSTEM NOTES

## SYSTEMS RELIABILITY

During July, the approximate mean time between failures on the CYBER was 21 hours, and the mean time to repair was about 12 minutes. During the month we experienced severe problems with data communications equipment and air conditioning. Both have been fixed.

On the 360/75 the approximate mean time between failures was 18 hours, with a mean time to repair of about 32 minutes. Main causes of down time were bad cables in the selector channel and CPU errors.



- . If the <pfm> belongs to a different user number, the command works; however, the file limits which are enforced are those stored in the catalog entry for <pfm>.

Also, a new command has been added to provide users the capability to insert their current project index and file limits into the catalog entry for a permanent file. The user's file limits are checked prior to the insertion of this information. The command is:

```
CLAIM(<pfm>/PN=<packname>,R=<r>,NA)
```

The parameters for CLAIM are defined in Chapter 8 of the NOS Reference Manual, Volume 1. Additionally, a C parameter is available to the REPLACE, APPEND and ATTACH commands. Adding this parameter to any of these commands causes a CLAIM command to be issued prior to the given command, e.g.,

```
REPLACE(<lfm>=<pfm>/C)
```

is equivalent to

```
CLAIM(<pfm>)
REPLACE(<lfm>=<pfm>)
```

#### CYBER MANUAL REVISIONS

Revisions to the CYBER manuals listed below are available in the CSO Distribution Center (164 DCL):

- . NOS Version 1 Text Editor Reference Manual (Revision E)
- . NOS Version 1 Reference Manual Volume 2 (Revision D)
- . NOS Version 1 MODIFY Reference Manual (Revision C)

Revisions may be obtained only by those persons who originally purchased the manual(s) from the CSO Distribution Center.

#### LFNS COMMAND FOR LOCAL FILE ENQUIRY

A new command called LFNS is available on the CYBER for enquiring about local files. Currently the command is available only from the batch subsystem in time-sharing, and in batch jobs.

The simplest usage of the command is to type "LFNS" followed by a carriage return. The program then produces a compact report on all your local files, reporting four files per line. This is followed by the total number of files reported, the total number of PRU's of local mass storage they take up (not counting the space taken up by direct access files) and a statement of the number of tapes currently mounted,

if any are mounted. The report for each file consists of its length in PRU's (or its block position for tape) followed by a two character code indicating either the type of file or the sort of device it resides on, followed by the name of the file. For example, a report line might contain the following output:

```
12 .. XYZ 123 NT MYTAPE      3 PT PROG      45 PM*STUFF
```

This output gives the following information about the four files XYZ, MYTAPE, PROG, and STUFF:

1. XYZ is 12 PRU's long. The ".." means it is an indirect access working file (non-primary). You will find that most of your local files will have this ".." designation.
2. MYTAPE is the local file name assigned to a tape. "NT" means MYTAPE is assigned to a nine track tape drive. The interpretation of the 123 differs depending on the tape format (the "F=" on the LABEL card) and whether the tape is labelled, but generally indicates the current position of the tape. If the tape is labelled, it indicates the position relative to the beginning of the last file given on a LABEL card; otherwise, it indicates the position relative to the very beginning of the tape. If the tape format is "S" or "L", it is the number of blocks preceding the current position, counting tape marks as blocks.
3. PROG is 3 PRU's long and "PT" means it is the primary file.
4. STUFF is 44 PRU's long and "PM" means it is a direct access permanent file. The asterisk means the file is write-locked; you won't be able to write on it until the file is re-attached in write mode.

If the file is a mass storage (disk) file, the two character code is the standard NOS code for that type of file (with the exception of ".." for working files); otherwise, if it is a non-mass storage file (e.g., tape drive), the code is the standard NOS device code. Some of the most common values that will appear are:

```
.. local working file

PT primary file

PR print file - a file that will be automatically sent to the printer
                at job termination (in a batch job, not time-sharing)

PH punch file - a file that will be automatically sent to the card
                punch at job termination (in batch, not time-sharing)

TT terminal file - a file associated with a terminal
```

NT nine-track tape

NE null equipment

The LFNS command can also be used to enquire about particular files. If a listing of file names separated by commas is included in the command, only reports on those particular files are made. For example,

```
LFNS,LAMBDA,BUTTON
```

produces reports only on the files LAMBDA and BUTTON. The file names can include asterisks in those character positions you don't care about, to allow enquiry about several related names. For example,

```
LFNS,LAM*,***ON
```

produces reports on all local file names beginning LAM, and all five character names ending in ON. A further feature of this ability to specify files is the ability to exclude specific files from the report by preceding their names with minus signs:

```
LFNS,*-BOSSWRK-INPUT-OUTPUT-BOSSINI
```

This makes reports on all files except BOSSWRK, INPUT, OUTPUT, and BOSSINI.

LFNS also accepts switches to further qualify the manner in which the reports are done or which files are reported. The set of switches currently accepted by LFNS is:

/H produce some help information

/S dump only the statistics line about the number of file reported and the number of PRU's of local mass storage they occupy

/T of the files specified, report only tapes

/Q omit the statistics at the end, and omit the files BOSSWRK, BOSSINI, INPUT, INPUT\*, and OUTPUT

/Z omit zero-length mass storage files from the report

/A show the allocated lengths of files rather than their written lengths

/P report only the primary file, if there is one

/D use NOS two digit octal equipment numbers in the report instead of the usual two letter codes

360/75

## SETUP CARDS

Since we have not documented the /\*SETUP card for some time, here is a revised complete writeup.

The SETUP card is used to tell the operator that you want to have some special action taken on your job. SETUP cards (there can be more than one, and should be one for every tape or disk mount) must come after all the /\*ID cards and before the first // (JCL) card. You will be charged one service unit for each SETUP card.

Since the SETUP card is read by the operators there can be some variations in format. However, in order to increase comprehensibility, and to facilitate the gathering of statistics, the following keyword format is suggested:

## . 2314 Disk

```
/*SETUP DISK=<volser>
```

where <volser> is the disk name as given in the VOL=SER= parameter of the DD card describing the disk.

## . Magnetic Tape

```
/*SETUP TAPE=<volser>,RACK=<rn>
```

where <volser> is the disk name as given in the VOL=SER= parameter of the DD card describing the tape, and <rn> is the rack number of the tape. If the tape does not have a rack number, write:

```
RACK=NONE
```

As a data security precaution, all tapes are stored without rings, and will be mounted without rings unless a ring is specifically requested as follows:

```
/SETUP TAPE=<volser>,RACK=<rn>,RING
```

## . Replies

```
/*SETUP REPLY=<r>
```

where <r> = U or N.

## . Large Region

A SETUP card is generated by the system when region requests exceed:

- . 400K for fast core
- . 600K for slow core

Before submitting such jobs, special permission should be obtained from Jack Knott (333-6562) so that an appropriate schedule for running the job can be negotiated.

## JOB CARDS

Effective October 1, 1977, CSO will no longer provide prepunched 360/75 JOB cards.

You may produce a JOB card by punching // in columns 1 and 2 and an alpha character in column 3 followed by up to 7 additional alphanumeric characters. This is followed by a space and the word JOB.

As in the past, you must know both the job name and HASP number in order to obtain a refund for a job.

## 360/75 INTERPRETING CARD PUNCH REMOVED

The IBM 3525 Interpreting Card Punch at DCL has been removed. It was replaced by an IBM 2520 Non-Interpreting Card Punch.

An IBM 548 Interpreter and an 029 Interpreting Keypunch are available at DCL and Commerce West.

The IBM 548 interprets only alphanumerics (A-Z, 0-9) punches. It takes two passes to interpret all 80 columns. The first pass interprets the first 60 columns. After the first pass, the wiring board and the printing position knob must be changed. The second pass interprets the remaining 20 columns. The interpreting appears in punched sequence but does not appear directly above the corresponding punched hole. Complete instructions are located on the interpreters.

The 029 Interpreting Keypunch interprets 80 columns in one pass at a rate of 10 cards per minute. The keypunch interprets alphanumerics and special characters. The interpreting appears directly over the corresponding punched hole.

The operators at DCL and Commerce West will assist you if you have questions, or will interpret your card deck for you.

STATISTICAL SERVICES

## STATISTICAL PACKAGE WORKSHOPS

Two workshops are being held to provide information about using statistical packages on CSO's CYBER and 360/75 computers. The workshops, given by staff members from CSO, SSQL and SRL, are scheduled as follows:

SOUPAC Workshop

SOUPAC (Statistically Oriented Users Package) will be taught in a six week series. No previous computer experience is necessary, but statistical knowledge of cross-tabulation, standardized scores, T-test and regression (sufficient to understand the terminology) is assumed.

Instructions for using SOUPAC on the 360/75 will be given. SOUPAC instructions for the CYBER will be given as programs become available.

The SOUPAC Workshops meet on Tuesday evenings, beginning September 13, from 7:30 to 9:30 PM in Room W-115 Turner Hall. Topics for each workshop session are listed below.

September 13

Orientation and computer terminology. Introduction to SOUPAC. Data coding convention. Formats and variables.

September 20

Diagnostics: types and meaning for error codes. Descriptive statistics: frequency, cross-tabulations, and standard scores. Labelling output and control variables.

September 27

Data manipulation using transformation - arithmetic, recode, go to, output, do notation.

October 4

Data manipulation using matrix - move, input, add, multiply.



October 11

Grouping data. T-test. One-way analysis of variance. Post Hoc test. Mann-Whitney U. Discriminant.

October 18

Simple and multiple regression. Simple and multiple correlation.

### SPSS Workshop

This workshop will introduce the functions available in the Statistical Package for the Social Sciences (SPSS) and will provide instructions to use them. The emphasis will be using SPSS on the CYBER.

Prior statistical experience is required. Statistics will be covered only to the extent necessary to describe the program functions.

The workshop meets on Wednesday nights, beginning September 14, from 7:30 to 9:30 PM in Room W-109 Turner Hall. Topics for each session are described below.

September 14

Introduction to computing at the University of Illinois, SPSS, data organization, and basic statistics.

September 21

Review of the first session and cross-tabulations.

September 28

Data transformations.

October 5

Basic statistics with control variables, T-Test statistics, and output of raw data.

October 12

Creating and using SPSS system files.

October 19

Subfile structure on SPSS systems files, correlations and plotting procedures.

October 26

Analysis of variance, regression, and nonparametric tests.

November 2

Using SPSS from a terminal.

Application forms for the workshops may be obtained at the following locations:

- . CSO Statistical Services Consulting Office  
65 Commerce West  
333-2170
- . Social Science Quantitative Laboratory  
202 Lincoln Hall  
333-6750
- . Survey Research Laboratory  
414 David Kinley Hall  
333-2219

### NUMERICAL SERVICES

#### IMSL EDITION 6 FOR THE 360/75 AND CYBER

IMSL Edition 6 tapes for the 360/75 and the CYBER have arrived and are now being put up on the respective machines. At this time, the complete library is up on the 360/75 in a dataset called SYS9.IMSL. The library will be moved to the standard system library by October 1, 1977; meanwhile, Edition 6 can be accessed by specifying LIBFILE='SYS9.IMSL' on any of the standard cataloged procedures for running FORTRAN or PL/I. The CYBER library is not up yet, but should be by October, if not sooner. The changes to the library are given below.

#### Deletions

The integration routine DCS2QU has been deleted from the library (both 360/75 and CYBER) in Edition 6. The routine will be retained, however, for

those who still wish to use it. DBCQDU is its replacement. The new routine allows the limits of integration to be specified. On the 360/75, DCS2QU will be moved to the FORTUOI library (so it will still be automatically available) and its source will be placed among the regular FORTUOI source on the UIMATH pack (accessed by the MATHLIST cataloged procedure). On the CYBER, DCS2QU will be moved to the miscellaneous source library called MISCOPL, accessed by the MISCDOC procedure in user number LIBRARY. This is being done because it is felt that, if IMSL regards a code as inferior to a more recently produced one, then the old one should not be perpetuated indefinitely, as would be the case if DCA2QU were placed in one of the standard supported libraries. For instructions on the use of the MISCDOC procedure, do the following on the CYBER:

```
GET,MISCDOC/UN=LIBRARY.
CALL,MISCDOC(HELP=1)
```

### Changes in Existing Routines

No previously existing routine has changed in the way it is used, but some routines have undergone internal changes to fix bugs, improve efficiency, or correct documentation. Below is a list of all the routines that were changed for the 360/75 or the CYBER; a plus sign by the name indicates the routine was changed for the 360/75 but not the CYBER, a minus sign indicates the routine was changed for the CYBER but not the 360/75, and the numbers following the name indicate one (or more) of the following:

1. The old routine is adequate; the replacement provides additional ability.
2. The old routine is adequate; the replacement is more efficient and is recommended.
3. Documentation was changed; if no other number is indicated, source code was not changed.
4. Calling sequence changed -- this does not apply to any routines.
5. Old routine is adequate; source code modified to ease portability problems.
6. The old routine is not adequate in some situations. These discrepancies were corrected.
7. Change for WATFIV compatibility -- this is not significant here, as 360/75 IMSL is not available in WATFIV.

AFACT-6	+AGLMOD-7	ALSQAN-5	ASNKMC-1
+BEMIRO-3	BEPATS-6	CTRBYC-1	DCADRE-5
DREBS-6	EHOUSH-2	+ELRH2C-7	FTAUTO-2
FTFREQ-3	FTMAXL-3	GGCSS-7	-GGU4-3,5
ICSFKU-6	MDBETA-2	MDFD-2	MDSTI-3,6
MDTN-6	+NAWNRP-3	+NAWRPE-3	+NAWRPU-3
RLFOTH-3,6	RLFOTW-2,3	RLINCF-2	RLINPF-2,3
RLSEP-3,6	RLSTEP-3,6	RLSUBM-6	SSRAND-2
USVH1-3	USLEAP-2	+USWB-3	+USWBSM-3
+USWLFM-3	+USWLSM-3	+VPOLYF-7	+ZANLYT-7
ZBRENT-3,6	+ZCPQLM-7	+ZRPOLY-7	-ZRPQLF-2

For further details on the changes in routines, see Stan Kerr at CSO's Systems Consulting Office (138 DCL).

#### Additions to the Libraries

The following new routines were added to the libraries on the 360/75 and the CYBER. A plus sign by the name below means the routine was added to the 360/75 library, but not the CYBER, and a minus sign means the routine was added to the CYBER library but not to the 360/75 library.

BECTR	BEGRPS	BESRB	BESRN
DBCQDU	DVERK	EIGZC	ELZHC
ELZVC	GGAMA	GGBNB	GGCAU
GGEOM	GGHYP	GGMUL	GGNLN
GGTRI	+GGU4	GGWEI	ICSMOU
LINV3P	MMBSIO	MMBSI1	MMBSJO
MMBSJ1	-MMBSKO	-MMBSK1	MMBSYN
NDMPLE	NDXEST	OCLINK	RLDCW
RLFOR	RLMUL	RLONE	RLRES
RLSUM	USTREE	VDCPS	VTRAN

#### A Special Fix for the 360/75 Library

The 360/75 version of the library has had a particular problem for some time, for which a fix has now been devised by IMSL. The problem occurs with routines which are available only in single precision (which occurs for some statistical routines) but which call routines that can be installed in either single or double precision. The latter routines are in double precision on our system, and an error results when they are called with single precision parameters. All the cases for which this occurred previously should be covered by the fix, which consisted of installing specially named single precision versions of some of the double precision routines, and changing the internal references of the routines which call the double precision ones.

### General Information about IMSL

By way of review and update, here is some general information about IMSL on the 360/75 and the CYBER.

IMSL is a leased library (leased from International Mathematical and Statistical Libraries, Inc., in Houston). There are separate versions of it for several different types of computers. Our 360/75 and CYBER libraries are physically separate, although most routines in the libraries exist in both versions and are used in the same way, with this one important difference:

Most routines in the 360/75 version of the library can be installed in either single precision or double precision. Where there is such an option, we install the routine in double precision. If a 360/75 IMSL writeup says the routine has precision "SINGLE/DOUBLE", then it is double precision, and all the REAL parameters to the routine must be in double precision.

All routines in the CYBER version of the library are in single precision.

Since IMSL is a leased library (and we very much want IMSL to stay in business), we do not make the source of IMSL routines freely available to users. If you need a source listing or a source deck for an IMSL routine, you must see Stan Kerr at CSO's System Consulting Office (138 DCL). Manuals documenting the IMSL routines are available for inspection in the User Work Area (134 DCL) and in the Systems Consulting Office (138 DCL). (There are separate manuals for the 360/75 and CYBER versions, even though most routines are used the same way.) On the CYBER the comment card blocks at the beginning of the routines, explaining the calling sequences, are on-line and can be accessed with the IMSLSDOC procedure. A writeup explaining IMSLDOC can be obtained as follows:

```
GET,IMSLDOC/UN=LIBRARY.
CALL,IMSLDOC(HELP=1)
```

On the 360/75, the IMSL library (SYS1.IMSL) is included in all the standard cataloged procedures for running programs. To access it, simply call the routines.

On the CYBER, one must first attach the library and declare it to be a library that can be searched for subroutine references as follows:

```
ATTACH,IMSLIB/UN=LIBRARY.
BATCH                               (this is needed only in time-sharing,
                                     to get into batch subsystem, which is
                                     necessary for the next command.)

$LIBRARY,IMSLIB.
```

The \$LIBRARY command sets your "global library set", those (local) files which are to be searched for subroutine references each time you run a program. It is not additive; it completely resets the global library set

each time it is used, so if there is another library to be searched as well, it must be included on the \$LIBRARY too. A restriction of the \$LIBRARY command on our system is that it will accept a maximum of two libraries. If there are more than two libraries to be searched, use LDSET control cards. For the details about LDSET, see the Systems Consultants (138 DCL).

#### MATHEMATICAL SOFTWARE

There are several options available for the APEX III Linear Programming package which are not on our system at this time. These options are:

- . An out-of-core system
- . A mixed-integer programming feature
- . A parametric programming facility
- . A matrix reduction capability

These options will not be added to the system until there is sufficient user demand for them, since they each involve an additional cost. CSO encourages the use of APEX for linear programming. Please send your comments and suggestions about the APEX system and the above mentioned options to Stan Bartilson, 120 DCL, 333-4715.

#### MATHEMATICAL SOFTWARE CATALOG

CSO is in the process of preparing a catalog of computing resources for mathematical programming. This will include the following:

- . A comprehensive list of computer software available through CSO which perform functions related to mathematical programming.
- . A list of researchers and computer professionals on campus who work with mathematical programming.
- . A list of documentation available on various mathematical programming technologies.

Currently, there is very little communication between mathematical programming and optimization-oriented researchers on this campus. (Much less than there is, for example, in the area of statistical methodologies.) To improve this situation, CSO would like to receive information from those users, regarding their activities, problems, future needs, etc. Please send your comments and suggestions to Stan Bartilson, 120 DCL, 333-4715.



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POLICYUSE OF IBM 360/75 ASSEMBLER TO BE RESTRICTED  
ASSIST TO BE REMOVED

In order to provide improved security for the Library Circulation System (LCS) and because of reduced usage, the 360/75 Assembler will be removed from EXPRESS on January 1, 1978. Also, by that time, use of the Assembler under HASP will be restricted to those who have a real need for the Assembler. The process for getting Assembler privileges will be announced in a future issue of OFF-LINE. For the same reasons, ASSIST will be removed from the system altogether on January 1, 1978. Please let us know if these changes cause undue hardship.

SYSTEM NOTES

## RELIABILITY REPORT

During August, the mean time between failures for the CYBER was 51 hours and time to repair was about 36 minutes. Most failures were caused by TIELINE software problems. There was one power failure.

On the IBM 360/75, the mean time between failure was about 9 hours and the mean time to repair was 39 minutes. The low MTBF figure was largely a consequence of re-defining the word "failure" to be far more stringent than before. This was done as part of a program to get the 360/75 into condition for the LCS project. A great deal of time has been spent checking internal 360/75 cabling which is showing wear and must be replaced.

## NEW REMOTE JOB ENTRY STATION

CSO has opened a new Remote Job Entry station in Room 146 Electrical Engineering Building. The facilities available there are:

- . 1 reader
- . 1 printer
- . 1 Teletype
- . 10 CRT's
- . 2 DECwriters
- . 1 high speed paper tape reader/punch

The site is open from 8:00 a.m. to 10:00 p.m., Monday through Friday. In the future, it will be CSO's initial site for graphics support, which will

include CRT plotting and the production of quality hard-copy graphics output.

## CYBER

### CYBER MANUALS

Revisions to the CYBER Manuals listed below are available at the CSO Distribution Center:

- . NOS Version 1 Reference Manual Volume 1 (Revision D)
- . Time-Sharing Users Reference Manual (Revision D)
- . CYBER Record Manager Version 1 (Replacement)

Revisions may be obtained only by those who originally purchased the manuals from the CSO Distribution Center. Replacement manuals will be given in exchange for the outdated editions.

Revisions to the following CYBER manuals can be obtained at the Distribution Center until October 31, 1977:

- . FORTRAN Extended Reference Manual (Revision C)
- . COBOL 4 Reference Manual (Revision B)
- . SYMPL Reference Manual (Revision C)
- . COMPASS Reference Manual (Revision C)
- . Common Utilities Reference Manual (Revisions C and D)
- . SORT/MERGE Reference Manual (Revisions C and D)
- . NOS Text Editor (Revision E)
- . MODIFY Reference Manual (Revision C)
- . NOS Time-Sharing Reference Manual (Revision C)

### /CLAIM OPTION ON DIRECT

In conjunction with the CLAIM command (September OFF-LINE, "Permanent File Commands"), the /CLAIM option is now available for use with the DIRECT command. The /CLAIM option resets the project index of permanent files to reflect the project index associated with the charge number, project number combination you are currently using.

The advantage of using /CLAIM with DIRECT is that it allows all your files to be CLAIMed at one time. For example:

DIRECT/CLAIM	claims all your files to the current project index.
DIRECT/PROJECT=ABZD/CLAIM	claims all your files that previously were located in project index hash ABZD.

360/75

## 360/75 RELIABILITY

The 360/75 has been very unstable during the past month due to major CPU hardware problems. Both local IBM engineers and external IBM specialist have been working on the numerous problems which have been encountered. CSO regrets any inconvenience this has caused and hopes to correct this situation as quickly as possible.

## 3330 DISK DRIVES REPLACED

CSO is acquiring new disk drives for the 360/75 to replace the present 3330's. The new drives will still be referred to as '3330' or 'DISK' but will have double the capacity of the old ones.

On October 22, many of our disk packs will have new names. Most noticeably, there will no longer be a UIPUB3. Its data sets will be moved to UIPUB1 or UIPUB2 and recataloged. Also UISYS2 will no longer exist.

NUMERICAL SERVICES

## CSMP III

CSMP III, an advanced version of CSMP (Continuous Systems Modeling Program) by IBM, should be available on the 360/75 by October, 1977.

For many purposes the previous CSMP Manual is adequate (e.g., structure statements are given in the same way, but output of results is done with OUTPUT instead of PRTPLOT). For this reason, and because a very limited supply of the new CSMP III manuals is available, only major CSMP research users should acquire the manual through CSO at this time. If you wish to order your own CSMP III manual you can do so through the local IBM office. Order manual number SH19-7001-3, "Continuous System Modelling Program III (CSMP III) Program Reference Manual". There are CSMP III manuals available for inspection at CSO's Consulting Office, 138 DCL, and in the IBM manual rack in the keypunch area, 129 DCL.

Several tests have been run on CSMP III, but the JCL procedures for using it are still being refined. The program presently exists on a setup disk. More information on the use of CSMP III will be given in a future issue of OFF-LINE.

All questions regarding the use of CSMP III and its documentation should be directed to Stanley Kerr (120 DCL, 333-4715).



MISCELLANEOUS

## WRITE PROTECT RINGS FOR TAPES

If the information which you have on tape is difficult or impossible to reproduce or you wish to have additional protection for a 'read only' tape, you may wish to obtain a free write protect ring from the CSO Distribution Center, 164 DCL. The write protect ring prevents anyone from writing on a tape by physically inhibiting the insertion of a write ring. A limited supply of the protect rings is available.



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

VOL. 5, NO. 6 MAY, 1977

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OFF-LINE is the newsletter of the Computing Services Office at the University of Illinois at Urbana-Champaign. OFF-LINE is printed every month. Articles may be reprinted provided that the source of the article is noted. CSO operates an IBM 360 Model 75 with one million bytes of fast core and two million bytes of slow core, under HASP and OS, a dual-processor DECsystem-10 with 256K words of core, under TOPS-10, serving up to 80 simultaneously active terminals, and a CYBER 175 with 131K words of core and 262K words of ECS, under NOS, serving up to 110 simultaneously active terminals.





Additions or corrections to the seminar schedule will be publicized in NEWS, HEARYE (Page 6) and RJE bulletins.

#### UWC SERVICE ENDS

The link to UWC has been discontinued due to lack of demand here and planned system changes at UWC. Users with files or tapes at UWC who want them transferred to UIC or to the IBM 360/75 should contact Scott Lathrop (187 DCL, 333-6618). The deadline for all such file or tape transfers is May 15, 1977.

#### CHARGES FOR DOCUMENT PREPARATION SERVICE

Starting May 9, 1977, CSO will charge for key-to-disk data preparation and for the use of the Diablo printer at the following rates:

##### Key-to-disk

- . \$3.60/100 lines entered.
- . \$.067 SRU/PRU/day disk storage for up to 7 days from completion of job (until first weekend backup). The user may extend the storage time to 30 days.
- . SRU charges accumulated during data entry.

##### Diablo (average 50 lines/page for pages printed)

- . \$0.15/page printed for wheels, ribbons and forms. There will be an additional service charge of \$0.50/page if output is run on individual sheets or stencils (these must be supplied by the user). This charge does not apply if the user operates the printer.

Available forms are 9.5" x 11", 10 lb., plain fan-fold with .5" removable tractor guide on each side, and standard long-form computer printout paper printed on the reverse side.

- . SRU charges accumulated during printing.

For further details concerning these charges, contact Ed Dewan, 333-8253.

CYBER 175-IBM 360/75

## TRANSFERRING EBCDIC FILES BETWEEN THE CYBER 175 AND THE IBM 360/75

Definitions

DISPLAY code is the standard character set used by CDC to represent the basic 64 character set. Each character uses a 6-bit storage mode.

ASCII code as used by CDC is a 12-bit escape code convention used to represent the 128 character set commonly referred to as ASCII. It is internally stored as two DISPLAY code characters.

EBCDIC code is a term used to refer to the IBM 256 character set. It consists of an 8-bit representation on IBM machines.

EBCESC code is a local extension of the CDC ASCII code to allow representation of the full EBCDIC character set on the CYBER. EBCESC is a mnemonic for EBCdic Escape Storage Code. Internally this requires an 18-bit storage, comprised of three DISPLAY code characters.

LINKESC code is the EBCESC code with a few added characters to allow transferring lines longer than 80 characters between the 360/75 and the CYBER. It also allows for special treatment of "/"\* and "/" which are used in 360/75 control language.

Transfer Procedures from the CYBER to the 360/75

In all cases, when transferring EBCDIC files between the two computers, a program must be run on both machines to modify the files.

When submitting a file from the CYBER to the 360/75, you must follow these steps:

1. Create the file containing the IBM job with an added step which converts the EBCESC input. The file (IBM 360) will look like:

```
//SAMPLE JOB           a legal IBM JOB card
/*ID PS=<your PS#>
/*ID CODE=<your codeword>
/*ID <any other necessary ID information>
// EXEC FROMCDC       procedure to convert EBCESC
//SYSOUT DD DSN=&&TEMP,DISP=(NEW,PASS),UNIT=DISK,SPACE=(TRK,(50,10))
//SYSIN DD DATA
    <the EBCESC text>
/*                   terminate the EBCESC text
// EXEC <proc>       your normal JCL follows
//SYSIN DD DSN=&&TEMP,DISP=(OLD,DELETE)
    <rest of your normal job deck>
/*
```

The FROMCDC procedure is to be executed on the 360/75 to translate the

EBCESC characters sent from the CYBER into IBM standard EBCDIC characters. The output from this translation is placed into the temporary file identified by the SYSOUT DD card. This temporary dataset is then used as input where the EBCDIC text is required.

2. You then use the TO360 control card to convert the EBCESC file into a code that can be transferred between the two computers (LINKESC). For example, if the above text is in the file IBM360, then enter:

```
TO360,IBM360,IBMOK.
```

The TO360 command copies the text from the file IBM360 to the file IBMOK. The output file IBMOK is now suitable for sending to the 360/75. The general format of this command is:

```
TO360,<fin>,<fout>.
```

where <fin> refers to the original input file and <fout> refers to the output file ready to send to the 360/75.

3. Next, you send the output file of TO360 to the 360/75 as you would any file which didn't need special character set treatment.

```
SUBMIT,IBMOK.
```

This submits the file IBMOK to the 360/75.

### Transfer Procedures from the 360/75 to the CYBER

When sending a file which is in the EBCDIC character set from the 360/75 to the CYBER, follow these steps:

1. You must add a step to your program which translates the EBCDIC text into a form that can be sent to the CYBER. The 360/75 job will look like:

```
//TEST2 JOB                                IBM 360 JOB card
/*ID PS=<your PS#>
/*ID CODE=<your codeword>
/*ID PRINT=CYBER
/*ID NAME='<filename>(<ID number>)'
// EXEC <proc>                               run your normal procedures
   <remainder of normal job deck>
//GO.SYSPRINT DD DSN=&&TEMP,DISP=(NEW,PASS),UNIT=DISK,SPACE=(TRK,(50,10))
// EXEC TOCDC                               procedure to translate EBCDIC
//SYSOUT DD SYSOUT=A[,DCB=(RECFM=F,BLKSIZE=133)]
//SYSIN DD DSN=&&TEMP,DISP=(OLD,DELETE)
/*
```

Where your program would normally generate EBCDIC output, as in the SYSPRINT DD statement in the example above, the text should be placed into a temporary dataset which can then be processed by the TOCDC procedure. The TOCDC program reads its input through the SYSIN DD card and generates a character set that can then be sent to the CYBER.

The DCB parameter should be used on the //SYSOUT DD statement if you want lines greater than 80 characters wide.

You will also notice that the /\*ID cards include PRINT=CYBER and NAME='<filenam>(<ID number>)'. These parameters specify that the printout of the job should go into the fetch queue on the CYBER. The details of fetching output from the fetch queue is explained in the HELP item on the FETCH command (CYBER and DEC-10). <filenam> can be any legal CYBER file name 1 to 7 characters in length. <ID number> is either your University ID (9-digit number) or your user number (7 character identification).

2. Once on the CYBER, you can enter the command:

```
FETCH.
```

to see the list of files awaiting fetch. These are print files from the 360/75. You can then access a particular file in the queue by:

```
FETCH,<filenam>.
```

This makes a local copy of the file <filenam>. You must now edit the file to remove the 360/75 header and burst pages normally generated on any IBM output. In addition, each line of the file has an extra system generated carriage control character in column 1, which can be removed using BOSS.

```
BOSS,<filenam>.
```

```
?? VMOD ^:*
```

```
M?? #
```

```
?? E
```

Modify all lines of the file by deleting the first column of each line. Then exit from BOSS.

If this was a file containing EBCESC, you would have to go through one more translation:

```
FROM360,<fin>,<fout>.
```

The program FROM360 copies the file <fin> to the <fout> by translating any LINKESC characters into valid EBCESC characters. It is the file <fout> which you want to save. You can, of course, use whatever file names suit your needs in place of <fin> and <fout>, following CYBER file-name rules. <fin> refers to the name used on the IBM /\*ID NAME= card, which was shown as <filenam>. <fout> can then be any local file name.

CYBER

## TRANSFER DEC-10 FILES TO THE CYBER

Since the DEC-10 will be removed from service at the end of the semester, users are urged to complete the transfer of their files to the CYBER. Files stored on DECTape should also be transferred at this time.

## HEARYE COMMAND ADDED TO CYBER

A news facility similar to the one now existing on the DEC-10 (NEWS) is available on the CYBER. Information regarding the CSO computer network will be presented via this facility. Since this facility is available on the CYBER, the majority of the user community will have immediate access to current information concerning the network.

The latest news can be obtained by typing HEARYE when logged in at a CYBER time-sharing terminal. Available articles will be presented in reverse chronological order. To stop the presentation, type STOP.

In addition, the HEARYE facility allows one to choose topics, read headlines only, specify a date constraint or specify an alternative output file. The general format of the HEARYE command is

```
HEARYE[, <topic>][<switch>]
```

where

- <topic> is a topic name. In specifying a topic name the character \* can be included to match any character or characters. If a \* is included within a topic name the \* matches any one character. If a \* appears as the rightmost character of a topic it matches any character in the same position and all characters to the right of that position.

- <switch> is one of the following:

/T list only topics (in alphabetic order)

/F list only headlines

/L=lfm the output goes to file lfm

/S=date list only items since date

/B=date list only items before date

where date is of the form ddd or dmmmm

If date is of the form ddd it is interpreted as meaning today's date minus ddd days.

If date is of the form ddmmm then if that date is within the present year, it is that date. If it is not in the present year it is interpreted as being that date in the previous year.

If /T and /F are used together on the HEARYE command, only topics will be listed. Any other combination of switches will produce the expected results.

Examples:

HEARYE/T.

TOPICS AVAILABLE:

ATOPIC TOPIC1 TOPIC02 ZTOPIC

HEARYE,\*TOPIC/F

12-APR-77 ZTOPIC        HEADLINE FOR ZTOPIC  
01-JAN-77 ATOPIC        HEADLINE FOR ATOPIC

HEARYE, TOPIC\*

10-MAR-77 TOPIC1        HEADLINE FOR TOPIC1

(This would be the news about TOPIC1. It could be arbitrarily long.)

5-MAR-77 TOPIC02        HEADLINE FOR TOPIC02

(This is the news about TOPIC02.)

HEARYE/S=10MAR/F

12-APR-77 ZTOPIC        HEADLINE FOR ZTOPIC  
10-MAR-77 TOPIC1        HEADLINE FOR TOPIC1

#### SORT/MERGE REFERENCE MANUAL REVISIONS

Revisions C and D to the SORT/MERGE Version 4 and 1 Reference Manual are available. If you own this manual, you may obtain the revision from the CSO Distribution Center (164 DCL) free of charge.

#### STATISTICAL SERVICES

#### CYBER SPSS ERRORS

The following is a list of known errors in the SPSS batch and SPSS/ONLINE systems.



CYBER SPSS Batch Errors

AGGREGATE	For a file with a subfile structure, only the first subfile is identified on output.
AGGREGATE	The n's for a weighted file with fractional weights are not computed correctly. The BCDOUT output file also has the wrong number of cases for a file in which some cases have fractional weights.
COMPUTE, IF COUNT, RECODE	If more than 5000 data transformations are requested only the first 5000 are done correctly.
CONDESCRIPTIVE	Z-scores are not computed correctly when fewer than three variables are requested.
CONDESCRIPTIVE	Does not allocate memory correctly. This problem only occurs when the input record length is very large.
CROSSTABS (integer mode)	When a list of variables is specified (i.e. A BY B BY C,D, E), partial gammas are computed incorrectly for all tables involving the second through nth variables in the list.
CROSSTABS (general mode)	If STATISTIC 4 or 5 is requested with an alphabetic variable as the column variable a Mode 2 error results.
DO REPEAT	Does not terminate correctly when its workspace is filled.
FREQUENCIES	Does not allocate memory correctly. This problem only occurs when the input record length is very large.
FREQUENCIES	OPTION 4 to write frequency distributions on BCDOUT is not working. When OPTION 4 is selected, the program terminates with the error message:  2015 - CODED OUTPUT - UNASSIGNED MEDIUM
FREQUENCIES (general mode)	Alphabetic values are not sorted correctly.
GET ARCHIVE	Cannot be used with the features ADD CASES, ADD SUBFILES, ADD VARIABLES and ADD DATA LIST.
MANOVA	The residual sum of squares matrix is not initialized with matrix input.
MANOVA	The design matrix, STATISTIC 3, is printed only if STATISTIC 4 is also selected.
MANOVA	An EDIT run may give misleading information about the amount of memory needed for a MANOVA analysis, and certain messages about memory needed are unclear. MANOVA determines: <ol style="list-style-type: none"> <li>1. The memory needed to read the data, and once the data has been read,</li> </ol>

2. the memory needed to complete the analysis.

Unfortunately, in an EDIT run, MANOVA only checks to see that there is enough memory to read the data. Consequently, when an EDIT run is resubmitted as a regular run, MANOVA may terminate after reading the data with the error message:

```
*** ERROR ***   xxxxxxB WORDS OF WORKSPACE NEEDED
FOR MANOVA ONLY yyyyyyB WORDS AVAILABLE.
```

where xxxxxx and yyyyyy refer to the amount of memory over and above that already available (i.e. the amount needed to read the data). These messages should refer to total field length.

NONLINEAR	Does not reload files created by the CYBER loader correctly. A flag used by the I/O routines gets clobbered with the result that E conversion is not being done correctly.
NONPAR CORR	Spearman and Kendall rank-order correlation coefficients are not computed correctly when the default missing data option (pairwise) is used and there were no missing values declared for the variables in the analysis.
NPAR TESTS	When group ranks are equal, Kruskal-Wallis Oneway Anova terminates with a Mode 2 error.
PARTIAL CORR	OPTION 5 to write correlation coefficients on BCDOUT does not work.
SCATTERGRAM	If SCATTERGRAM runs out of memory and OPTION 8 is not selected, the data file is not positioned correctly for subsequent procedures.
SCATTERGRAM	On the X axis, 5 places to the right of the decimal point are always printed. The correct number of print values should have 2 plus the number of digits specified by PRINT FORMATS places to the right of the decimal point.
ERROR PROCESSING	When the VARIABLE LIST or ADD VARIABLES card is misplaced, the message:  ERROR 17 - NOT DEFINED. PLEASE REPORT.  is printed instead of an informative diagnostic.

#### CYBER SPSS/ONLINE Errors

BREAKDOWN	If STATISTIC 2 is requested with an alphabetic variable, BREAKDOWN terminates with a Mode 2 error.
-----------	--

CROSSTABS        STATISTIC 10 is labelled as ETA SQRD instead of ETA.  
 PLOT             The PLOT procedure cannot be accessed in SPSS/ONLINE.

#### USING MPOS ON THE CYBER

The Multi-Purpose Optimization System (MPOS), an integrated system of computer programs to solve optimization problems, has been tested and installed on the CYBER. Reference guides covering the use of MPOS on the CYBER are available (free) in the user's area at CSO North (134 DCL) and CSO South (70 Commerce West). MPOS manuals will soon be available for purchase at the CSO Distribution Center (164 DCL).

To use MPOS, you must issue the following commands:

```
ATTACH,MPOS/UN=LIBRARY.  
MPOS,<lfn1>,<lfn2>.
```

where <lfn1> is the name of the local file containing your problem information and <lfn2> is the name of the local file into which your results are to be written. If <lfn1> is not specified the file "INPUT" is assumed. If <lfn2> is not specified the file "OUTPUT" is assumed.

If you encounter any problems with MPOS, contact CSO Statistical Services (84 Commerce West, 333-2170).

#### USING LISREL III AND COFAMM ON THE CYBER

The LISREL III and COFAMM programs authored by Karl G. Joreskog and Dag Sorbom of the University of Uppsala have been tested and installed on the CYBER. LISREL III provides an "Estimation of Linear Structural Equation Systems by Maximum Likelihood Methods". COFAMM provides a "Confirmatory Factor Analysis with Model Modification". Reference guides covering the use of LISREL III and COFAMM on the CYBER are available (free) in the user's area at CSO North (134 DCL) and CSO South (70 Commerce West). LISREL III and COFAMM manuals will soon be available for purchase at the CSO Distribution Center (164 DCL).

To use LISREL III you must issue the following commands:

```
GET,LISREL3/UN=LIBRARY.  
LISREL3,<lfn1>,<lfn2>.
```

To use COFAMM you must issue the following commands:

```
GET,COFAMM/UN=LIBRARY.  
REDUCE(-)  
RFL,45000.  
COFAMM,<lfn1>,<lfn2>.
```

where, in both instances, <lfn1> is the name of the local file containing your problem information and <lfn2> is the name of the local file into which your results are to be written. If <lfn1> is not specified, the file "INPUT" is assumed. If <lfn2> is not specified, the file "OUTPUT" is assumed.

If you encounter any problems with either LISREL III or COFAMM contact CSO Statistical Services (84 Commerce West, 333-2170).

#### COMPRESSED SPSS SYSTEM FILES ON THE CYBER

SPSS system files on the CYBER take up much more disk space than SPSS system files on the IBM 360/75. When it is used to create a system file, the CYBER version of SPSS stores each variable in one computer word. This results in large files. To alleviate this problem, the CYBER version of SPSS has a provision for creating a compressed system file. While it is true that a compressed system file is much smaller than a regular file on the CYBER, it is also true that it takes somewhat longer to run from a compressed system file than from a regular system file.

CSO Statistical Services recommends that very large system files be stored on magnetic tape as regular system files. However, if a large system file is to be stored on disk, we recommend that since machine time on the CYBER is more plentiful than disk space (especially when considering the great reduction in disk space compared to the small increase in execution time), that users take advantage of the savings in disk space offered by compressed system files. Questions concerning SPSS system files or SPSS compressed system files should be directed to CSO Statistical Services (84 Commerce West, 333-2170).

The following is reprinted from the "SPSS-6000 Version 6.5 Update/CDC-IBM SPSS MANUAL DIFFERENCES", Northwestern University, pages 4-5 (it should be noted the CP times quoted are approximately 5 times what they would be on our CYBER and a PRU is comparable to 64 words):

An SPSS system file (created by SAVE FILE or SAVE ARCHIVE) can require considerably more disk (or tape) storage than the corresponding BCD file, since each variable is stored in one computer word (the equivalent of 10 characters in a BCD file). However, system files in which most of the unused space is compressed out may be created; such files are known as compressed system files.

Using compressed files can result in spectacular savings in disk space and permanent file charges. For example, a file that would normally occupy 5925 PRU's (disk words), when compressed required only 771 PRU's.

However, nothing is ever free, and in the case of compressed system files, central processor time is increased when the files are read. Using the above file, a run executing a single SPSS procedure increased in CP time from 7.8 to 17.5 seconds. Thus, the compressed feature appears to be appropriate for large files that are not heavily used. When a compressed file is being processed, the data is 'decompressed' while the file is being read for the first procedure. As is true with uncompressed files, if there is more than one procedure in the job, a binary copy of the data is written on a scratch disk file in uncompressed mode. This means that the penalty in CP time for decompression is only for the first procedure. This also means that a job run against a compressed file with more than one procedure will cause an expanded copy of the data to be written.

To write a compressed system file, the key word COMPRESSED is specified on the SAVE FILE or SAVE ARCHIVE card. The form of the SAVE FILE card is:

```

1           16
SAVE FILE   COMPRESSED [ file name, file label ]

```

The format of the SAVE ARCHIVE card to create a compressed file is:

```

1           16
SAVE ARCHIVE COMPRESSED [ file name, file label/ ]
              FILE = infile1 VARIABLES = variable list
              / FILE = ...

```

No other changes are required to a job deck set up for writing a system file.

No changes at all are required to read a compressed system file since SPSS automatically recognizes a compressed file.

### MISCELLANEOUS

#### REPAIR OF TEXAS INSTRUMENT TERMINALS

The Center for Advanced Computation has facilities for repairing the Silent 700 series of Texas Instruments terminals. Spare parts are stocked for the Silent 700 models 725, 735 and 745. Repair charges are \$12.00 per hour with a one hour minimum plus parts. Warranty work can also be done if a copy of the original purchase order and the terminal's delivery receipt accompanies the T.I. terminal submitted for repair. Pick-up and delivery service is not available. For further information contact Mr. Del Knecht in Room 140 of the Advanced Computation Building, phone 333-9422 or 333-8150.



## SERIES/1 GENERAL PURPOSE COMPUTER

IBM will give a presentation concerning the recently announced SERIES/1 general purpose computer on May 5, 1977 at 3:45 PM in Room 115 DCL.

The SERIES/1 is designed to answer problems in the application areas of communications, batch processing, on-line processing and sensor base.

HELP WANTED

## GENETICS RESEARCH

Research Assistant - Computer programming in genetics research with dairy cattle in Department of Dairy Science. Involves data management and complex statistical analyses. Knowledge of FORTRAN, matrix algebra and statistical methods for unbalanced data are required. Experience with the CYBER 175, statistical program packages, statistical analysis of large datasets and farm animals is desirable but not essential. Full time temporary employment. Call A. J. Lee, 333-2626.



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

VOL. 5, NO. 8 July, 1977

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OFF-LINE is the newsletter of the Computing Services Office at the University of Illinois at Urbana-Champaign. OFF-LINE is printed every month. Articles may be reprinted provided that the source of the article is noted. CSO operates an IBM 360 Model 75 with one million bytes of fast core and two milion bytes of slow core, under HASP and OS, a dual-processor DECSYSTEM-10 with 256K words of core, under TOPS-10, serving up to 80 simultaneously active terminals, and a CYBER 175 with 131K words of central memory and 262K words of ECS, under NOS, serving up to 110 simultaneously active terminals.

POLICY

SERVICE UNIT DEVALUED

The service unit was devalued at midnight on June 28, 1977. One service unit now costs \$0.91.

CORRECTION TO CSO FACILITIES - SUMMER SCHEDULE

These are corrections of the schedules given in the June edition of OFF-LINE for CSO South and Lincoln Hall. For the summer session, the hours of operation will be:

CSO SOUTH [COM].....70 Commerce West (333-4500)

8:00 AM - 12:00 Midnight, Monday - Thursday

8:00 AM - 5:00 PM, Friday

2:00 PM - 10:00 PM, Sunday

SOCIAL SCIENCE [LH].....202 Lincoln Hall (333-6750 or 333-0309)

9:00 AM - 5:00 PM, Monday - Friday

TERMINAL ROOMS CLOSED

Three rooms containing terminals have been closed for the summer:

- . 103b Engineering Hall
- . 83 Commerce West
- . 166 Digital Computer Lab.

These rooms were closed because the hardware which is necessary for adding ports to the CYBER to accept the terminals freed by the departure of the DEC-10 has not arrived.

CSO SEMINAR SCHEDULE

Seminars will be presented from 3:00 to 4:00 PM in Room 237 DCL. The topics are as follows:

July 18                    SPSS on the CYBER                    Speaker: Beth Richardson

Using SPSS on the CYBER. Known problems and differences from the 360 version. Converting existing data from the CYBER. What about OSIRIS interface. Topics with SPSS.



The second difference is that disk is a repository rather than a generative service. It is accepted that in calculating a new set of results more CPU time will be used. On the other hand, you never quite know when a data file has completely served its purpose and, the world being the way it is, a need for a data file will present itself immediately after you have altruistically removed it from disk. There is thus a natural "wait and see" attitude about removing files from disk. After all, they are bound to be useful again sometime.

Most computing resources are measured in quantities which have everyday analogues (such as a CPU second) or that are easily countable (such as lines or cards). Thus, the occasional user has some intuitive notion of what resources are necessary for a job. There is not always such a direct comparison with disk space, especially when a file is built up piecemeal from a terminal. For instance, on the CYBER:

My mistress eyes are nothing like the sun;  
 Coral is far more red than her lips' red;  
 If snow be white, why then her breasts are dun;  
 If hairs be wires, black wires grow on her head.  
 I have seen roses damask'd, red and white,  
 But no such roses see I in her cheeks;  
 And in some perfumes is there more delight  
 Than in the breath that from my mistress reeks.  
 I love to hear her speak, yet well I know  
 That music hath a far more pleasing sound;  
 I grant I never saw a goddess go;  
 My mistress, when she walks, treads on the ground:  
 And yet, by heaven, I think my love as rare  
 As any she belied with false compare.

takes nearly one PRU (640 characters) when typed in upper case with capitals preceded by "up arrow". In ASCII it takes two PRU's and in EBCDIC, three PRU's. For larger files, we can construct the following scale:

<u>Thousands of Characters</u>	<u>Novel</u>
250	The Great Gatsby
500	Silas Marner
750	Sense and Sensibility
1000	Nostromo
1250	Crime and Punishment
2000	David Copperfield

Perhaps units like "sonnet" and "Nostromo" should be used instead of "PRU" and "megabyte".

The tendency to postpone file removal is encouraged to some extent by the lower visibility of disk charges. Job charges are immediately available for all to see and rail against. Disk charges insiduously eat away an account, and are only apparent on monthly statements, which as often as not are never seen by the person actually using the disk. Unfortunately, charges for disk storage space are comparatively difficult



to calculate. At this time, there seems to be no way to make them readily available to users without incorporating long delays at log-in or log-off time. So, charging is usually done by stealth in the dead of the night. Also, although daily charges may be comparatively small, their accumulation over a month or so may not be. Accumulated totals are practically impossible to present in an economical, on-line way.

The result of all this is that disk usage tends to exhaust all the disk space available (regardless of its size) unless some sort of disk management scheme is used to keep it in order. Compared with CPU management or memory management, disk management schemes tend to be rather rudimentary. This is mainly a historical phenomenon. On this campus, the main retarding influences are the IBM heritage, the relatively late adoption of time-sharing, and the late appearance but rapid acceleration of computing activities by the social science and related disciplines which tend to rely on large data collections.

Generally speaking, disk management schemes form a spectrum with complete user control of disk on one hand and complete computer center control on the other. Some computer centers, for example, insist that disk users pay only "real money" for permanent storage space, and rates are set so that the disk system always recovers its cost plus a small expansion increment. As the disk fills up, more disk space is acquired. The size of the disk system thus reaches a level determined by the wealth of its users. Little computer center management is necessary because the user community can always get as much as it can afford. There are two major disadvantages to this system. First, disks must be leased on shorter, more expensive agreements so that fluctuations in need can be accommodated economically. Disk space thus costs more than it would if it were acquired under long-term agreements. Second, and more seriously, the fact that the disk must pay for itself may lead to demands that other equally important, but more expensive, services such as consulting and documentation services, pay for themselves too. However, these services are, in general, far too expensive on a per-item basis unless they are subsidized to a certain extent by other rates. Additionally, on this campus, a large proportion of users "pay" for their computing services with service units, and would be computationally paralyzed if disk services were to be paid for with real money.

At the other end of the spectrum, the computer center allocates disk space to each user on some basis and rigidly enforces both the extent and duration of disk usage for each user. Clearly great economies in disk storage are achievable by this method, although they are often not realized because users often need large quantities of space for a short time and smaller quantities of space for most of the time. The disk tends to be unresponsive to change because it is partitioned into fiercely defended territories. The cost of managing disk and arbitrating between defenders is very high.

Since disk management of some sort is necessary, CSO attempts to provide one that is a happy medium between these two extremes. The principal method is to artificially refresh disk by removing files that have not been accessed for a month or that belong to expired or cancelled accounts. The 30 days is a compromise period designed to be practical and minimize the complaints of users who rely on the

cleaning process to remove files for them and of those who complain that files are removed too frequently. The second method is to charge for disk, since this encourages people to look at their disk usage and make rational judgments about whether to retain an infrequently used file on disk or not.

On the 360/75, MERLIN provides a freely accessible, short-term storage device which is completely purged each week, but is charged for at a lower price than "permanent" disk. Since it has been observed that many users tend to use CSO facilities at high intensity for a few days, and then at a lower intensity for several weeks, those requiring the use of large files for a short time should find MERLIN useful. CSO is looking at providing a similar kind of service on the CYBER 175. CYBER 175.

Setup packs are a different, but inferior, approach to disk management. It is different in the sense that the owner of the pack must do his own disk management, and because the user is charged for the labor of mounting the pack (and maintaining the drive) but not for its storage. It is inferior because the need for manual intervention increases both the average and the variance of the time needed to access the data, and also increases the chance of catastrophic loss of data if the heads crash or the pack is dropped.

CSO does not encourage the use of setup packs because it puts the department in the position of providing an inferior (albeit inexpensive) service. It is unreasonable that a segment of users be penalized because they use large amounts of data, yet the current technology and financial situation offer little hope of escape.

The time-sharing orientation of the CYBER allows more scope for the development of disk management systems. The main emphasis will be towards making disk storage more visible and amenable to individual user control on one hand and matching automatic functions more closely to measured user habits on the other. This should lead to a scheme where users could mark their own files for backup and restore when they feel they have finished with them for a while, or think they will need them soon. It could also lead to a routine backup policy dependent on the file size as well as file inactivity.

Other possibilities such as using large archival storage systems or the use of user mountable floppy disks are being considered. These are more radical alternatives and will take longer to develop.

CYBER

## CONVERT NOW

If you have not converted to the CYBER, do so now. Take advantage of the computational power of this new resource and the growing list of available software. Many aids to conversion are available. One of these is CONVPRC which is described fully in the FORTRAN CONVERSION GUIDE, available at the CSO Distribution Center (164 DCL), and, briefly, below:

CONVPRC is a procedure for running the locally written IBM-FORTRAN to CDC-FORTRAN conversion program. CONVPRC is located in user number LIBRARY and may be accessed using:

```
GET,CONVPRC/UN=LIBRARY.
```

The basic call to it is:

```
CALL,CONVPRC(OLD=OLDPROG,NEW=NEWPROG,D=DIRECTIVES,L=LISTING)
```

where:

OLDPROG        Is the name of the local file containing the source program to be converted. If this parameter is omitted entirely, the program is assumed to be in local file OLD.

NEWPROG        Is the name of a local file in which the converted version of the program is to be put, provided the user includes a \*PUNCH directive to the conversion program (otherwise only the diagnostic listing is produced). This file is rewound before conversion begins and should be saved/replaced if anything is actually put in it. If this parameter is omitted entirely, the converted program goes in local file "NEW". If you are at a terminal "NEW=OUTPUT" may be used to display the converted deck without storing it.

DIRECTIVES     Is the name of a local file containing directives to the conversion program. (See the writeup on the conversion program for a list of these directives.) If you wish to be prompted at the terminal for the directives, use "D=INPUT". If the "D" parameter is not included, directives will be taken from the local file named "D".

LISTING            Is the name of a local file to which the diagnostic output of the program is to be directed. If "L=OUTPUT", the listing will appear at the terminal (if you are at a terminal), or will be printed (if you are running from cards). If the parameter "L" is omitted, the listing will go to local file "L" (which the proc automatically prints if you are running from cards).

NOTE:            When run in time-sharing, COMVPRC normally rewinds all the files it deals with; in batch, no rewinding is done. To suppress the rewinding in time-sharing, code "NR=1" in the procedure call; it is then up to you to make sure all the files are positioned properly.

The conversion program is attached under the name "CNVPGM". If you have a local file of this name, it will disappear and be replaced by the conversion program.

Local files TAPE27, TAPE28, TAPE29, TAPE30, TAPE31, TAPE32, and TAPE33 are used as scratch files by the conversion program. If you have any important information in any of these files, save it beforehand.

As a reminder, this writeup may be dumped by using:

```
CALL,CONVPRC(HELP=1)
```

A printed copy can be obtained as follows:

```
CALL,CONVPRC(HELP=1,OUTPUT=FILE)
PRINT,FILE.
```

Examples:

```
1.  GET,PROG.
    GET,CONVPRC/UN=LIBRARY.
    CALL,CONVPRC(OLD=PROG,D=INPUT)
    PRINT,L/CC.
    SAVE,NEW=NEWDECK.
```

In this example, a file called "PROG" containing a program to be converted was retrieved and run through the conversion utility. The user was prompted at the terminal for conversion directives. The diagnostic listing went to file "L", which was printed afterward. The new version (assuming a \*PUNCH directive was given) was placed (by default) in file "NEW", which was saved.

```
2.  GET,DECK.
    GET,CONVPRC/UN=LIBRARY.
    CALL,CONVPRC(OLD=DECK,NEW=NEWDECK,D=DIR,L=LIST)
    REPLACE,NEWDECK.
    PRINT,NEWDECK,LIST/CC.
```

Here the user retrieved an old program and a file with his own conversion directives. The new version of the program was put in "NEWDECK", which was replaced after the diagnostics from conversion were routed to file "LIST", which was printed afterward along with the new deck. The "/CC" is included in the print command since the diagnostic output already has carriage control on it.

3. Suppose one wants to read a deck in from cards, with his own conversion directives also on cards, and save the converted result. His batch job might be set up as follows:

```
JOB CARD.
SIGNON(987654321)
PASSWORD.
CHARGE(CHAR ,PROJ )
COPYCR,,D.
COPYCR,,OLD.
GET,CONVPRC/UN=LIBRARY.
CALL,CONVPRC(L=OUTPUT)
REWIND,NEW.           These two cards suffice to print "NEW".
COPYSBF,NEW,OUTPUT.
7/8/9                 (Here goes the 7/8/9 multipunch delimiter)
*PUNCH                (Plus assorted other directives, one per card.)
7/8/9
  <old program deck>
6/7/8/9
```

#### DIRECT AVAILABLE

DIRECT is a command which was created locally to provide permanent file information on the CYBER. DIRECT may be used either in batch or time-sharing. The format of the command is:

```
DIRECT<options>,<filename><options>,...,<filename><options>
```

where

- . <filename> is a valid file name, i.e., 1-7 alphanumeric characters.
- . <options> is zero or more of the switches given below.

Entering only DIRECT results in an alphabetically sorted listing of all permanent files followed by a summary of disk space used for them.



A maximum of 10 files may be specified. If no file name is given, DIRECT is applied to all permanent files.

Each file designation may have the wild card character "\*" in it. If "\*" is the last character in the file designation, it matches any number of characters. If "\*" is not the last character, it matches the character in that position.

All options given are applied to each file specified in the command string. Options may be abbreviated. The abbreviations must be unambiguous and the shortest abbreviations are underlined in the list below. The values assigned to an option (if any) may also be abbreviated. The shortest abbreviations are given below.

The options are:

/ACCESS

Updates the access date on the requested files.

/ALLOC (default with /NORMAL, /TOTAL  
and /DETAIL)

Provides the space allocated by direct access files. Disk space is allocated in units of 227 PRU's for direct access files.

/COUNT (Assumed with /TOTAL and /DETAIL)

Provides the count of modifications.

/CI (Assumed with /NORMAL, /TOTAL  
and /DETAIL)

Requests the CT of each file be output. The default type PRIVATE is not indicated in the listing.

/CI=<type>

Request a list of files with CT=<type>. <type> may be PRIVATE, PUBLIC or SEMIPR.

/DATES (Assumed with /TOTAL and /DETAIL)

Provides access, creation and modification dates and times.



/DATES=<type>

Provides access, creation or modification dates and times. <type> can be ACCCESS, CREATE or MODIFY.

/DETAIL

Requests that all information about a file be given.

/DIRECT (Assumed except when /INDIRECT given)

Lists all direct access files. Each is flagged by a "\*" immediately preceding the filename.

/FAST (Default)

Provides a sorted list of all file names. Direct and indirect files are listed.

/INDIRECT (Assumed except when /DIRECT is specified)

Lists all indirect access files.

/LSTING=<file> (Default <file> = OUTPUT)

Allows specification of an alternate file name for the listing. A 132 column output line is assumed when an output listing is requested or when DIRECT is used in a card batch job.

/MODE (Assumed with /NORMAL, /TOTAL and /DETAIL)

Requests that mode of each file be listed. The default mode WRITE is not indicated in the listing.

/MODE=<type>

Requests that only files with the specified mode be listed. <type> may be WRITE, READE, APPEND, MODIFY, EXECUTE, RAPPEND, RMODIFY or NULL.

/NORMAL

Assumes /CT, /MODE, /PRU, /ALLOC and /PROJECT.

/PCOUNT (Default with /DETAIL or /PTOTAL)

Provides the modification/count value for each access by a permitted user.

/PDATE (Default with /DETAIL or /PTOTAL)

Provides the access date and time for each permitted user.

/PERMIT (Default with /DETAIL and any permit request)

Requests a list of user numbers permitted to use the specified files.

/PMODE (Default with /DETAIL or /PTOTAL)

Provides the access mode available to the permitted user number.

/PROJECT (Assumed with /TOTAL and /DETAIL)

Provides the project hash associated with each file.

/PROJECT=<projecthash>

Provides a list of only the files under the specified <projecthash>.

/PRU (Assumed with /NORMAL, /TOTAL and /DETAIL)

Provides the PRU usage of each file.

/PTOTAL (Default with /DETAIL)

Provides all the permit information for each file. This includes the user number, access count, access mode and access date and time.

/SORT (Default)

/NSORT

Allows you to get an alphabetical sorting of your files. The /NSORT turns the sort off.

/TOTAL

Turns on all of the possible options described above. Also, the subsystem and password are given.

/UN=user number (Defaults to your user number)

Allows you to specify an alternate user number to list the permanent files from. If this is specified in conjunction with a permit request, then only files permitted to this particular user number are listed.

Examples:

1. DIRECT/PRU/CT=PUBLIC.

Will list all PUBLIC files along with the number of PRU's they use.

2. DIRECT,S\*RT\*

Will list any file with first letter of S, third and fourth letters of RT and any number of letters following (including no letters). This will list the files SORT, SORTING and SQRT.

3. DIRECT/TOTAL/L=OUT.

Will list all information about the permanent files in the local file OUT.

## SPITBOL 6000 AVAILABLE

A preliminary release of the SPITBOL 6000 interpreter has been installed on the CYBER 175. Users should find SPITBOL 6000 to be more complete, more reliable and, in some cases, faster than CAL SNOBOL.

In batch, the control card

```
SPITBOL.
```

will read the source program and data from cards and produce the source listing and other standard output on the line printer. In batch and the time-sharing BATCH subsystem, the control card

```
SPITBOL,I=<source>,L=<listing>.
```

will read the source program and data from the local file <source> and produce the output listing in the local file <listing>.

Because this is only a preliminary release of SPITBOL 6000, complete documentation is not yet available. The incomplete documentation which accompanied this release may be examined in the Consulting Office (138 DCL).

## GCS AVAILABLE

A portion of the Graphics Compatibility System (GCS) has been installed on the CYBER 175. To use GCS:

```
ATTACH,GCSBASE,<devlib>/UN=LIBRARY.
$LIBRARY,GCSBASE,<devlib>.
```

where <devlib> is the device dependent library for the graphics device you wish to use. At the time this article is being written, the following device dependent libraries are available:

GCSPRNT line printer plotting

GCSALPH printer plotting on interactive alphanumeric terminals such as the Vistar GT

GCSADDR printer plotting on terminals with addressable cursors such as the Vistar II, Hazeltine 2000, or Hazeltine Module 1

Consult HEARYE on the CYBER for up to date information on what device dependent libraries are available.

Documentation on GCS may be purchased at the CSO Distribution Center (164 DCL). A local guide to GCS including local extensions will be produced when the installation of GCS is complete.

## BOSS VERSION 1.2

Version 1.2 of BOSS will be available soon. In this version, a number of bugs will be fixed and the default line number mode will be changed to UNNUMBERED mode.

## SORT/MERGE INSTANTS

A revised edition of the SORT/MERGE Versions 4 and 1 Instant is available at the CSO Distribution Center (164 DCL). The old edition may be exchanged for the revised edition free of charge.

IBM 360/75

## 360 DOWNTIME

The cause of the extended downtime on the 360/75 during the week of May 29, 1977, was a faulty cable in the IBM 2870 Multiplexor Channel. The cable was replaced and similar failures have not occurred. We regret any inconvenience this downtime may have caused you.

DOCUMENT PREPARATION

## NEW DIABLO TERMINAL

CSO has purchased a new Diablo HyTerm Communications Terminal for use by the Document Preparation Service. The Diablo terminal has programmable features which are utilized by transmitting control codes and escape code sequences to the printer. Following is a list of the features available:

- . Resolution: 1/120" horizontal, 1/48" vertical in Graphics mode.
- . Dimensions: 132 columns at 10 characters/inch (Courier 10), 158 columns at 12 characters/inch (Elite 120; print line 13.2").
- . Multiple forms (0.27"/.69mm maximum).
- . Multiple form length: 1/6, 3, 3.5, 4, 5,5, 6, 7, 8, 8.5, 11, 12 and 14 inch.

- . Cut stencils.
- . Red/black (fabric) ribbon.
- . Normal line spacing, 6 lines/inch.
- . Backward printing.
- . Standard horizontal tabbing.
- . Absolute horizontal and vertical tabbing, i.e., direct to addressed position.
- . Line feed up and down at full or half line spacing.

Presently these features can be utilized through an editor such as BOSS, or through user-written programs. Tabulations of the control codes and escape sequences, plus a translation table for converting decimal numbers into the appropriate arguments for use in the tabbing and spacing sequences follow.

#### CONTROL CODES (DISPLAY CODE REPRESENTATIONS)

^/	Backspace
^sp	Carriage Return
^(	Horizontal Tab
^)	Line Feed
^=	Form Feed
^8	Send ACK
^*	Sound Alarm (bell)
sp	Space

#### ESCAPE CODE SEQUENCES (DISPLAY CODE REPRESENTATIONS)

^>1	Set horizontal tab stop.
^>2	Clear all tab stops.
^>3	Graphics on.
^>4	Graphics off (CR also clears).
^>5	Forward print on.
^>6	Backward print on (CR also clears).
^>8	Clear individual tab stop.
^>9	Set left margin.
^>A	Print in red.
^>B	Print in black.
^>D	Negative half-line feed.
^>U	Positive half-line feed.
^>^)	Negative line feed.
^>^(n	Absolute horizontal tab to position n.
^>^\$n	Absolute vertical tab to line n.
^>^^n	Set vertical spacing equal to n-1 times 1/48 inch.
^>^;n	Set horizontal spacing equal to n-1 times 1/120 inch.



n is any character whose ASCII code is between decimal 1 and 126; the ASCII code is translated into an appropriate value for the escape action designated. The table given below shows the DISPLAY CODE representations to use to get any particular value of n.

For example, the escape code sequence "absolute tab to column 55" is:

```
^>^(7
```

and the escape code sequence to set the vertical spacing to 2/48 inch is:

```
^>^^^8
```

Note that the user must be in NORMAL mode in BOSS to enter these codes correctly.

DISPLAY CODE Representations for Decimal Arguments

	0	1	2	3	4	5	6	7	8	9
0		^6	^7	^8	^9	^+	^-	^*	^/	^(
10	^)	^\$	^=	^sp	^,	^.	^#	^[	^]	^%
20	^"	^_	^!	^&	^'	^?	^<	^>	^e	^\
30	^^	^;	sp	!	"	#	&	%	_	'
40	(	)	*	+	,	-	.	/	0	1
50	2	3	4	5	6	7	8	9	:	;
60	<	=	>	?	e	A	B	C	D	E
70	F	G	H	I	J	K	L	M	N	O
80	P	Q	R	S	T	U	V	W	X	Y
90	Z	[	\	]	^	_	^:	^A	^B	^C
100	^D	^E	^F	^G	^H	^I	^J	^K	^L	^M
110	^N	^O	^P	^Q	^R	^S	^T	^U	^V	^W
120	^X	^Y	^Z	^0	^1	^2	^3			

Superscripts and Subscripts - RNF

Many users have inquired about using the Diablo to do superscripts and subscripts within RNF. This capability is planned for RNF, but it is not yet available. However, RNF will transmit any control codes properly entered by the user (i.e., in NORMAL mode), so superscripting and subscripting can be accomplished by using the negative and positive half line feeds.

The control codes are non-printing characters; however, RNF counts them as printing characters for .F (fill) and .J (justify). Clearly, this presents problems when right justified text is required and adjustments are required to make the right margin come out properly.

The following macros, entered in NORMAL mode, can be used to generate subscripts and superscripts:

```
.MACRO UP = .X ^>D
```

```
.MACRO DN = .X ^>U
```

Note that "up" in Diablo terminology refers to an up movement of the platen, which corresponds to a down movement of the paper, and vice-versa. Thus, ^>D for UP, and ^>U for DN.

The macros .UP and .DN can be used to construct superscript and subscript macros as follows:

```
.MACRO SUP = .RM +4 .UP .X .SUP1 .DN
```

```
.MACRO SUB = .RM +4 .DN .X .SUB1 .UP
```

Once these macros are defined, they are invoked as follows:

```
.SUP 4 is a superscript 4.
```

```
.SUB22 is a subscript 22.
```

The purpose of the command .RM + 4 in SUP and SUB is to compensate for the four non-printing characters used for each superscript and subscript sequence. Therefore, the right margin must be restored on the next output line by the sum of all the +4 increments used. Some caution is advised because end-of-line situations can arise which give anomalous results. In general, superscripting and subscripting by this method should be done in unjustified text.

Presently, superscripting and subscripting cannot be done on the standard fan-fold form, since the tractor mechanism is not designed for accurate reverse motion. A pin-feed platen is on order for this purpose, and should be available by mid-July. In the meantime, users can get effective results using standard friction feed and individual sheets of bond paper.

Diablo Type Styles Available

At present there are 25 type styles available for use on the Diablo terminal. They are reproduced below from a Diablo brochure.

**Type Style: Courier 10 Part Number: 38100**

ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz  
0123456789 -£, . : ; - + \$ # % { } [ ] ( ) > = < ~ ' ^ ` ? ! @ \* / | \ & " \_

**Type Style: Pica 10 Part Number: 38101**

ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz  
0123456789 -¢, . : ; - + \$ # % { } [ ] ( ) > = < ~ ' ^ ` ? ! @ \* / | \ & " \_

**Type Style: Elite 12 Part Number: 38102**

ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz  
0123456789 -¢, . : ; - + \$ # % { } [ ] ( ) > = < ~ ' ^ ` ? ! @ \* / | \ & " \_

**Type Style: Manifold 10 Part Number: 38103**

ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNPOQRSTUVWXYZ  
0123456789 -¢, . : ; - + \$ # % { } [ ] ( ) > = < □ ' b o ? ! @ \* / | \ & " \_

**Type Style: Courier Legal 10 Part Number: 38104**

ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz  
0123456789 ½¢, . : ; - + \$ # % ¼ ¶ [ ] ( ) † = \$ " ° ° ' ? ! @ \* / = ° & " \_

**Type Style: Prestige Elite Legal 12A Part Number: 38105**

ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz  
0123456789 ½¢, . : ; - + \$ # % ¼ ¶ [ ] ( ) † = \$ " ° ° ' ? ! @ \* / = ° & " \_

**Type Style: Dual Gothic Legal 12 Part Number: 38106**

ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz  
0123456789 ½¢, . : ; - + \$ # % ¼ ¶ [ ] ( ) † = \$ " ° ° ' ? ! @ \* / = ° & " \_

**Type Style: Courier 72 Part Number: 38107**

ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz  
0123456789 -¢, . : ; - + \$ # % { } [ ] ( ) > = < ~ ' ^ ` ? ! @ \* / | \ & " \_

**Type Style: Courier Legal 10A Part Number: 38108**

ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz  
0123456789 == ¢, . : ; - + \$ # % \$ † [ ] ( ) ½ = ¼ " ' ° ° ? ! @ \* / ¶ ° & " \_

**Type Style: Pica Legal 10A Part Number: 38109**

ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz  
0123456789 == ¢, . : ; - + \$ # % \$ † [ ] ( ) ½ = ¼ " ' ° ° ? ! @ \* / ¶ \ & " \_

**Type Style: French Prestige Cubic Part Number: 38131**

ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz  
0123456789 llr, . : ; - + \$ % € è ° § ( ) > = < ~ ' ^ ` ? ! à \* / ù ç à " \_

**Type Style: German Pica 10 Part Number: 38132**

ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz  
0123456789 -¢, . : ; - + \$ § ž ü ä ü Ä ( ) > = < ~ ' ^ ` ? ! B \* / ð ö & " \_



Currently CSO stocks only the Courier 10 and Elite 12 wheels. CSO will purchase any non-standard wheel for which a user shows sufficient need. It takes approximately six to eight weeks to get delivery on wheels ordered from Diablo. Two to three weeks delivery can be obtained on wheels purchased from NCE, who stock the following non-standard wheels: Courier Legal 10, Prestige Elite Legal 12, Courier Legal 10A, Pica Legal 10A, APL 10, General Scientific 10 and Manifold 10.

For further information or consulting on document preparation, call Ed Dewan, 333-8253.





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: ( ) New subscriber  
( ) Removal request  
( ) Address correction

New address: NAME \_\_\_\_\_  
ADDRESS \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
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# Off-Line

VOL. 5, NO. 9 August, 1977

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OFF-LINE is the newsletter of the Computing Services Office at the University of Illinois at Urbana-Champaign. OFF-LINE is printed every month. Articles may be reprinted provided that the source of the article is noted. CSO operates an IBM 360 Model 75 with one million bytes of fast core and two million bytes of slow core, under HASP and OS, and a CYBER 175 with 196K words of central memory and 256K words of ECS, under NOS, serving up to 190 simultaneously active terminals.

POLICY

SERVICE UNIT DEVALUED

The service unit was devalued at midnight on June 28, 1977. One service unit now costs \$0.91. All eligible hard-money accounts and PS numbers were appropriately adjusted. Due to the amount of paper work involved, account and PS number owners were not individually informed of the update. If you have inquiries, please contact the Accounting Office, 162 DCL, phone 333-6760.

UNIVERSITY ACCOUNT INFORMATION FORMS CHANGED

The CSO Accounting Office has updated the University Account Information Forms to reflect the devaluation of the service unit. The old forms were made obsolete by the update.

The change in the forms appears in section B, columns 53 through 58. The new forms specify dollars instead of service units.

CSO STATISTICAL SERVICES RE-OPENS OFFICE  
AT COMMERCE WEST IN NEW LOCATION

As of August 15, 1977, the Statistical Consulting Office will be located in Room 65 Commerce West. The present Statistical Consulting Office, located in Room 138 DCL, will be closed August 12 to allow for the move and will not be reopened.

The Statistical Services phone number (333-2170) and office hours remain unchanged:

9:00 AM - 12:00 Noon

Monday through Friday

1:00 PM - 5:00 PM

SYSTEM NOTES

## SYSTEM RELIABILITY AND DEFENSIVE COMPUTING

Nothing happens to any man that he is not formed by nature to bear.

- Marcus Aurelius Antonimus

There are two aspects of systems reliability: that which is perceived and that which is measured. Both are important in developing defensive computing habits which minimize last minute panics, lost files and mysterious encounters with the unexpected.

Because a working system is generally regarded as a non-event, perceptions of machine reliability generally center on relatively traumatic events such as losing a file after a long editing session, not being able to make that "final run" before catching a plane to a conference, finding the system unavailable at the only slot between classes in which to complete a project, or even that the system is always down in the afternoon. In a sense, this perception is asymmetric - good times are taken for granted; bad times are the remembered norm.

Each system failure which causes a large number of users to login again is documented and analyzed by CSO on a weekly basis. When the data for a period of a year is analyzed, the conclusion is that system failures occur completely at random and are spread out uniformly over the time period in which the system is available. There is a suggestion that there might be slightly more failures than usual at the beginning of each shift (8:00 AM, 4:00 PM and Midnight) but this is not significant. The interval between failures also appears to be random. The fact that the system has just failed is no indication of when it is going to fail again, nor is it an indication of how long repairs will take. However, because the system exhibits this kind of statistical behavior, we can calculate the chances of failing during any period of time, such as a time-sharing session. To do this we use the mean time between failures (MTBF) as a measure of system reliability. MTBF is simply the number of times the system failed divided by the hours it was scheduled to be in service. For time-sharing sessions of less than about four hours, the probability that the machine will fail is simply

$$\frac{\text{Length of time-sharing session (hours)}}{\text{Mean time between failures (hours)}}$$

For sessions longer than four hours, it tends to be smaller than the above ratio.

Over the past few months, the MTBF for the CYBER has been about 30 hours. In a typical time-sharing session of about 20 minutes, the probability of a failure is about 1%. On the other hand, the probability of a failure during a four hour session is about 10%, which many believe would not be a risk worth taking. The chances of file loss can be reduced by SAVEing or REPLACEing files every 20 minutes, or more often if the

system appears unreliable. (The probability of 20 different sessions of 20 minutes all being successful is only 80%.)

It is here that user perception is important. If you have a healthy paranoia about system reliability, it is worthwhile and costs little to safeguard against file loss at an acceptable risk level. On the other hand, if you are an optimist who works through long time-sharing on the assumption that the system will be up, it is best to develop SAVE and REPLACE habits that reduce the risk of loss to an acceptable level. If the combination of your strategy and system behavior is effective, the system will appear reliable.

A similar line of reasoning applies to planning tomorrow's work. If you have an hour's work to do before leaving for the airport, the chance that the machine will be down during that hour is calculable. The average period of down time or mean time to repair (MTTR) is approximately 15 minutes, so budget more time than needed depending on your gambling instinct.

Regardless of gambling instinct, everyone should learn to use the CYBER's RECOVER facility, which is useful after a TIMEOUT as well as a system crash.

Of course, the situation could be improved a great deal if CSO could improve system reliability (i.e., increase the MTBF and reduce the MTTR throughout the network). It is continually trying to do this, but improving reliability is not an entirely clear cut process. Typical reasons for system failure are (in rough order of frequency), hardware failure, software failure, human error and environment failure (such as power and air conditioning). As one might expect, hardware and software tend to wear out rather than fail suddenly. The difficulty is seeing the wearing out process, then making the right judgment. For example, the number of non-catastrophic disk errors is monitored constantly. When they reach a certain threshold they are displayed on the operator's console. The operator must decide either to continue through to the next maintenance time, or take the system down immediately. The time of day, number of users on the system and previous experience are factors in the decision. Only the engineers' report, user reaction, or the monthly statistics will tell if the right decision was made. Even trying to classify a failure as a hardware, software, or operator error can be difficult, because each can trigger an unusual response from the other, which complicates any subsequent analysis.

Software reliability performance can gradually degrade under increased or changing load, and with the addition of minute changes, each exhaustively tested by itself, until the whole gradually becomes less than the sum of the parts.

Operator errors are minimized by long training periods (about 250 hours) and overlapping shifts to preclude sudden changes in operators. Operators have a period to understand what is going on before taking control of the shift.

Environment problems literally depend on the weather. Although we can (and do) control some of our responses to power and air conditioning interruptions, once we have learned to manage the air conditioning for the new computer room, there will be little further improvement.



Some improvement in reliability is achieved by exploiting the limited redundancy of CSO's central mainframes. It is uneconomical to duplicate the entire mainframe, but one can often "limp along" with part of it missing. Sometimes this is not particularly visible to the user. When the 360/75 drum is down, we use part of the system disk instead. Turnaround is a little slower, but everybody gets their work done. Sometimes, it confuses the reliability picture altogether. Recently, the CYBER lost one of its data communications controllers, which took 50 hardwired terminals with it. The result was that some people thought the CYBER was down, and others thought it was up as usual.

CSO's commitment is to provide as much continuous service through as many terminals as possible during scheduled service hours. This allows people to get their work done even if they have to temporarily move to another terminal. Whether such partial availability should be counted as "up-time" or "down-time" depends on the situation. Providing CSO could keep more than half its terminals alive, the CYBER would probably be regarded as being "up". A similar criterion applied to disk spindles could be unsatisfactory.

It is important to report system "glitches" to CSO's consultants and operators when they occur. Always getting a busy signal on a dial-up terminal line could mean the system failed, which, if reported, could be corrected. It could also mean that all the lines are busy. This is not a system failure, but a traffic problem, and we have to know so that we can start solving the traffic problem. In either case, we want to know.

Most of the minute to minute reliability monitoring is done from the central system outwards. The user community is usually looking from the terminal inwards. The two views don't necessarily look the same. It would take several days to deduce from terminal usage statistics (from the in-side-out) that a particular terminal was faulty, yet it is really difficult for CSO to check it from the out-side-in more frequently than once a day. Conversely, it is very easy for the mainframe operators to tell whether a Remote Job Entry station is running or not. What they cannot tell is whether it has been turned off deliberately, or whether it is broken. When computer services are distributed, there is not only a geographical distribution of reliability problems, but also a logical distribution, because faults can be "ANDed" throughout the network, resulting in a distribution of responsibility because only the person on the outside looking in can notify CSO of his predicament quickly. However, because the distribution network provides an enormous amount of redundancy, it seldom presents severe reliability problems to large numbers of users.

In order to help people assess reliability related risk, CSO will publish the MTBF and MTTR values for the CYBER and the 360/75 in OFF-LINE.

Because of its architecture, the 360/75 MTBF is typically shorter than that of the CYBER, but because it is a batch machine this is not so important, if reasonable turnaround times can be maintained. The disk systems are much more reliable than the mainframes, and this is enhanced by CSO's nightly backup policy. Typically, we irretreivably lose some incremental changes to files about once every 4000 hours of scheduled service time.

## SYSTEMS RELIABILITY

During June, there were 10 unscheduled interruptions to CYBER service. The mean time between failures was approximately 54 hours, and the mean time to repair a failure was about 50 minutes. The longest interruption was caused by an air conditioning failure on June 28. Six interruptions were hardware errors, two were operator errors, and one was a software error. There were several announced early closings of service for preventive maintenance and TIELINE development.

The IBM 360 had a mean time between failures of about 20 hours, with a mean time to repair of about 15 minutes. Most of the failures were caused by intermittent channel problems which have since been isolated and fixed.

## CYBER

### CYBER DIAL-UP NUMBERS ADDED

Two telephone numbers for dial-up connection to the CYBER have been added. Two numbers are now available for both 110 baud (10 characters/second) and 300 baud (30 characters/second) connections:

110 baud - Total 10 ports:

Telephone Numbers, 333-4000 and 333-4005

300 baud - Total 40 ports:

Telephone Numbers, 333-4002 and 333-4007

Twenty additional ports will be activated before the start of school in the fall.

## STATISTICAL SERVICES

### SOUPAC ON THE CYBER

A subset of SOUPAC will be available for use in late August. SOUPAC Monitor and Matrix are running on the CYBER. Transformations and some of the more utilized statistical routines are in the process of being converted. In addition, documentation is being prepared for CYBER SOUPAC.

Questions regarding the availability of routines on the CYBER should be directed to CSO Statistical Services. The staff is converting the routines and preparing documentation as quickly and as accurately as possible.

NEW INTERACTIVE STATISTICAL PACKAGE  
INSTALLED ON THE CYBER

STATPAK (not to be confused with the STP package that existed on the DEC-10) is an interactive statistical package that has been installed on the CYBER. It is intended for use in interactive mode only.

STATPAK is a package of statistical routines applicable to small, fairly uncomplicated statistical problems. It is conversational in that a question and answer process is used to describe the problem and obtain results. Therefore, using the package requires little more than knowing how to login to the CYBER and initialize the package.

STATPAK is not intended to compete with the more elaborate statistical packages (such as SOUPAC, SPSS, SAS, BMD, etc.) used for larger, more complicated problems. Instead it may prove useful as an aid in teaching statistics in lower level classes that presently utilize one of the larger packages. Additionally, certain individuals who have small statistical calculations to perform may find STATPAK useful.

STATPAK is limited to a maximum of 10 variables and 500 observations. Once in the package, files can be created, edited, and saved for use at later terminal sessions. It offers limited transformation capabilities and includes 21 statistical routines. The routines are:

- Elementary Statistics (mean, standard deviation, etc.)
- Correlation
- Scatter Diagram
- Histogram
- Plot Multiple Lines
- Step-Wise Multiple Regression
- Regression (one independent variable)
- Rank Correlation
- Polynomial Regression
- Chi-Square
- Simultaneous Equations
- Frequency Tabulations
- Selection of Observations in Bounds
- First Four Moments
- T-Test on Population Means
- Multiple Linear Regression
- Canonical Correlation
- Non-Parametric Statistics
- Discriminant Analysis
- Factor Analysis
- Time Series

To access the package, the following commands should be issued after logging in:

```
ATTACH,STATPAK/UN=LIBRARY.
STATPAK.
```

STATPAK Manuals are not available through CSO at this time. Anyone with questions regarding the package and those wishing to see the reference manual should contact the Statistical Consultants (333-2170).

INTERACTIVE LINEAR PROGRAMMING PACKAGE  
INSTALLED ON THE CYBER

EZLP is an interactive program designed to solve typical student oriented linear programming problems. It was developed at the Georgia Institute of Technology and has been installed on the CYBER.

EZLP may also be utilized in the batch mode from cards as well as interactively from a terminal. It does not have the capabilities demonstrated by a package such as the Multi-Purpose Optimization System (MPOS) already installed on the CYBER, however it may prove to be a useful tool in the instruction of basic linear programming.

EZLP may be accessed by utilizing the following commands:

```
ATTACH,EZLP/UN=LIBRARY.
RFL,76000.
EZLP.
```

Documentation describing the command structure (including examples) may be obtained from the CSO Distribution Center (164 DCL) or from the CYBER by utilizing the following commands:

```
GET,EZHELP/UN=LIBRARY.
PRINT,EZHELP.
```

Any problems or questions concerning EZLP should be directed to CSO Statistical Services (333-2170).

SPSS RELEASE 7 ON THE IBM 360/75

A new release of SPSS is available for use on the 360/75. To access this version include the following JCL cards in your job:

```
//PROCLIB DD DSN=SYS4.PROCLIB,DISP=SHR
// EXEC SPSSV7
```

Since Release 7 incorporates extensive changes to the SPSS system, both SPSSV6 and SPSSV7 will remain on-line until September 1, 1977. On September 1, the following changes will be in effect:

- . SPSSV5 will be removed from the system.

- . SPSSV6 will be transferred to a set-up pack.
- . SPSSM Release 6 will be removed from the system.
- . SPSSM Release 7 will be available on a set-up pack.

Note that there is no Release 7 for SPSSG. After September 1, users may access the SPSS systems as follows:

SPSS Release 6

```
/*SETUP UNIT=2314, ID=UITST5  
//PROCLIB DD DSN=SYS4.PROCLIB, DISP=SHR  
// EXEC SPSSV6
```

SPSS Release 7

```
// EXEC SPSSV7
```

SPSSG

No Changes

SPSSM Release 7

```
/*SETUP UNIT=2314, ID=UITST5  
//PROCLIB DD DSN=SYS4.PROCLIB, DISP=SHR  
// EXEC SPSSM
```

The new release of SPSS includes three new statistical procedures: NPAR TESTS, RELIABILITY and MULT RESPONSE. The data transformation facilities have been enhanced with the introduction of the LAG command and two new functions, NORMAL and UNIFORM. Thirteen existing procedures have been modified to correct errors, improve precision or improve performance. Data management facilities have been enhanced through the introduction of the SEED card and through additional specifications for the INPUT FORMAT and MISSING VALUES card. With the additions, corrections and improvements, Release 7 also includes many changes which are not readily apparent. Approximately 36% of the SPSS code has been revised to generally improve performance. An update manual for Release 7 may be purchased (\$2.60) at the CSO Distribution Center (Room 164 DCL). IBM SPSS users are strongly encouraged to obtain this manual.



The following is a brief description of some of the most important Release 7 features. Consult the update manual for detailed descriptions.

#### New Statistical Procedures

MULT RESPONSE    Frequency tables for multiple response items.

NPAR TESTS        Non-parametric tests for the analysis of nominal and ordinal data.

RELIABILITY       Computes widely used coefficients of reliability for evaluating multiple item additive scales. This program can also be used for repeated measures analysis of variance.

#### New Data Transformation Capabilities

LAG                A command for creating lagged variables.

UNIFORM            Used as a function on the COMPUTE card for creating uniform random deviates.

NORMAL             Used as a function on the COMPUTE card for creating normal random deviates.

SEED                A command for specifying the initial value of the random number generator which is invoked by the SAMPLE command.

#### Changes to Existing Facilities

SELECT IF          Multiple SELECT IF commands are connected by AND in Release 7. They are connected by OR in Release 6.

DO REPEAT          The DO REPEAT command has been rewritten to handle and generate constants in the DO REPEAT statement and several limitations have been removed.



- MISSING VALUES An optional specification of missing values has been implemented which conforms with the OSIRIS convention for missing values. It is now possible to specify that any value between two given values is to be treated as missing by using the keyword THRU in the MISSING VALUES card.
- ANOVA The regression approach, option 9, has been completely rewritten and will give different results.
- REGRESSION If the list of independent variables in a REGRESSION= specification does not end with an inclusion level, the variables for which no level was supplied are given the level 1 (included last and stepwise).



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# Off-Line

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POLICY

CYBER CONVERSION POLICY

A revised conversion policy will go into effect January 1, 1978. This policy provides for limited conversion assistance during the Systems Consulting Office hours. People with unusual or troublesome conversion problems which require special attention will continue to receive consultant assistance outside the Consulting Office. Under the new conversion policy, CSO will no longer:

- . assign consultants to user conversion projects,
- . complete user program or data conversions, or
- . supply funds for user conversion projects.

All conversion requests received by December 31, 1977, will be completed under the current policy. Because the installation of SOUPAC on the CYBER has been delayed, applications for SOUPAC conversions will be accepted until March 31, 1978. User conversions using CSO funds should be completed before July 1, 1978. On this date the accounts supporting conversion will expire.

The information given below explains:

- . The current conversion policy.
- . The new conversion policy.

An Application for Conversion is included. Questions regarding CSO's conversion policy and procedures should be directed to:

Scott Lathrop  
System Consultant  
187 DCL  
Phone: 333-6618

Current Conversion Policy

(until December 31, 1977)

Program Conversion

The prime user of a PS number or his appointed representative can meet, by appointment, with a consultant to discuss the user's particular conversion problems. There should be some discussion of those programs which can be converted, those which must be transformed



to an alternative package, and those which cannot be converted. In addition, some explanation of the use of automated conversion aids, which exist for some processors, should be given. The consultant will, at the user's request, select and completely convert one working DEC-10 and/or one working 360/75 program as examples of program conversion. In addition, the consultant will remain available to aid the user with any problems which may develop. However, since the user is the person most familiar with the logic of the programs, it is his ultimate responsibility to convert and verify his programs.

#### Data Conversion

An application can be made by the prime user of a PS number to arrange for the movement and conversion of data to the CYBER 175. Data can be moved by the user and/or a consultant. The consultant, however, will only convert disk files on public disk packs as of August 22, 1977, and only those tapes for which CSO will supply replacements. If the user wishes to do the conversion himself, he can request a scratch tape for use over a 2-week period. This tape is for the purpose of transferring disk files from the public packs. In addition, the user can request a number of permanent tapes onto which old data tapes can be converted.

If the user requests CSO to move the data, an appointment must be made with a consultant. At the meeting with the consultant, the user must supply the consultant with all necessary information for the conversion to be made. Necessary information is defined as 1) a listing of a program which will read or write each binary data file in its entirety or 2) DCB parameters for EBCDIC files. Reading a data file in its entirety is defined as processing correctly all the bytes in the file. Each data file will be moved correctly only once. Files on public disks will be backed up to tape at the time of their conversion and the backup will be kept for one year.

CSO will supply new tapes for the users data to be converted onto subject to the following limitations:

- . The original tapes to be converted were in our tape inventory on July 1, 1976.
- . No more than 10 tapes per PS number.
- . Any negotiated exceptions to 1 and 2.
- . The tape must require conversion. EBCDIC data is typically readable on the CYBER, therefore does not require conversion.

The new tapes will become the user's property upon completion of the conversion. The user's old tapes will become CSO's property. The old tapes will be stored for one year at which time they will be recycled. The old tapes will be given to CSO at the time of new tape assignment and will not be returned to the user. They will remain in storage during user conversion and will be placed in dead storage following

it. The new tapes will be NOS standard labeled to the user's specifications. Unless special arrangements are made, the end of user conversion for a tape is signaled either by the removal of the new tape from the machine room or the expiration of one month from the time of tape assignment. CSO reserves the right to demand proof of readability before new tape assignment. That is, CSO will not trade new tapes for tapes which are unreadable. If the user wishes, he can keep both the old and the new tapes for the cost of a new tape. Data on backup tapes or on tapes in dead storage will not be generally available. Requests for such data will be reviewed individually.

#### Computer Time For Conversion

At the time of conversion application, the user will be allocated a suitable amount of CYBER System Resource Units, and will be given an additional CYBER account for the conversion. The number of System Resource Units in each account shall be determined by a formula, which takes into account the approximate number of lines of convertible code, the number of online disk files and the number of tapes to be converted.

#### New Conversion Policy

(Effective January 1, 1978)

Conversion to the CYBER will be accomplished by the user using other than CSO conversion funds. Documentation of conversion aids is available in the CSO Distribution Center (Room 164 DCL). Consulting Services are available for reasonably short questions (15 minutes or less) during office hours.

If you feel your questions will take longer than 15 minutes, please contact Scott Lathrop (187 DCL, 333-6618) to make an appointment with a consultant to discuss your programs and data.

Requests for funds and assistance submitted by December 31, 1977, will not be effected by this revised policy.

Application of Conversion  
(expire Dec. 31, 1977)

Name \_\_\_\_\_ Phone \_\_\_\_\_ Dept. \_\_\_\_\_

Address \_\_\_\_\_

University ID \_\_\_\_\_

Program Conversion:

<u>Language/Processor</u>	<u>Number of Program</u>	<u>Total No. Lines of Code</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

(Attach list, of necessary)

Data Conversion:

# 360 Disk files to be converted \_\_\_\_\_

# 360 Data tapes to be converted \_\_\_\_\_

(any nonzero responses this section ~~complete~~ reverse side)

Do you wish:

to discuss the conversion with a consultant?

Yes No Maybe

help with program conversion?

Yes No Maybe

help with data conversion?

Yes No Maybe

a scratch tape to use in transferring your disk files?

Yes No

---

(CSO use only)

Con \_\_\_\_\_ Date Ass \_\_\_\_\_ Date Comp \_\_\_\_\_

CPS# \_\_\_\_\_ Amt \_\_\_\_\_

Tape/Diskfile Conversion Request

Tapes

(List only those to be replaced or converted by CSO)

<u>Old Tapename</u>	<u>New Tapename</u>	<u>Conversion Help Required</u>	<u>Keep 360 Tape</u>
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

360 Diskfiles

(List only those to be moved or converted by CSO)

<u>Public pack</u>	<u>Dataset Name</u>
_____	_____
_____	_____
_____	_____
_____	_____

Please return form to:

Scott Lathrop  
187 DCL  
CAMPUS

## DIABLO PRINTER BILLING

Diablo printer charges are billed to real money accounts. Persons without access to real money accounts are billed personally through their University ID number. Research Board and Class computer accounts are not accepted for billing.

The charge for DIABLO printer use is \$0.15 per page.

General policies on text processing, including charging policy, will be reviewed by the CSO Liaison Committee during this year.

## TERMINAL PURCHASE

Some of the vendors of terminals have agreed that University of Illinois faculty members can purchase terminals for personal use at the quantity discount prices available to CSO. Although these terminals are purchased citing the CSO contract, they must be purchased directly from the vendor rather than through the University. These purchases will contribute to the quantity used to figure discount rates. Purchase with University or contract funds will continue to be handled through the University Purchasing Division.

Currently CRT and hard copy terminals are available. These range in price from \$860 to \$2000. Since CSO does not maintain privately owned terminals, maintenance contract prices are also available. For further information about available equipment, prices and points of contact, call Cliff Carter at 333-3723.

## CALCOMP PLOT OUTPUT

Effective November 1, all plotting output will be filed by user bin number in the Routing Room (Room 127 DCL). This will reduce the confusion of finding plot jobs.

In the near future, plot output will be sent to the RJE site from which the 360/75 job originated. If you wish to have your printed output routed and your plot output sent to a different RJE site, specify the site on an ID card for 360/75 jobs as follows:

```
/*1D PRINT=<dest>
```

Therefore, your printed output would be routed to and your plot sent to CSO South at Commerce West if you used:

```
/*ID PRINT=COMM
```

The same results could be obtained for a plot created on the CYBER by using the PLOT command, i.e.,

PLOT,TAPE20/RJE=COMM.

The operators in the Routing Room will see that the jobs are sent to the appropriate RJE site. See RF-1.3 for a complete listing of the routing codes you may use. An announcement will be made in HEARYE and an RJE Bulletin when this is implemented.

#### CSO SOUTH RJE HOURS

The schedule at the CSO South RJE site (Room 70 Commerce West) has been changed. New Friday hours are 8:00 AM to 6:30 PM. The weekly schedule is as follows:

8:00 AM - Midnight	Monday - Thursday
8:00 AM - 6:30 PM	Friday
CLOSED	Saturday
2:00 PM - Midnight	Sunday

#### SYSTEM NOTES

##### RELIABILITY REPORT

During September, the mean time between CYBER 175 failures was about 77 hours, with a mean time to repair of about 9 minutes.

On the IBM 360/75, the mean time between failures for the whole month was about 9 hours and the mean time to repair was about 45 minutes. The cause of most reliability problems was an intermittently faulty cable in the CPU. It was corrected during the middle of the month. The mean time between failures during the latter half of the month was about 14 hours.



CYBER

## CYBER MANAGE ACCOUNTING SYSTEM

The MANAGE accounting system on the CYBER will be completely in effect on January 3, 1978. At that time users will be able to specify either:

CHARGE,DEPT,PS#

or

BILL,DEPT,PS#

Either command will invoke the MANAGE system, since the old accounting system will have been removed. All other signon procedures will remain the same.

The MANAGE accounting system is used to allow departments to designate a Project Manager for their computer accounts. The most significant change which MANAGE makes is to associate privileges with a project as well as a user, and to place control of these privileges principally in the hands of the Project Manager. For this reason, we need to obtain the initial data base authorizing user privileges within these projects. For information about the Project Manager, see the Accounting Guide for the Project Manager, available in the CSO Distribution Center (Room 164 DCL).

To be converted from the current accounting system to MANAGE, you must complete a CDC Project Creation/Change form, available in the Accounting Office (Room 162 DCL).

Questions about MANAGE may be taken to the Accounting Office (Room 162 DCL, 333-6760) or to the Systems Consulting Office (Room 138 DCL, 333-6133).

The MANAGE system also involves charging projects for disk space utilization. See the January, 1977 issue of OFF-LINE, "New CYBER Rates", for more information.

## 360/75 JOB ENQUIRY FROM THE CYBER

A new command, HASP, is now available during CYBER time-sharing sessions to enquire about either local or remote 360/75 jobs. The HASP command has two forms - a short form for local enquiries and a long form for local and remote enquiries. For example, if you wish to enquire about the status of the local 360/75 job, MYJOB, type

&DJMYJOB

(short form)

A possible response to this might be

```
JOB 123 MYJOB      ON PRINTER1
```

If MYJOB were a remote 360/75 job on the 370/168 at Chicago Circle, the command

```
HASP.@UIC&DJMYJOB      (long form)
```

would give its status.

The general format of the HASP command is

```
HASP<term><id><verb><op>      (long form)
```

or,

```
&<verb><op>      (short form)
```

where,

- <term> Standard CYBER control statement terminator . or ).
- <id> Local command identifier of & or \$, or remote command identifier of @ followed by a three-character site name (U01, UIC) followed by a local command identifier.
- <verb> Command verb - currently the only acceptable values are D or null.
- <op> Command operand(s) - currently the only non-acceptable value is N.

The following table summarizes the local display command available.

<u>Function</u>	<u>Command</u>	<u>Notes</u>
Status of 360 link	&	
Single job information	&D'<jobname> &DJ<jobname> &DJ<job#>	<jobname> = IBM job name <job#> = IBM job number
Active job(s) information	&DA . &DA,XEQ &DA,PRT &DA,PUN &DA,PLT &DA,RDR &DA,RTV	All active jobs Active jobs in execution Active jobs printing Active jobs punching Active jobs plotting Active jobs being read Active jobs retrieving
Job class limits	&DC	

Permanent storage units	&DD	
Special forms print	&DF	
Input permission table	&DH	
Job initiator settings	&DI &DI<n>	All initiators Initiator number <n>
Oldest jobs	&DO	
Queued job(s) information	&DQ &DQ,XEQ &DQ,XEQ<c> &DQ,PRT &DQ,PUN &DQ,PLT &DQ,RDR	# of jobs in each Q by Q # of jobs in execution Q # of jobs in xeq Q class <c> # of jobs in print Q # of jobs in punch Q # of jobs in plot Q # of jobs in reader Q
Setup queues	&DS &DS<xy> &DS<n>	First 5 setup job #'s As above, class <x> to <y> Setup cards for job# <n>
Turnaround times	&DT	

#### UNIVERSITY ID OPTION ON DIRECT

A new option has been added to the DIRECT command that allows a University ID specification. The format of the option is:

```
DIRECT/ID=<uid>
```

Where <uid> is your 9 digit University ID number. This option lists all public files under the given <uid>.

A list of all the DIRECT command options and their descriptions is available in the Systems Consulting Office (Room 138 DCL).

#### CYBER MANUALS

A revision to the CYBER manual listed below is available at the CSO Distribution Center (Room 164 DCL):

. APEX-III Reference Manual (76070000) (Revision F)

This revision replaces all previous APEX-III reference manuals. The revision will be given in exchange for the outdated edition.

360/75

## PAPER TAPES

A high-speed, input/output paper tape facility which is connected to a standard 360/75 RJE site is located in Room 146 Electrical Engineering Building. The facility, available to all CSO users, enables reading paper tapes into CYBER and 360/75 files or producing data on a paper tape. An experienced operator is at the RJE site to provide instruction and give assistance.

Paper tape data read via this facility is transformed into 80 character card images. Character and binary data is easily read into the 360/75 using the paper tape reader as the stream input device. Character files are easily read in the CYBER using the following ID card in the 360/75 job which reads the tape:

```
/*ID PRINT=CYBER,NAME='<filename>(<uid>)'
```

where:

<filename> is 1-7 character name.

<uid> is your University ID.

Binary information is not easily read into the CYBER since it is translated as if it were character information when it goes from the 360/75 to the CYBER via TIELINE.

Data may be punched to paper tape easily by using the paper tape facility as the punch device associated with a 360/75 job. Use:

```
/*ID PUNCH=RM16,CARDS=<estimate of card image to go on the tape>
```

Special arrangements can be made to use teletypes at other RJE sites as slow-speed, input/output paper tape stations. This procedure requires a special program; those interested in this must contact Mr. Robert Skinner (333-4488) for permission and instruction.

## GRAPHICS SUBROUTINE LIBRARIES

Three subroutine libraries supporting graphics have been added to user number LIBRARY. These libraries are:

PLOT10 Supports TEKTRONIX graphics terminals as a standalone library. This library is equivalent to FOR:TEKLIB on the DEC-10.

GCSTEKT Provides GCS support for TEKTRONIX terminals. It must be used with GCSBASE.

GCSCALC Provides GCS support for the CALCOMP plotter. It must be used with GCSBASE and CALCOMP. It produces a plotting command file TAPE99 which may be plotted as follows:

PLOT,TAPE99.

NOTE: When a program uses more than 2 libraries, the LIBRARY command is not appropriate. Instead a LDSET card is required:

```
LDSET(LIB=<lib1>/<lib2>/.../<libn>)
```

The LDSET card may be made part of your binary program by including the following subprogram in its source.

```
IDENT <names>
LDSET LIB=<lib1>/<lib2>/<lib3>...
END
```

Each of the subprogram statements must begin in column 11.

#### GCS Error Fix

A modified version of GCSBASE has been installed in LIBRARY. This version should correct all cases in which an axis was mislabeled by a power of 10. If you encounter such a problem, please contact the Systems Consultants (Room 138 DCL, 333-6133).

#### HELP WANTED

#### LINEAR ALGEBRA TUTOR

There is a one quarter time assistantship available to a linear algebra tutor for a staff member. Those interested should call Mrs. Baker (333-0022) for an appointment.

## RESEARCH ASSISTANT WANTED FOR COMPUTER WORK

Any graduate student or other person who would like to earn \$4.00 to \$5.00 an hour doing some interesting computer work with Professor Stuart Nagel of the Political Science Department should phone him at 359-8774.

The work mainly involves running research data through SPSS or SOUPAC statistical programs and through some mathematical optimizing routines. The subject matter of the data generally deals with a causal or evaluative analysis of alternative public policies.

Previous experience with statistical computer work or related work is expected. No programming will be involved, but the person should have a knowledge of how to write control cards for a statistical software package and possibly experience with mathematical software. There may also be some work involving the compiling and coding of data from courthouse records and other sources, although that work may be assigned to a different research assistant.

The hours are flexible, but preferably about five to ten hours per week. If interested, phone 359-8774.

## PROGRAMMER POSITIONS

Two full-time or part-time programmer positions are available. Experience with FORTRAN, PL1, and tape and disk mounting is preferred. For more information, call Tom Ealy, 333-6901.



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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URBANA-CHAMPAIGN

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OFF-LINE is the newsletter of the Computing Services Office at the University of Illinois at Urbana-Champaign. OFF-LINE is printed every month. Articles may be reprinted provided that the source of the article is noted. CSO operates an IBM 360 model 75 with one million bytes of fast core and two million bytes of slow core, under HASP and OS, and a CYBER 175 with 196K words of central memory and 256K words of ECS, under NOS, serving up to 190 simultaneously active terminals.

POLICY

## CHRISTMAS SCHEDULE

Both the IBM 360/75 and the CYBER 175 will be available throughout the scheduled University Christmas vacation. However, during this period some system time will be taken for installation of additional memory on the CYBER. The schedule for this installation will be announced in HEARYE and RJE Bulletins.

Offices and RJE stations will operate according to the following schedule.

CSO Departmental Offices:

Sat. Dec. 24 - Sun. Jan. 1	CLOSED
Mon. Jan. 2	Resume regular schedule

Systems Consulting Office (138 DCL):

Sat. Dec. 24 - Sun. Jan. 1	CLOSED
Mon. Jan. 2	Resume regular schedule

Statistical Consulting Office (65 Comm. West):

Sat. Dec. 24 - Sun. Jan. 1	CLOSED
Mon. Jan. 2	Resume regular schedule

CSO North Routing Room (129 DCL):

Sat. Dec. 24	8:00 AM - Noon
Sun. Dec. 25	CLOSED
Mon. Dec. 26 - Sat. Dec. 31	8:00 AM - 5:00 PM
Sun. Jan. 1	CLOSED
Mon. Jan. 2	8:00 AM - 5:00 PM
Tues. Jan. 3	Resume regular schedule

CSO South RJE (70 Comm. West):

Sun. Dec. 18 - Fri. Dec. 23	8:00 AM - 5:00 PM
Sat. Dec. 24 - Sun. Jan. 1	CLOSED
Mon. Jan. 2	8:00 AM - 5:00 PM
Tues. Jan. 3	Resume regular schedule

ISR and FAR RJE's:

Thurs. Dec. 15 - Wed. Dec. 21	1:00 PM - 5:00 PM
Thurs. Dec. 22 - Sun. Jan. 22	CLOSED
Mon. Jan. 23	1:00 PM - Midnight
Tues. Jan. 24	Resume regular schedule

Psychology RJE (453 Psychology):

Sat. Dec. 24 - Sun. Jan. 1	CLOSED
Mon. Jan. 2	Resume regular schedule

Social Science RJE (202 Lincoln Hall):

Fri. Dec. 23	8:00 AM - Noon
Sat. Dec. 24 - Sun. Jan. 1	CLOSED
Mon. Jan. 2	Resume regular schedule

Agriculture RJE (W-515 Turner Hall):

Fri. Dec. 23	8:30 AM - 4:30 PM
Sat. Dec. 24 - Sun. Jan. 1	CLOSED
Mon. Jan. 2	Resume regular schedule

TRANSFER OF SERVICES FROM  
CAC TO CSO

During the past few months, administrative responsibility for some service activities of the Center for Advanced Computation (CAC) has been transferred to CSO. Although this transfer is not complete, a brief progress report is in order.

The most significant service transferred is related to the UNIX operation on the PDP-11. This system serves as both a small time-sharing service and as a connection to the ARPA-net. The purpose of this system has been to provide services to the CAC staff with minimal use elsewhere on campus. These services have been especially useful in network research and research using a variety of machines over a network.

With the switch to CSO, we would like to extend this service to others who can benefit. We are in the process of deciding the basis on which the service will be available, e.g. allocated funds or hard money only, and the scope of activity that will be encouraged. Several issues must be resolved in this process:

- . Getting long-term permission to be connected to the ARPA-network.
- . Clarifying the use allowable under the UNIX licenses.
- . Pricing structure and cost recovery policy.
- . Physical facilities for access.

Further information will be published in OFF-LINE as it becomes available.

Two other services which CSO now administers are the terminal rental

program and the terminal repair program. These programs from CAC are being integrated with their counterparts in current CSO service offerings.

#### CYBER MANAGE ACCOUNTING SYSTEM

The MANAGE accounting system on the CYBER will be completely in effect on January 3, 1978. At that time users will be able to specify either:

CHARGE,DEPT,PS#

or

BILL,DEPT,PS#

Either command will invoke the MANAGE system, since the old accounting system will have been removed. All other signon procedures will remain the same.

The MANAGE accounting system is used to allow departments to designate a Project Manager for their computer accounts. The most significant change which MANAGE makes is to associate privileges with a project as well as a user, and to place control of these privileges principally in the hands of the Project Manager. For this reason, we need to obtain the initial data base authorizing user privileges within these projects. For information about the Project Manager, see the Accounting Guide for the Project Manager, available in the CSO Distribution Center (Room 164 DCL).

To be converted from the current accounting system to MANAGE, you must complete a CDC Project Creation/Change form, available in the Accounting Office (Room 162 DCL).

Questions about MANAGE may be taken to the Accounting Office (Room 162 DCL, 333-6760) or to the Systems Consulting Office (Room 138 DCL, 333-6133).

#### CYBER DISK CHARGES

On February 1, 1978, CSO will begin charging for permanent file space used on the CYBER. The basic rate will be 0.03 System Resource Units (SRU) per Physical Record Unit (PRU) per day, resulting in a monthly charge of approximately 1 SRU per PRU. Billing will be for space allocated rather than space used. For indirect files, these two quantities are equivalent. Direct files, however, are allocated in units of 227 PRU's, and the two quantities may differ accordingly. Additionally, to account for the system overhead which is incurred when a large number of files is supported by the system, each file will be assessed a surcharge of 0.15 SRU's per day.



The catalog entry for each file on the CYBER contains a four character string known as a "project index". A file created by a user under the old CYBER accounting system (i.e., the CHARGE command is used at signon) is given a project index of AAAA. A file created by a user under the new accounting system (i.e., the BILL command is used at signon) is given a project index unique to the charge,project specified on the most recent BILL command.

Beginning February 1, disk space used by a file will be billed to the charge,project named by its project index. Files having a project index of AAAA will be purged from disk on February 5.

If you are still using the CHARGE command at signon, contact the CSO Accounting Office (Room 162 DCL) to gain access to the new accounting system. Once you have done this, you must change the project index of any existing files to that assigned to your charge,project by the new accounting system. To do this, use the DIRECT command as follows:

- . At signon, enter:

BILL(chg,prj)

in place of CHARGE(chg,prj). This will access the new accounting system and establish the new project index to be inserted into catalog entries.

- . Insert your new project index into the catalog entry of each of your files. Enter the command in the BATCH subsystem:

DIRECT/CLAIM.

If you have already transferred to the new accounting system, you should ensure that all your files have a valid project index, as follows:

- . At signon, enter:

BILL(chg,prj)

- . Enter the command:

DIRECT/PROJECT

The generated output will list each file name, followed by either the project index of the files, or blanks. Blanks indicate that the file belongs to the (chg,prj) used at signon.

- . For each invalid project index listed, enter the command:

DIRECT/PROJECT=<project index>/CLAIM.

where <project index> is an invalid project index listed above. The project index associated with the (chg,prj) used at signon will replace each occurrence of the specified <project index> in the catalog.

### SYSTEM NOTES

#### EQUIPMENT TO BE ADDED ON CYBER AND 360/75

Equipment will be added to both the CYBER and the 360/75 over the next three months.

64K words of main memory and 256K words of Extended Core Storage will be added to the CYBER. Installation will begin after December 22 and should be completed during the University Christmas vacation, thus minimizing loss of service hours. Total CYBER downtime for this installation is expected to be about 24 hours.

Extensions to the Memorex 3330 disk system on the 360/75 will be completed in January to provide space for the Library Control System. No downtime outside of regular maintenance periods is expected. The conversion to double density drives was recently completed.

Further notices of specific schedules will be published in future OFF-LINE articles, HEARYE and RJE Bulletins.

#### SYSTEMS RELIABILITY

During October, the approximate mean time between failures on the CYBER was 19 hours, and the mean time to repair was about 17 minutes. Most problems were caused by a software error which caused a Peripheral Processor to "hang".

On the 360/75 the approximate mean time between failures was 9 hours, and the mean time to repair was about 54 minutes. The main cause of down time was a bad, low-speed core box in which the error proved to be very difficult to find.

The major problem with each machine has been fixed.

CYBER

## MINICOMPUTER TAPE COMPATABILITY PLANNED

CSO is developing a utility which will read ASCII 9-track magnetic tapes generated by various minicomputers and produce internally-formatted CYBER files on disk or tape. Thus, data which is acquired using a minicomputer can be readily transferred to and analyzed on the CYBER. Since CSO does not operate any minicomputers which have 9-track tape drives, the test base for the reformatting utility has been greatly restricted and the program may not be completely debugged. If you use this new utility, we urge you to work closely with the CSO staff in order to resolve any existing problems quickly.

A basic conversion utility now exists to convert DATA GENERAL NOVA tapes and PDP-11 tapes in RT11 format to CYBER 6 bit display code. Optional conversion of the full 128-character ASCII to TELEX ASCII is planned in the near future.

In addition, the program can be expanded easily to other minicomputer tape formats. If a user wishes to use the utility on another type of machine and is willing to supply a sample data tape, the extension could be done in a short time. It would be helpful if the user could also supply some documentation on the tape formats of the machine to be supported.

Anyone wishing to use the services now existing or to have a new minicomputer supported should contact Ed Krol, 181 DCL (333-2048) or the Systems Consultants (Room 138 DCL; 333-6133).

## 360/75 JOB ENQUIRY

360/75 job enquiries from the CYBER (November OFF-LINE) now may be made after signon, but prior to issuing a BILL or CHARGE command. For example:

```
SIGNON: 123456789  
PASSWORD:  
SECRET  
&DJMYJOB
```

will return the status of the 360/75 job MYJOB.

## STATISTICAL SERVICES

### STATPAK TO BE RENAMED

STATPAK, the interactive statistical package on the CYBER, will be renamed STAT to facilitate the publication of a local version of the user's manual. This manual, University of Illinois STAT User's Manual, will be available in the near future at the CSO Distribution Center (Room 164 DCL).

Starting January 1, 1978, the following commands should be entered to access the STAT package:

```
BATCH
ATTACH,STAT/UN=LIBRARY
STAT
```

Any questions regarding STAT should be directed to the CSO Statistical Services Consulting Office (Room 65 Commerce West; 333-2170).

### FOSOL LANGUAGE ON THE CYBER

The FOSOL language, best described as a "language for statisticians", has been installed on the CYBER. This new system is a structured programming system that contains many preprogrammed statistical routines.

The FOSOL interpreter is accessed by issuing the following commands:

```
GET,FOS/UN=LIBRARY.
CALL,FOS(P=<lf1>[,0=<rje>])
```

where <lf1> is the local or permanent file containing the FOSOL language statements. The 0=<rje> parameter (0 is zero) is optional and <rje> refers to the RJE site to which you wish your output routed; if not specified, it defaults to your terminal if time-sharing and to the DCL printer if BATCH.

In addition to the FOSOL interpreter, the FOSOL Interactive User Manual is available on the CYBER. The interactive manual allows you to page from topic to topic in a random fashion and also allows you to print selected excerpts from it. This manual is accessed by issuing the following commands:

```
GET,MAN/UN=LIBRARY.
CALL,MAN[(0=<rje>)]
```

where the 0=<rje> parameter is optional and refers to the RJE site to which you wish your output routed when you request excerpts from the manual.

The following description of FOSOL is quoted from the FOSOL User Manual (Copyright 1977) authored by Dr. D. Anton Florian of Sangamon State University. This manual is available at the CSO Distribution Center (Room 164 DCL). Any questions concerning FOSOL should be directed to the CSO Statistical Services Consultants (Room 65 Commerce West; 333-2170).

FOSOL is a general purpose computing language that stresses statistical and matrix algebra facilities. FOSOL contains many unique and distinctive features that are absent in other high level languages and statistical systems. To give an idea of the scope of FOSOL, a brief list of its features are listed below....

#### Features of FOSOL

1. The documentation for FOSOL is available in three forms:
  - a) A keyword driven interactive manual that has its text on a word-addressable random access file. A user may page from topic to topic at random and dispose any portion of interest to his remote job entry terminal.
  - b) A printed upper case only file may be disposed to the high speed printer at a remote job entry terminal.
  - c) A printed manual written in an upper and lower case character set that may be obtained from the developer. The manuals contain a wealth of information: initial log-on procedure for the novice, permanent file commands, language specifications, hundreds of sample programs complete with output to illustrate the language features and the library routines.
2. FOSOL is available in interactive, batch and deferred batch mode.
3. Primitive arithmetic operations and assignments on integer and real numbers have been extended to arrays. Mixed mode arithmetic between integers, reals and arrays is permitted. All matrix algebra operations, including generalized inverses and tensor products, are implemented.
4. Arrays are dynamically allocated at run-time when they are assigned or read from external files. The arrays may be in rectangular or lower triangular form (for symmetric matrices).
5. Virtual memory routines extend core memory automatically. It is theoretically possible to handle arrays up to twenty million elements--enough space to do a multiple regression with 6500 variables. The size of the core work space is user definable.



6. Basic external functions such as the square root function are generic. They accept integer, real or array arguments and return integers, reals or arrays.
7. There is an extensive library of over 200 user callable functions and procedures that transform, partition, concatenate and analyze data arrays. The number and types of arguments in the user's program is checked against a master list. Automatic type conversion is performed. Library routines have variable number of arguments as some of the arguments are optional. Many of the "state of the art" statistical service routines in the library are not available elsewhere.
8. Extensive format-free, formatted and binary input/output operations on external files are available.
9. FOSOL provides a rich set of conditional, branching and iterative control statements that facilitates a user in writing a top-to-bottom structured programming style. Two alternatives to the unrestricted GOTO statement are given. FOSOL does not have a GOTO statement.
10. Complete syntax error checking is performed by the FOSOL processor. The error messages are given in reference to the user's program statements. Complete trace-back to the user's statement that is causing a fatal run-time error is provided.
11. All permanent file commands written in the NOS control language are allowed in the user's FOSOL program file. These statements allow the user to DEFINE, GET, or ATTACH permanent files that are to be used in the user's job and to SAVE or REPLACE files after the FOSOL execution is over. On fatal errors on these statements, the relevant portion of the user's dayfile is listed.
12. FOSOL is a growing language with new and improved features being added regularly.

#### CYBER SPSS VERSION 7

Version 7 of the CYBER SPSS batch system is now available. To access this version, use the following control statements:

```
ATTACH,SPSS=SPSSV7/UN=LIBRARY.  
SPSS(<optional parameters>)
```

Because Version 7 incorporates extensive changes to the SPSS system, both Version 6.5 and Version 7 will be available until January 16, 1978. After January 16, Version 6.5 will be removed and Version 7 will be accessed by the control statements:



ATTACH,SPSS/UN=LIBRARY.  
 SPSS(<optional parameters>)

Changes to the Documentation

The CYBER SPSS documentation (which describes those SPSS features not documented in the burgundy SPSS manual) has been changed for Version 7 as follows:

<u>Document</u>	<u>Changes</u>
SPSS Manual Differences	rewritten
SPSS Version 7	new document
ANOVA	1 page rewritten
JFACTOR	slight revision
MANOVA	rewritten
MULT RESPONSE	new document
NONLINEAR	rewritten
NPAR TESTS	rewritten
REGRESSION	5 pages rewritten

All other documentation has remained the same. The complete set of Version 7 CYBER SPSS documentation can be obtained at the CSO Distribution Center (Room 164 DCL). The following prices are in effect.

<u>Document</u>	<u>Cost</u>
SPSS Manual Differences	no charge
SPSS Version 7	no charge
MANOVA documentation	2.45
RELIABILITY documentation	1.60
A packet containing documentation for:	3.55
ANOVA	
G3SLS	
JFACTOR	
MULT RESPONSE	
NONLINEAR	
NPAR TESTS	
PLOT	
REGRESSION	
SUMMARY TABLES	
TETRACHORIC	

Users who have the Version 6.5 documents for ANOVA and/or REGRESSION may obtain the pages which have been changed in Version 7 free of charge from the Statistical Service Consultant (Room 65 Commerce West).

Changes To Existing Programs

There have been extensive changes to the programs in Version 7. A handout on the complete set of changes, called SPSS Version 7, is available free of charge at the Distribution Center (Room 164 DCL) or from the Statistical Services Consultants (Room 65 Commerce West). The following is a very abbreviated list of some of the important changes.

- DO REPEAT                    Now handles values as well as variables in the substitution list.
- FREQUENCIES                A new and faster GENERAL version has been implemented.
- MANOVA                      Has been rewritten for Version 7. The OPTIONS and STATISTICS numbers have been changed. The CONTRANS keyword has been renamed to TRANSFORM. HELMERT and SIMPLE contrasts have been added. VARIMAX, EQUIMAX and QUARTIMAX rotating has been added. Multiple ANALYSIS and DESIGN specifications are now permitted. The program requires substantially less memory and computing time to process orthogonal designs.
- MISSING VALUES            A missing value range specification has been implemented.
- NONLINEAR                  Has been revised to include some new features. They are: multiple nonlinear regression, user specified or program calculated derivative function, choice of Gauss or Marquadt method, parameter fixing, greatly improved speed of execution. Most STATISTIC and OPTION numbers have been changed and all PARAMETER specifications have been revised.
- NPAR TESTS                 A new STATISTIC and two new OPTIONS have been added and numerous improvements have been made to most of the tests.
- ONEWAY                      The calculation of polynomial contrasts has been extensively revised. Processing of linear contrasts has been rewritten to properly handle groups with zero variance, and calculation of degrees of freedom for the separate variance estimate of t has been corrected. The computations for random effects measures have been corrected for unequal group sizes.
- OPTIONS Processing        A description of the OPTIONS in effect for a statistical procedure is now printed.
- SAMPLE                      Several changes have been made to the way that sampling is implemented. SAMPLE cards are now executed in

sequence. Previously, sampling was done first in a series of data modification statements regardless of the placement of the SAMPLE card in the job deck. The initial seed used by SAMPLE is now a function of the time of day at which the job begins. In Version 6.5, sampling began with a fixed seed.

SELECT IF Multiple SELECT IF commands are operated on as if they are connected by AND in Version 7. They worked as if joined by OR in Version 6.5.

REJECT IF Multiple REJECT IF statements work as if they are connected by OR in both Version 6.5 and Version 7. However, Version 7 operates on multiple REJECT IF's more efficiently because processing of a case stops as soon as a REJECT IF condition is satisfied. Version 6.5 did not reject a case until all data modification and data selection statements had been executed.

#### New Programs

MULT RESPONSE Performs an analysis of multiple response variables. (A multiple response variable is an item on a survey to which a respondent might legitimately make more than one reply.) This procedure provides two types of output: frequency tables similar to those produced by FREQUENCIES and crosstabulation tables similar to those produced by CROSSTABS.

This article has only briefly described the numerous changes and additions in SPSS Version 7. Because the changes are so extensive, and because many of the new features will make previously written programs incompatible with Version 7, SPSS users, whether novice or expert, are strongly encouraged to obtain at a minimum the new SPSS Manual Differences handout, and the handout on SPSS Version 7.0 updates. Both handouts are available free of charge at the CSO Distribution Center (Room 164 DCL) or from the Statistical Services Consultants (Room 65 Commerce West).

MISCELLANEOUS

## GUIDE TO CSO

CSO has produced a new document, Guide to CSO, which gives general information about its services and facilities.

Guide to CSO is available, free of charge, at the CSO Distribution Center (Room 164 DCL).

HELP WANTED

## FORTRAN PROGRAMMER

Radio astronomers are looking for an experienced FORTRAN programmer to assist them in reducing observational data. The applicant must be reliable, and available for work during term breaks, some holidays and the summer. The job requires 10 hours of work a week, and will begin as soon as possible. If interested, contact Scott Lathrop at 187 DCL (333-6618).

## PROGRAMMER POSITION

A full time programmer is wanted to work with various computers. The position requires familiarity with assembly language programming on at least one machine, and willingness to learn other machine languages. Knowledge of the IBM 360/75 and the CYBER 175 is desirable. For more information contact Mr. Don Secrest (333-1728).

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