

COMPUTER CENTER NEWSLETTER

Volume III, No. 1

January 5, 1968

Partial Refund of CDC 3300 MASTER Charges for October

The revised rates for use of the Control Data 3300 given in the Computer Center memo of November 7 did not state explicitly how time was recorded for reservation of core and scratch segments. At that time the accounting system recorded in-out time for these two items, reflecting the actual reservation time. This procedure, still in effect at certain other installations, has been abandoned by the OSU Computer Center in favor of a system which will give more predictable results. Statements for November and December services were computed on the basis of CPU-plus-channel time for all components of the system except card reader, card punch, and printer. Charges for October services will be recomputed on the same basis. All MASTER users will receive the resulting refund along with statements for December services.

Formula for Computation of Charges Under MASTER

Several users have requested clarification of charges resulting from reservation of scratch storage. Scratch storage is reserved for input, output, and punch files in addition to the segments reserved for program usage. The number of scratch segments reserved is computed in integer arithmetic as follows:

$$\begin{aligned} \text{Number of scratch segments} = & \\ & \frac{(\text{Estimated Number of Lines of Print}) \cdot 34 + 10239}{10240} + \end{aligned}$$

$$\begin{aligned} & \frac{(\text{Estimated Number of Cards Punched}) \cdot 40 + 10239}{10240} + \end{aligned}$$

$$\begin{aligned} & \frac{(\text{Actual Number of Cards Read}) \cdot 20 + 10239}{10240} + \end{aligned}$$

Number of scratch segments reserved for program.

The actual charge is then computed as follows:

$$\begin{aligned} & \left[\text{(Number of scratch segments) + (Number of} \right. \\ & \quad \left. \text{quarter pages of core reserved) + \$250} \right] \cdot \left[\text{CPU-plus-} \right. \\ & \quad \left. \text{channel time} \right] + \\ & \text{(Number of lines of output) } \cdot \text{\$.00125 } + \\ & \text{(Number of cards read) } \cdot \text{\$.0025 } + \\ & \text{(Number of cards punched) } \cdot \text{\$.0025} \end{aligned}$$

New Rates for Certain Classes of Low Priority Work

The method of charging described above is designed primarily for the short, multiprogrammed, computer job. A new rate for those who use large blocks of core for long time periods has been established.

Users with long-running jobs may reserve the entire available core and take advantage of a flat \$300 per hour rate. This rate will be limited to those jobs which actually use five minutes or more of CPU-plus-channel time and which reserve 64 or more quarter pages of memory. Charges will still be made for lines of output, cards read and cards punched. These jobs may be delayed for overnight processing depending upon computer loading. The new rate will be effective for work processed since January 1, 1968.

Charges for OS3

Charges for use of the CDC 3300 under OS3 will be based on a flat rate of \$400 per hour for CPU time. Users of OS3 will be billed for all 1967 work on the statements for December services.

Recent OS3 Developments

An overlay processor has been added to the facilities available under OS3. This processor is patterned after the Real Time Scope overlay scheme. OS3 users may now make use of magnetic tape as well. For details, please contact Jim Meeker, extension 3158.

Remote Job Entry

After a two month absence, the MATS system will once again be made available to all users with access to teletype equipment. The system has been considerably improved and operates simultaneously with the MASTER operating system. Users of the MATS system will be restricted to programs with 40 or less quarter pages of reserved memory except by special arrangement with the Computer Center. Those who must enter larger programs through MATS should contact Ron Davis in Kidder 152, extension 2494. MATS/MASTER User's Manuals are available at the Computer Center office.

New CDC 3300 Operating Schedule

On Tuesday, January 9, the following schedule will be adopted:

7:30 AM - 9:30 AM	OS3
9:30 AM - 10:00 AM	MASTER
10:00 AM - 12:00 M	MASTER with MATS access
12:00 M - 1:00 PM	MASTER
1:00 PM - 3:00 PM	MASTER with MATS access
3:00 PM - 4:00 PM	MASTER
4:00 PM - 6:00 PM	OS3
6:00 PM - 12:00 PM	MASTER and scheduled work

Your cooperation is requested to observe posted restrictions on the use of the system in order to ensure reasonable turn-around-time for all users.

Bring Your Problems Here

Mr. Ron Davis of the Computer Center Staff has been assigned to supervise the job shop operation of the Computer Center. His responsibilities will include coordination of the maintenance of operating systems, and supervision of the collection, processing, and distribution of user jobs. He will also be responsible for hearing and acting upon complaints and suggestions from the entire user community. Mr. Davis may be reached in Kidder 152, extension 2494.

Advisory Committee on Computational Services

To facilitate improvements in computational services provided by the Computer Center an ad hoc committee of current active users of the facilities has been created by the Director to advise the Center in matters relating specifically to computational services. Members of the committee and details of its function will be announced soon.

Availability of Key punch Machines for Fixed Period Rental by Individual Departments

The Computer Center has received several inquiries from Departments on campus regarding the possibility of acquiring keypunch machines for exclusive use by individual Departments. To date, the heavy demand for keypunch machines and the lengthy delays in obtaining additional machines made it impractical for the Center to make any of its facilities available for this purpose.

The Center has recently acquired additional keypunch equipment, and will make these machines available to Departments at the cost incurred by the Center. Individual Departments which may be interested in acquiring a keypunch machine for their own use are requested to contact Wendell Arntzen at the Computer Center.

Manuals Now Available at the Computer Center Office:

- cc-67-16: "A Free Format Numerical Input Routine for Teletypes Under OS3" by Walt Pawley.
- cc-67-17: "A Complex Arithmetic Package for 3300 FORTRAN Library" by Walt Pawley.
- cc-67-18: "Card Reader Subroutine for the PDP-8 FORTRAN Compiler" by Steve Sullivan.
- cc-67-19: "MATS/MASTER User's Manual" by Dennis Thomas.
- cc-67-20: "OS3 Teletype Editor" by Fred Dayton.

COMPUTER CENTER NEWSLETTER

Volume III, No. 3

March 28, 1968

FORTRAN T.V. SHORT COURSE

A FORTRAN short course will be given for all interested staff and students beginning April first.

This is a course, for people with little or no experience, in the basic elements of the scientifically-oriented FORTRAN language.

The course is not intended to serve as an introduction to data processing, nor as a complete and detailed course in programming; but rather as an introduction to a language which will be a useful tool for those who want to use computer facilities. The basic structure or "grammar" of FORTRAN is presented, including statements of the following types: input-output, control, specification, and computation.

The course should enable the student to begin writing simple FORTRAN programs, and rapidly progress to the programming of more difficult problems.

The course will be shown on two schedules and will consist of five sessions covering the following topics:

- I. Introduction
Character Set-Values-Constants-Variables-Operators-Expressions
- II. Order of Operation-Mode of Arithmetic-Replacement-
"GO TO" Statement
"IF" Statement-Logical Operators and Expressions-
"DO" Statement
- III. "READ", "WRITE", and "FORMAT" Statements-Format
Specifications
Subscripted Variables-Subscript Forms-"DIMENSION" Statement

IV. Format Specifications
 Format Specifications-Other Input/Output Information

V. Flow Charting-Program Example
 Program Examples

SERIES 1 will be shown in Kidder Hall, Room 20, and Room 274 on the following schedule:

I.	7:00 PM	Monday	April	1
II.	"	Wednesday	"	3
III.	"	Monday	"	8
IV.	"	Wednesday	"	10
V.	"	Monday	"	15

SERIES 2 will be shown in Kidder Hall, Room 108 on the following schedule:

I.	4:00 PM	Tuesday	April	2
II.	"	Thursday	"	4
III.	"	Tuesday	"	9
IV.	"	Thursday	"	11
V.	"	Tuesday	"	16

Anyone interested should sign up at the Computer Center Office, Kidder Hall, Room 130, where problem sets will be given out and Control Data FORTRAN Manuals will be available for purchase.

As stated above, the course is not intended as an introduction to data processing. Another short course, An Introduction to the Basics of Electronic Data Processing, will be presented later. Developed to provide a comprehensive approach to the understanding of computers and the concepts of data processing, the course is oriented toward Business Data Processing and discusses the following areas of EDP:

- (1) Introduction to Data Processing
- (2) Punched Card Data Processing
- (3) Computer Data Processing
- (4) Data Processing Systems
- (5) Job Opportunities in Data Processing

SPRING TERM COMPUTER SCHEDULE

The current CDC 3300 computer schedule will remain in force throughout the Spring term except for the addition of late evening hours for the OS3 system. OS3 will be available from 9:00 PM until 11:00 PM on Monday, Wednesday, Thursday, and Friday evenings to accommodate the increasing instructional demands for the OS3 system.

USER COMMITTEE

The ad hoc Computer Center Users Committee held its initial meeting on March 5. The next meeting will be held on April 2.

COMPUTER CENTER SEMINAR NOTICE

On Wednesday, April 10, at 4:00 PM in Weniger 153, Mr. Don Mackenzie will discuss a new feature of the MATS system. This feature is a new command, CONV, which gives the user access to an on-line arithmetic expression evaluator. The talk will cover the design and structure of the language as well as the implementation techniques. The talk should be of interest to students of computer language and systems programmers as well as potential users of the system.

NSF SUPPORTS NEW COOPERATIVE COMPUTER EXPERIMENTS

The National Science Foundation announced on February 28 the first grants in a program to determine the value and costs to educational institutions of sharing computers and related activities on a geographical basis.

The grants, totaling \$735,500, were made to Cornell University (\$116,800); Dartmouth College (\$164,200); and Oregon State University (\$454,500).

Under the grants each of these institutions will:

1. Serve as a regional computing center to a group of other educational institutions, with the groups consisting of members such as universities, colleges,

junior colleges, and high schools.

2. Work with members of its group to develop computer-oriented curricula.
3. Train faculty and teachers of its own and member institutions in the uses of computers in education.

The organizations and institutions participating with Oregon State University are the Teaching Research Division of the Oregon State System of Higher Education, Oregon College of Education, Portland State College, Eastern Oregon College, Southern Oregon College, Oregon Technical Institute and Lane Community College.

The project starts April 1, 1968, and runs for a period of approximately two years. Dr. D. D. Aufenkamp is principal investigator.

CONTINUED OSCAR DEVELOPMENT

A major portion of the project for the development and appraisal of time-shared computer facilities for instruction within Oregon centers around a continued development of OSCAR, the mathematical "conversational" language for use at remote terminals. The National Science Foundation in the award of the grant noted above has included direct support for the OSCAR project. This support will facilitate:

- (1) implementation of the remainder of the initial version of OSCAR,
- (2) developments of the language to increase its utility to users, and
- (3) experimentation with classroom use.

Dr. Joel Davis, principal investigator, Gil Bachelor and Bob Brenne are responsible for the design and implementation of the language.

APPENDICES FOR OSCAR MANUAL

A complete user's manual for OSCAR is in preparation. The manual has not been completed; however, in the interests of providing information about OSCAR certain appendices to that manual which have been completed will be made available by the Center. The six appendices are:

- A. List of Reserved Words
- B. List of Special Symbols
- C. Order of Precedence of Operations
- D. Constants and Data Inputs
- E. Forms of Statements
- F. List of Commands

Appendices A, B, C, and F are presently available.

PDP-8/CDC 3300

The PDP-8 has been moved up to the Computer Room in Kidder 128. It will be used as a peripheral computer to the CDC 3300.

REVISED OS3 USER'S MANUAL

An updated version of the OS3 User's Manual, by Mr. G. Bachelor, is now available to users. Copies may be obtained from the Computer Center office.

OS3 DOCUMENTATION

The Computer Center has initiated a documentation project for the OS3 system. George Rose and Gil Bachelor will undertake the job of producing technical documentation suitable for maintenance of the system either here or at other installations. Harvey Thoennes will participate in the project and will be ultimately responsible for the maintenance of the system. The forthcoming version 2 of OS3 will be frozen for this documentation effort.

NEW FEATURES OF OS3 FORTRAN COMPILER

OS3 FORTRAN Version 1.4 is now available. A descriptive manual written as an extension of the CDC 3300 FORTRAN Reference Manual is available from the Computer Center office.

LARGE PROGRAMS

The OS3 system utilizes the full 32K of memory for loading programs. If a user's program is marginal on core requirements under MASTER, OS3 will allow the user to increase data storage or program storage.

A new "type other" arithmetic is also available on the OS3 FORTRAN library which will permit the user to double the size of floating point arrays. This feature is not recommended for normal use, but is available upon request from Ron Davis. A 40K program has been successfully run for the Radiation Center using this technique.

USER SUBROUTINES AND PROGRAMS

The Computer Center is attempting to gather all CDC 3300 programs and subroutines written by users in order to compile an up-to-date reference list of available programs and routines. Such library routines will be helpful to all users and would eliminate much time consuming duplication of efforts.

Ron Davis (ext. 2494) is responsible for this project. The cooperation of all CDC 3300 users will be very much appreciated to make this reference service as complete as possible.

CDC 3300 REFERENCE MANUALS

Reference Manuals for the CDC 3300 can be ordered from the OSU Bookstore. These manuals should be ordered by name and

the CDC reference number. Some of the manuals frequently used are:

ALGOL REFERENCE MANUAL	60134800
ALGOL INSTANT CODE BOOK	60134900
BASIC ASSEMBLER REFERENCE	60057100
COBOL REFERENCE MANUAL	60132000
COBOL INSTANT CODE BOOK	60131200
COMPATIBLE COMPASS REFERENCE	60174000
FORTRAN REFERENCE MANUAL	60057600
FORTRAN INSTANT CODES	60131400
3300/3500 MASTER REFERENCE MANUAL	60176800
3300 COMPUTER SYSTEM REFERENCE MANUAL	60157000

MANUALS WRITTEN BY COMPUTER CENTER PERSONNEL

In the past year, a host of manuals has been produced by the personnel in the Computer Center. Copies of the following are available from the Computer Center office:

INTERVAL ARITHMETIC, 67-1, by D. Bigham. (3300)
 BINARY CARD LOADER, 67-4. (PDP-8)
 FLOATING POINT PACKAGE #1, 67-6, by Wilson & Haek. (NEBULA)
 NEBULA PROGRESS REPORT, 67-8, by J. Boles.
 EVALUATION OF THREE-DELAY-LINE CONTENT ADDRESSABLE
 MEMORY SYSTEMS, 67-9, by P. Rux.
 FLOATING POINT PACKAGE #2, 67-11, by Wilson & Haek. (NEBULA)
 ARITHMETIC CALCULATION PROGRAM, 67-12, by M. McCune.(1620)
 REPORT ON OSU MATS SYSTEM, 67-13, by L. Hedberg.
 A BRIEF DESCRIPTION OF OSCAR, PART I: THE DIRECT MODE,
 67-14, by J. Davis.
 OS3 USER'S MANUAL, 68-3, by G. Bachelor.
 A FREE FORMAT NUMERICAL INPUT ROUTINE FOR TELETYPES
 UNDER OS3, 67-16, by W. Pawley.
 A COMPLEX ARITHMETIC PACKAGE FOR 3300 FORTRAN LIBRARY,
 67-17, by W. Pawley.
 MATS/MASTER, 67-19, by D. Thomas.
 OS3 TELETYPE EDITOR, 67-20, by F. Dayton.

STAR (Symbolic Translator and Assembly Routine),
67-21, by R. Wasilk. (NEBULA)
REVIEW OF COMPUTER CENTER FUNCTIONS AND ACTIVITIES,
68-1, by D. D. Aufenkamp.
MECM (Program to Reproduce on the 1620), 68-2,
by R. Green.

RECENT PUBLICATIONS

Jennings, M.A. "Optimizing Library Automation with a
Central Dynamic Store...A Data Bank Technique",
Pacific Northwest Library Association Quarterly,
January, 1968.

Jennings, M.A. and A.D. Birch. "A University Personnel
Data Administration Technique (UPDATE)", State
Government Administration, September 1967. Also
published in College and University Business,
November, 1967.

Jennings, M.A. and A.D. Birch. "A University Questionnaire
Information System (UNIQUE)...A Study in Manpower
Reporting", College and University Business,
January, 1968.

Jennings, M.A. and A.D. Birch. "Personnel Data Systems",
Business Automation, March, 1968, p. 64.

Rose, George D., Ethel Tobach, Mark Smith, and Donald Richter.
"A Table for Making Rank Sum Multiple Paired Comparisons",
Technometrics, Vol.9, No. 4, November 1967, pp. 561-567.

Papers accepted:

SWAP-14 Meeting, Chicago, April 22-24 (Control Data Small
and Medium Scale Computer User's Group).

Mackenzie, Don G., "Conversation under MATS/MASTER".

Schoenborn, Roland E., "Random Access Memory Packed
Write/Read (GENRAMOI)".

Fifth Annual Colloquium on Information Retrieval, Philadelphia,
Pa., May 3, 4.

Jennings, M.A., "Optimizing Library Automation with a
Central Dynamic Store".

PROGRAMMING TIPS

Programming Tips will be a regular feature of the Computer Center Newsletter. These tips are intended to give users up-to-date information about recent developments.

MASTER MONEY SAVERS

Users may now schedule as few as six quarter pages of memory for certain small binary jobs.

Users may specify zero scratch segments for jobs which need no scratch area and avoid the charge for three segments which is automatic if the scratch reservation field is left blank.

Users may suppress the memory maps generated by the loader by using the new control card "\$NOMAP".

OS3 PUNCHED OUTPUT

Unless labeled, it is impossible to associate punched output with other output for the same job in OS3. One or more label statements can be used to identify punched output.

Example:

```

      7
      8 LABEL,62/(NAME)

```

Non-labeled output cannot be properly identified and will be discarded.

MATS INNOVATIONS

MATS users may direct their output files to the teletype rather than the system printer by using a new \$SCHED card option "OUT=*_^ ^ ^ ^", where ^ ^ ^ ^ is a one to seven character MATS file name. These files are limited to 600 lines.

A new MATS command, DJOB, has been added to allow users to submit jobs to a delayed queue. These jobs will be deferred

until MATS is off the air. Jobs which exceed any of the following schedule limits will be automatically delayed:

CORE = 44 quarter pages

TIME = 5 minutes

LINES = 5000

PUNCH = 1000

Users are reminded that the JOB and DJOB commands put only file names into the job queues. Deleted files cannot be processed.

TAPE LABELING

A routine to label magnetic tapes in standard CDC format has been added to the library. Bulletins explaining its use are available outside the machine room (K 128) or from the Computer Center office. Users are strongly encouraged to use labeled tapes. Labeled tapes provide a substantial increase in file security and ensure that the correct density is used.

FORTRAN-32 SUBSCRIPTS

Users should be cautious not to exceed allowable limits in the use of large arrays, particularly with double or triple subscripts. Under certain circumstances the allowable array size (normally 32,767) may be substantially reduced. In a triply subscripted array, the allowable size is $32767 - (I_{max}) - (I_{max}) * (J_{max})$ where I and J are the first two subscripts. In a doubly subscripted array, the allowable size is $32767 - (I_{max})$. However, if the subscripts are fixed, as IBUF(10,440,2), the restriction does not apply. In the example below the address of IBUF(I,J,K) will be incorrectly calculated so that the IF statement will not check the same two words.

```
DIMENSION IBUF(20,600,2)
I = 10
J = 440
K = 2
IF(IBUF(I,J,K).EQ.IBUF(10,440,2)) 10, 20
```

Users are also reminded that the maximum character array is 16,383.

COMPUTER CENTER NEWSLETTER

Volume III, No. 4

April 30, 1968

ORGANIZATIONAL CHANGES IN THE COMPUTER CENTER

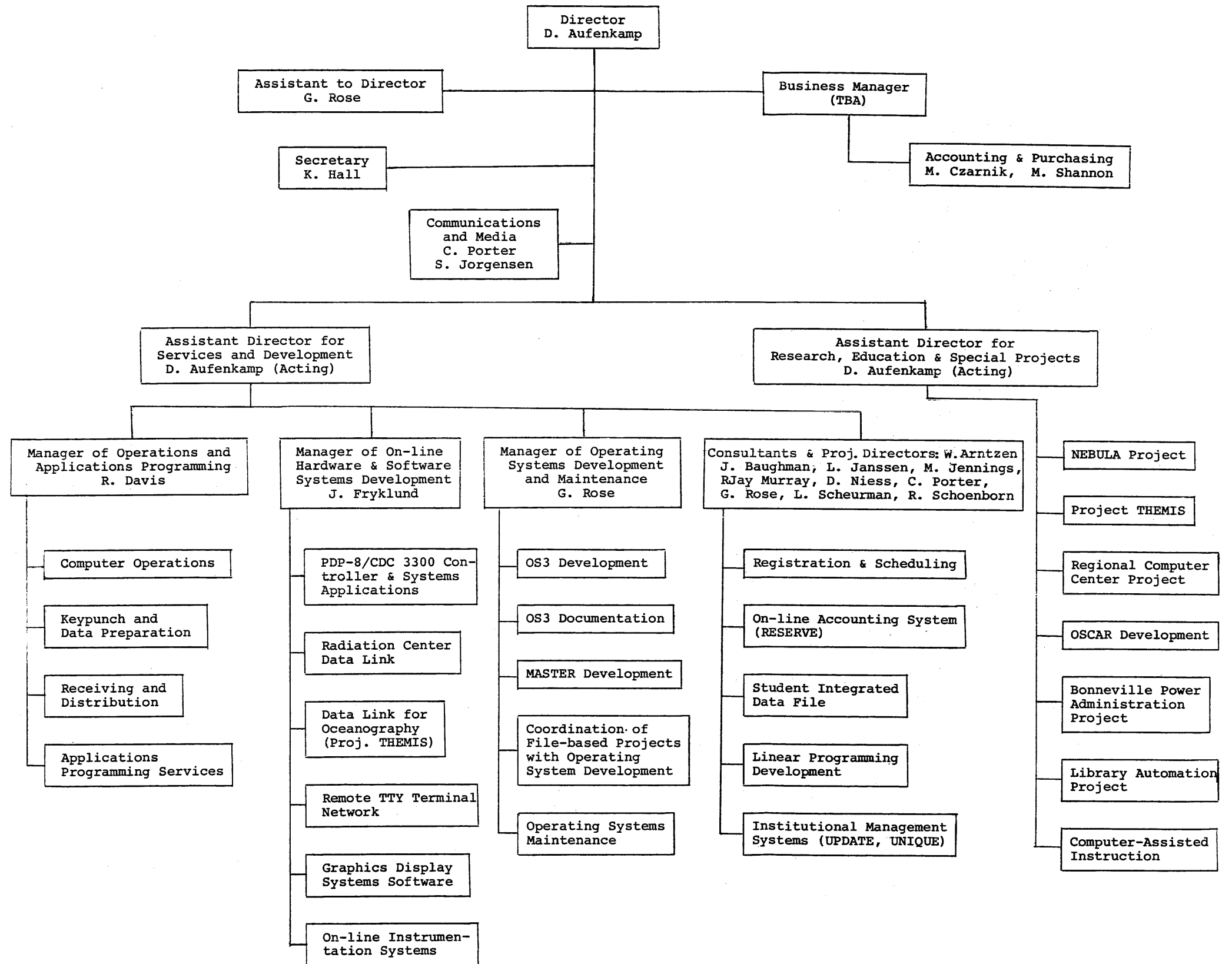
Several changes in management assignment within the Computer Center become effective May 1, 1968. These changes are reflected in the accompanying organization chart. The functions of Manager of Computing Services and Software Development have been realigned under three principal areas of technical responsibilities:

1. Operations and Applications Programming.
Ron Davis, Manager
2. On-Line Hardware and Software Systems Development.
James Fryklund, Manager
3. Operating Systems Development and Maintenance.
G. Rose, Manager

A position of Business Manager for the Center has also been called out.

Wendell Arntzen will expand his role as a senior investigator on Project THEMIS, The Use of On-Line Computers in Environmental Research, to strengthen the support of that project. Larry Janssen becomes a systems analyst for institutional management and other file-based data management projects. Dave Niess will devote most of his time to development of programming packages and associated instructional materials for use at remote terminals in the regional computer center project, facilities which will also be useful for the campus.

The organization chart provides a reasonably complete delineation of principal functions and projects in which the Center is currently participating. In addition to the specific activities mentioned there are numerous other computer activities and developments in the Center to which many staff members also contribute.



CONVERSION TO OS3 AS PRINCIPAL OPERATING SYSTEM

OS3 will become the principal operating system for the CDC 3300 starting July 1, 1968. The proposed schedule of operations is as follows:

8:00 AM to 4:00 PM	OS3
4:00 PM to 9:00 PM	MASTER and Systems Development
9:00 PM to 12:00 PM	OS3

As conversion to OS3 is accomplished the MASTER schedule will be reduced accordingly. By October 1, 1968, it is expected that MASTER users will be accommodated on an over-night basis.

MATS services will terminate July 1 when the above schedule becomes effective except for announced special runs to accommodate MATS users in completing the conversion of programs still under MATS.

Plans for assistance in the conversion to OS3 include seminars, video tape lectures, written illustrative materials and services of consulting programmers. It is to be expected that many of the usual problems in changing operating systems can be avoided in this conversion since we already have a working understanding of OS3 in a service environment.

Accounting under OS3 has been based to date primarily on a measure of CPU time. A revision of this procedure will be incorporated into the system July 1.

In view of the interest of many individuals on campus in operating systems used by the Center, planned improvements in OS3 will be described in future newsletters and other reports. In particular, it is the intention of the Center to take advantage of CDC releases of new compilers, utility packages and other programs.

Some of the plans for OS3 over the next months in addition to the revised accounting system include:

1. Additions to CDC FORTRAN-32
2. Installation of utility packages under OS3

3. Installations of LP packages under OS3
4. Accommodation for CRT displays
5. Use of PDP-8 as a satellite to the CDC 3300
6. Operation of on-line data line to Radiation Center
7. Design of on-line data system for Oceanography
8. Installation of forthcoming new COBOL
9. Simulation studies of OS3 to optimize the operating system in regard to the present and projected equipment configuration and campus requirements for computational services.

INTRODUCTION TO THE BASICS OF ELECTRONIC DATA PROCESSING

This videotape course, which will be released by D.C.E. next fall, will be previewed on closed circuit television:

Monday - Friday, May 13-17, 4-5 PM, Kidder Hall, Rm. 20

The purpose of this course is to provide the beginning student with a broad comprehensive approach to computer and data processing concepts. It is strictly an introduction to data processing.

Topics discussed are as follows:

Monday

What is data processing
Four types of data processing equipment
Vocabulary
History of data processing
Punched card data processing
The card
Form design

Tuesday

Punched card recording	Advantages of computer data processing
Punched card processing	
How a card is read	Magnetic tape
Control panel wiring	Vocabulary
Computer data processing	Peripheral devices

Wednesday

Review of vocabulary	Document scanners
Input devices	Data communications
Output devices	Teleprocessing
Storage devices	Programming
Data processing systems	Types of programming
Random access	Number systems
Sequential processing	

Thursday

Number systems	Program coding
Conversion of bases	Software
Planning a program	Hardware
Flowcharting	Real-time processing
Systems Analyst	Magnetic tape
Programmer	

Friday

Systems programming	Report program generator
Languages	Monitors
Assemblers	Utility routines
Compilers	Jobs in data processing
Advantages	Review
Report generators	Vocabulary

NOTE: This course should serve as an introductory survey course for the layman. Please call the Computer Center, ext. 2494, if you are interested in watching this course.

STUDENT EXPERIMENTATION WITH COMPUTERS INVITED

The recent NSF grant to Oregon State University for an experimental regional computer center for the State of Oregon included as a vital part of the project funds for "unsponsored" student experimentation with computers via the remote teletypewriter terminals. All OSU students as well as those of other participating institutions are invited to avail themselves of this unusual opportunity.

The terminals will be "on the air" for this purpose daily between 9:00 and 11:00 PM starting approximately May 15. In addition to OSCAR and other programming facilities presently available at the remote terminals, the Computer Center expects to add several demonstration packages to the system including computer assisted instruction (CAI) programs during the two-year project. Furthermore, students will also be encouraged to contribute to this "library." Several introductory "short" courses, lectures, discussion groups, and appropriate materials are planned.

Instructors are invited to bring this announcement to the attention of students and to emphasize that the invitation is extended to all students.

Additional information concerning the project will be available shortly.

ALGOL UNDER OS3

The installation of ALGOL under OS3 has been completed. Control Data Reference manuals on ALGOL provide instructions on using this language on the CDC 3300. These manuals are available at the Computer Center.

STAFF ACTIVITIES

George Rose will give a paper to the Intermediate Education District Superintendents of Oregon on May 21. It is entitled, "Government, 1985."

STAFF ACTIVITIES (continued)

Dave Komaroff is a new staff member of the Computer Center. He is assisting in software development for the data link to the Radiation Center. Dave also holds an assistantship in the Department of Mathematics.

JoAnn Baughman visited the National Center for Atmospheric Research in Boulder, Colorado, on April 24-25. She consulted with them on their On-Line Time Series Analysis and Computer Graphics.

Dr. D. D. Aufenkamp, Wendell Arntzen, and Jim Fryklund will be in Pullman, Washington, on May 10-11 attending a computer symposium of university and industrial personnel for the northwest states. D. D. Aufenkamp will speak on computing developments at OSU and Jim Fryklund will participate in a panel discussion of computer handling of network information. Jim Meeker, Ron Crandall, and Fred Dayton will speak at the same symposium on OS3 at a session sponsored by the student chapter of the ACM. Demonstrations are planned for OS3 and OSCAR, the conversational language available under OS3.

COSMIC PROGRAM DIRECTORY

Under a contract with NASA, the University of Georgia has established a center known as COSMIC (Computer Software Management and Information Center) for the dissemination of computer programs made available by NASA. These programs cover a range of engineering, numerical mathematics, cost control, and scheduling applications. The cost of fully operational and documented programs depends on program size, but a magnetic tape copy presently averages \$75 with the user supplying the tape. A copy of documentation only costs \$5 to \$10; in a few cases the documentation contains a program listing from which a deck may be punched.

A directory of programs available from COSMIC is maintained at the Computer Center. Interested persons should contact RJay Murray at extension 2062 or 2063.

THE COMMON DESK

The representatives to the Common Desk met Tuesday, March 26, in Portland. Lester Mock from D.C.E. will succeed Ken Warren as coordinator of the Common Desk function.

The members discussed the functions of the Common Desk committee and considered ways of performing the information collection and dissemination. The coordinator will compile, collate, and synthesize information received.

It was suggested that a relatively small number of individuals on each campus could be identified as key contacts for compilation of the quarterly reports by campus Common Desk representatives.

The group agreed that the position of Electronic Communications Information Coordinator should be established as a staff position in the central office.

Common Desk institutional representatives will meet together at least twice a year to assess progress and evaluate procedures.

The members of the Common Desk are:

Dr. Bert Kersh Oregon College of Education	Paul Chitwood Oregon Technical Institute
Dr. D. D. Aufenkamp Oregon State University	Dr. Laurence Butler Southern Oregon College
James W. Simmons Eastern Oregon College	Kenneth Butler Portland State College
George Carver University of Oregon Dental School	Dr. Fred Andrews University of Oregon
Richard Herren University of Oregon - Medical School	

COMPUTER CENTER HOURS

Kidder Hall is open from 6:00 AM to 2:00 AM daily for the convenience of users who want to leave or pick up computing jobs or who want access to keypunch machines or flexowriters.

REQUEST FOR MATERIALS

The Computer Center Newsletter is published once a month by the Computer Center. Material for the newsletter should be sent to Kay Porter, Kidder Hall Room 130, telephone 754-2494.

NEW COMPUTER CENTER PUBLICATIONS

Several new Computer Center publications are or will soon be available to users. They are:

68-3	OS3 User's Manual Revised	Bachelor	3/68
68-4	OS3 Fortran Version 1.4	Meeker	3/68
68-5	Design and Evaluation of Glass Delay Line Content-Addressable Memory System (Ph.D. Thesis) (NEBULA)	P. Rux	4/68
68-6	Teletype Operation	Civil Eng.	4/68
68-7	Several Illustrated Examples of OSCAR (OS3)	Hedberg, Davis	4/68
68-8	Conversion Under MATS/MASTER	Mackenzie	4/68
68-9	DECKEDIT Routine for CDC 3300/OS3	Bachelor	4/68
68-10	SCANIN, A Free Format BCD to Floating Point Converter	Pawley	4/68
68-11	DECKLIST Routine, Version 1.3 (for CDC 3300/OS3)	Bachelor	4/68
68-12	A Beginner's Manual for OS3	Massie, Dept. of Civil Eng.	4/68

PROGRAMMING TIPSOS3

A new feature of the OS3 Compiler is now available.

```
FORMAT (....'DESCRIPTION' ....)
```

can be written instead of

```
FORMAT (11 H DESCRIPTION)
```

A new function (EOF (lun)) has been added to OS3 Fortran. It is very similar to EOFCKF(lun) except that it returns the values true and false (1 and 0) instead of 1 and 2.

Examples:

```
IF (EOF(60)) go to 3
```

```
IF (EOF(1)) 3, 40
```

```
VARIABLE = EOF (6)
```

NOTE: VARIABLE should be declared as integer.

PROGRAMMING TIPS (continued)MASTERPERT

PERT/TIME and PERT/COST have been added to the Master library. PERT/TIME will handle up to 8000 activities and 4095 events. PERT/COST will handle 3000 account numbers and 2000 summary numbers. PERT/COST and PERT/TIME are compatible. The PERT/COST system permits the incorporation of costs with the PERT/TIME network. Information on manuals may be obtained from the Computer Center Office.

MATS

Several new MATS features have been implemented including two new commands UTILITY and QUEUE. Complete information is on the system file "BULLETIN(S)" which any user may output.

Previously Undocumented Features of MASTER

Three control cards provide manipulation of files.

\$REWIND (DSI)	will rewind the magnetic tape with this dsi.
\$WEOF (DSI)	write an end of file record on this dsi.
\$LOCATE(DSI,funct,n)	
	dsi = 1-4 characters specifying an open file
	funct = function to be performed on file
	FWD Position file n blocks forward
	BWD Position file n blocks backward
	BLK Locate to block n on mass storage. For magnetic tape the only legal value for n is 1. This rewinds the tape.
	FMF Position tape n file marks forward
	FMB Position tape n file marks backward
n	Depending on function n is the number of blocks or file marks.

Tapes may be opened and labeled automatically by *DEU

To open and label a tape replace the U parameter by 2, 5, or 8.

The number specifies the tape density desired (200, 556, or 800 BPI).

Example \$*DEU(5,W,56,604,1888,LABEL-NAME,01,05,0)

Fortran

Large Fortran programs may be broken up into any number of MASTER tasks using the c option of the Fortran compiler. For more information contact Tom Cattrall, Kidder 142.



OREGON STATE UNIVERSITY COMPUTER CENTER NEWSLETTER

Vol. III No. 5 May 28, 1968 Corvallis, Oreg.

CONVERSION TO OS3 FROM MASTER

The new time schedule for the 3300 will be effective July 1, 1968. Users are urged to convert their programs from MASTER to OS3 as soon as possible.

Sample control cards for OS3 are available upon request at the Computer Center office.

The Computer Center will assist users to convert MASTER programs and MASTER files to the OS3 system.

For any questions, contact Ron Davis at ext. 2494.

ACCOUNTING PROCEDURES IN OS3

In general, OS3 is a system that multiplexes available resources between some number of concurrent users to achieve both efficient hardware utilization and acceptable service. The software components of the system can be viewed, then, from two perspectives:

- (1) Software that is user responsive is required to define and manipulate files, run programs, etc.
- and (2) Software that is traffic responsive is required to schedule available hardware resources dependent upon fluctuating load factors.

The problem in accounting derives from this split perspective. Certainly the cost of using the system can be made proportional to the quantity of "work" expended. However, a user tends to evaluate this quantity within a user responsive context, while such expenses can be accurately established only within the broader context of total traffic control.

The accounting breakdown proposed here represents a reasonable trade-off between accounting categories and overhead expended to maintain accounts. This scheme is fine grained enough to establish equitable charges based upon job characteristics, and it is commensurate with measurable system characteristics.

The following items will be measured and recorded for each user run:

- 1) Processor time - this is the accumulated CPU time used amended by some quantity, δ , where δ is a function of system overhead. Since δ increases during peak hours, a user will, in effect, pay a premium for prime time. To help the user ascertain the current δ , OS3 will support a new control statement, TRAFFIC, that will print out pertinent factors about current traffic loads. In version 2.0 TRAFFIC will yield only the number of current users.
- 2) Unit Record Output - the system will record the number of records scheduled for output to the printer, punch, and plotter. It should be noted that a user could generate more output than he actually receives. For example, assume that a user generates 4000 records of printed output and his program hangs in a loop so that he writes 4000 duplicate lines. At the time this output is printed, the operator recognizes the difficulty and aborts printing after only a few hundred lines. The bill for printed output will indicate 4000 records.
- 3) Card Input - the system will record the number of cards read.
- 4) Tape I/O - the system will keep track of the number of words transferred. Charges here are used to compensate for the necessity of allocating large amounts of core when reading or writing large tape records.
- 5) Elapsed console time - the system will record elapsed time at the console. This charge should help to discourage the user who logs on and ties up a port without doing any computing.

In addition, provision will be made for recording every user's saved file space on a daily basis in order to compute the monthly charge for this item. Since OS3 saves files in 512 word blocks, these charges can be entirely compatible with charges under MASTER. In passing we note that such charges should probably be made on a graduated basis.

Finally, it will be possible to execute a command that computes the approximate cost of a user run. Since this cost will no longer be based upon CPU time alone, it is desirable that I/O charges be converted to their CPU time equivalent and subtracted from the remaining maximum time for each user. This will be accomplished when the control statement LOGOFF is executed.

TWO BILLINGS FOR THE MONTH OF JUNE

Because of the deadlines issued by the Business Office for the end of the fiscal year, the Computer Center will issue one June billing for service through June 15. This will allow the first half of the month's bills to be processed during this fiscal year. The June 15 billing will be received by users about June 24. Another bill will be issued with charges incurred during June 16-30. This billing will be received at the usual time--about the 10th of the following month.

COMPUTER CENTER USER'S MANUAL

The Computer Center User's Manual is available. User's who would like a copy and who have not already returned to the Center the form distributed a few days ago are invited to do so at their convenience.

OMNITEC TELECOUPLER

The Computer Center has recently acquired an acoustic coupler, which when used in conjunction with any remote teletypewriter, can transmit data between the computer and the teletypewriter via a standard telephone handset. If you are interested in a demonstration or in discussing applications of this device please contact Mr. Ron Davis, ext. 2494.

COMPUTER INSTRUCTIONAL LABORATORY

Batcheller Hall, Room 105, has been reassigned as a Computer Instructional Laboratory. The room will be instrumented initially with eight to ten teletypewriters and one to two CRT character displays supported by the CDC 3300 and two classroom TV monitors. The room will also have about 35 student stations. We expect to have part of the installation carried out early in the summer and the remainder by the beginning of Fall term. It is expected in time that other instrumentation will be added.

The laboratory will be available for use by

- (1) Classes for which use of terminals is desirable during the class period.
- (2) Individuals seeking "on-line" access to the CDC 3300 via the terminals when the room is not assigned to specific classes.

Those instructors who would like to use this facility for either classroom use or for general laboratory use are requested to contact D. D. Aufenkamp at extension 2494.

DIGITIZING EQUIPMENT

X, Y, Z digitizing equipment is available in the Department of Civil Engineering. This equipment has resolution of up to 1,000 counts per inch. Size limitations are 42 inches in X and Y and approximately 12 inches in Z. Output from the digitizer is punched on 80 column cards. People having use for this equipment should contact either Professor Fred Burgess or Professor Robert Schultz, Department of Civil Engineering.

NEW COMPUTER CENTER PUBLICATIONS

- | | |
|-------|--|
| 68-13 | 3300-PAL: A PDP-8 Assembler That Runs on the CDC 3300.
Sullivan 4/68. |
| 68-14 | Computer Center User's Manual.
R. Davis, C. Porter 4/68. |
| 68-15 | CAM STAR (The Associative Version of STAR) (NEBULA).
Wasilk 5/68. |
| 68-16 | RAM General Purpose Disk Control with Fortran.
Schoenborn 5/68. |

NEW COMPUTER CENTER PUBLICATIONS (cont.)

- 68-17 OS3 TTY Editor Manual (Revised). Dayton, Massie 5/68.
- 68-18 Control Cards/Command Instructions for OS3. Davis, Porter 6/68.

ABSTRACTS OF RECENT COMPUTER CENTER PUBLICATIONScc-68-3 OS3 Reference Manual

A revised edition of the OS3 User's Manual, a manual describing the use of OS3, a time-sharing operating system developed by the OSU Computer Center for the CDC 3300.

cc-68-9 Deckedit Routine For CDC 3300/OS3

DECKEDIT/OS3 is a routine which runs under OS3. It is stored in a public file, and may be used by any OS3 user. Its purpose is to prepare and update (revise) a "library" file, which contains a set of subprograms constituting a single program system. DECKEDIT was written to help manage the set of binary decks constituting OSCAR, and could be useful to other persons or groups who are developing program systems.

cc-68-7 Several Illustrative Examples In OSCAR

OSCAR is a "conversational" mathematical programming language for use at remote consoles. With the aid of OSCAR the user has direct access to the CDC 3300 computer in a "conversational mode"; the teletypewriter unit may be used as a sophisticated desk calculator. The user types certain statements, transfers control to the computer, and receives responses typed out on the teletypewriter. The statements may be simple arithmetic expressions, or may indicate more complicated calculations involving several steps. In this report the use of OSCAR is demonstrated by several examples:

1. Demonstration of simple operations
2. Functions and constants
3. Vectors and matrices
4. Subroutine files. Subroutines to calculate the transpose and the inverse of a matrix
5. Data files
6. Least squares test
7. Newton's method for solving $f(x)=0$
8. The Runge-Kutta method for solving differential equations
9. Calculation of interatomic distances for a molecular model

cc-68-11 Decklist Routine For CDC 3300/OS3

The purpose of DECKLIST is to print the symbolic information in relocatable binary decks, including: (1) the subprogram name on an IDC card; (2) the entry point names on EPT cards; (3) the external names on XNL cards; (4) the transfer symbol, if any, on a TRA card; and (5) the Hollerith information on EXS cards.

DECKLIST is stored in an OS3 public file under the name DECKLIST. It may be used by any OS3 user, either in a batch job, or from a teletype.

cc-68-12 A Beginner's Manual For OS3

This manual is to acquaint the new user with OS3 methods of operation. The manual discusses and shows samples of the operations available with OS3.

cc-68-13 3300 PAL: PDP-8 Assembler That Runs On The CDC 3300

A PDP-8 Assembler is now available as an additional system in OS3. This system includes both an assembler, which works on the CDC 3300, and a Binary Loader for the PDP-8.

Complete documentation is provided in the Computer Center's publication "cc-68-13" entitled "3300 PAL: A PDP-8 Assembler that Runs on the CDC 3300" by Steve Sullivan.

cc-68-16 RAM: General Purpose Disk Control With Fortran

The original purpose of this program was to exchange computer time for more memory storage space. The requirement of the specific program for which this subroutine was developed was the need for quick access to variable length records which were to be modified on-line and returned to storage. To speed up this process no attempt was made in this application to keep track of space no longer used or needed and while the data was of variable length, the indices were of fixed length and location. The reasoning behind this procedure was that any system that can afford the costs of on-line modification (such as with data display devices) must also afford the costs of back-up dumps to protect itself from machine failure.

cc-68-17 OS3 TTY Editor Manual (Revised)

A revision of the OS3 TTY Editor Manual. The EDIT program within the OS3 operating system allows the user to generate, alter and list files from teletypewriter terminals on-line to the CDC 3300

cc-68-18 Control Cards/Command Instructions For OS3

This reprint from the Computer Center User's Manual is designed to assist the user in his conversion from the MASTER to OS3 operating system.

Sample deck structures for batch operations under OS3 are included in this manual.

STAFF ACTIVITIES

Sue Margolis has joined the Computer Center staff and will be in charge of compiling the Computer Center programming library. She will document programs and will develop an abstract of all programs in the library.

Any user interested in contributing programs to a general Computer Center file, please contact Sue Margolis at ext. 1624.

The Computer Center would like to compile as complete a library as possible. Contributions or ideas will be appreciated.

RESEARCH AND ADMINISTRATIVE USE OF COMPUTATIONAL SERVICES

For the general information of the campus the Computer Center has compiled statistics on the value of computational services incurred in support of OSU research and administrative activities for the period July 1, 1967 - April 30, 1968. These figures have been compiled from monthly billing records and from information provided to the Center by users at the time job numbers are opened. Where a given Department is associated with two Schools or associated with a School and a Research or Extension unit, an arbitrary assignment of organizational unit was made.

INSTRUCTIONAL USE OF COMPUTATIONAL SERVICES

A breakdown of the value of instructional computing services by course, Department and School are given in the attached tables for the period July 1, 1967 - March 31, 1968. No attempt was made in this report to indicate the specific computer used. This further breakdown is available in records maintained by the Center.

OS3 PROGRAMMING TIPS

Multiple copies of printed output

Since OS3 schedules printed output independent of the time that a job is run, there are two recommended procedures for making multiple copies of printed output. The output can be dumped into a file, and by use of the Utility Routine COPY this information can be duplicated several times into another file equipped as a print file. Alternatively, if there is a large amount of printing to be done, the job can be scheduled during some time when OS3 is not servicing on-line users so that triplicate paper can be mounted prior to printing.

Standard output file

In version 2.0 OS3, which will become available at the beginning of July, it will be possible to equip 61 as a file other than the default output device. This is one way of making it unnecessary to change the WRITE statement within a FORTRAN program. However, these statements may be easily changed by use of the on-line teletype editor. In this case the FORTRAN program is read into a file, and the search and replace (SAR) command is used to locate every WRITE(61,...) and replace the 61 with some other logical unit number.

CAMPUS RESEARCH FOR COMPUTATIONAL SERVICES

July 1, 1967 - April 30, 1968

School of Agriculture

Ag Extension	\$	812.82
		<hr/>
Total		812.82

Ag Experiment Station

Ag Chemistry		645.19
Ag Economics		10,669.58
Ag Engineering (see School of Engr.)		
Ag Experiment Station		1,566.97
Animal Science		3,686.01
Farm Crops		510.63
Food Science & Technology		635.51
Fisheries & Wildlife		1,384.01
Horticulture		140.01
Poultry Science		903.32
Range Management		299.00
Soils		246.28
Statistics		10,865.65
		<hr/>
Total		31,552.16

School of Business and Technology

Business Administration		2,276.08
Secretarial Science		120.00
		<hr/>
Total		2,396.08

School of Education

Education		753.94
Physical Education		108.46
Psychology		269.42
		<hr/>
Total		1,131.82

School of Humanities and Social Sciences

Political Science		425.71
		<hr/>
Total	\$	425.71

School of Engineering

Agricultural Engr	2,309.83
Chemical Engr	2,803.40
Civil Engr	6,999.78
Electrical Engr	1,896.37
Engr Experiment Station	3,618.55
Industrial Engr	88.75
Mechanical Engr	1,138.07
Production Technology	306.64

Total 19,161.39

School of Forestry

Forest Management	2,105.56
Forest Research Lab	2,665.86

Total 4,771.42

School of Home Economics

Family Life	31.38
Home Economics	474.00
Home Management	615.39
Institution Management	7.13

Total 1,127.90

School of Science

Atmospheric Science	1,836.32
Biochemistry Biophysics	586.74
Botany	226.69
Chemistry	10,454.39
Entomology	843.43
General Science	788.53
Mathematics	3,444.68
Oceanography	18,020.70
Pharmacy	155.70
Physics	7,133.81
Zoology	463.16
Statistics (See Ag Experiment Station)	

Total 43,954.15

Reserve Officers Training Corps

ROTC 10.81

Total 10.81

Administrative Offices

Alumni Office	\$ 5,923.18
Business Affairs	12,104.64
Campus Organizations	52.15
Comptrollers Office	20.89
Dean of Students	66.37
Institutional Research	38.30
Library	29.84
President's Office	306.93
Registrar's Office	57.85
Student Health Center	449.48
	<hr/>
Total	19,049.63

Research and Extension

Dean of Research	117.46
Division of Continuing Education	960.95
KOAC	48.18
NDEA	70.75
Radiation Center	2,867.45
Science Research Institute	3,270.28
Water Research Institute	228.41
	<hr/>
Total	7,563.48

GRAND TOTAL \$ 131,957.37

			1967-1968 Fiscal Year						
			SUMMER		FALL		WINTER		
	NO. OF STUDENTS	VALUE OF SERVICE	AVG. \$/STUDENT	NO. OF STUDENTS	VALUE OF SERVICE	AVG. \$/STUDENT	NO. OF STUDENTS	VALUE OF SERVICE	AVG. \$/STUDENT
SCHOOL OF AGRICULTURE									
<u>Dept. of Ag. Econ.</u>									
AEC 567,8				13	1.56	.12	10	8.95	.89
Averages				13	1.56	.12	10	8.95	.89
SCHOOL OF BUSINESS & TECH.									
<u>Dept. of Business Admin.</u>									
BA 457,8,9				21	2155.38	102.63	20	446.00	22.30
BA 499	19	208.06	10.95	38	271.99	7.16	39	585.73	15.02
BA 431	8	647.65	80.96	29	342.25	11.80	25	59.28	2.37
BA 531				40	2701.81	67.54			
BA 477				82	774.08	9.44	67	867.33	12.94
BA 211,2				609	124.67	.20	668	80.96	.12
BA 507				41	1.34	.03			
BA 433							22	115.89	5.27
BA 443							35	816.35	23.32
Averages	27	855.71	31.69	860	6371.52	7.41	876	2971.54	3.39
SCHOOL OF ENGINEERING									
<u>Dept. of Civil Engr.</u>									
CE 381				29	306.63	10.57	69	16.67	.24
CE 407				2	153.18	76.59			
CE 526,7				5	334.65	66.93	8	39.90	4.99
CE 521,2,3				6	213.64	35.61	1	149.15	149.15
CE 471,2				10	48.78	4.88			
CE 311				22	96.95	4.41	8	94.58	11.82
CE 532				4	30.66	7.66	9	133.00	14.78
CE 361X				16	50.89	3.18	15	30.42	2.03
CE 411X				56	309.33	5.52			
(cont.)									

	SUMMER			FALL			WINTER		
	NO. OF STUDENTS	VALUE OF SERVICE	AVG. \$/STUDENT	NO. OF STUDENTS	VALUE OF SERVICE	AVG. \$/STUDENT	NO. OF STUDENTS	VALUE OF SERVICE	AVG. \$/STUDENT
<u>Dept. of Civil Engr. (cont.)</u>									
CE 405							58	1590.02	27.41
CE 485				63	41.78	.66			
CE 451				56	50.78	.91			
CE 560							7	102.15	14.59
CE 515							3	42.89	14.30
CE 565X							1	57.92	57.92
CET 222				12	25.67	2.14	20	14.66	.73
CET 406							4	1.00	.25
Averages				281	1662.94	5.92	203	2272.36	11.19
<u>Dept. of Chem. Engr.</u>									
ChE 325,6,7				40	2481.59	62.04	43	50.54	1.17
ChE 427							14	54.79	3.91
ChE 550							8	420.56	52.57
ChE 521							5	98.97	19.79
Averages				40	2481.59	62.04	70	624.86	8.93
<u>Dept. of Elec. Engr.</u>									
EE 507,8,9				14	1596.76	114.05	14	90.68	6.48
EE 571,2				10	23.52	2.35	8	100.92	12.61
EE 503	15	315.30	21.02	25	486.63	19.46	23	206.26	8.97
EE 431,2,3				11	1330.93	120.99	10	853.72	85.37
EE 311,2				94	22.25	.24			
EE 591							5	1721.64	344.33
EE 537							5	150.00	30.00
EE 462							40	61.01	1.52
EPT 201,2,3							24	16.67	.69
Averages	15	315.30	21.02	154	3460.09	22.47	129	3200.90	24.81

	NO. OF STUDENTS	SUMMER		NO. OF STUDENTS	FALL		NO. OF STUDENTS	WINTER	
		VALUE OF SERVICE	AVG. \$/STUDENT		VALUE OF SERVICE	AVG. \$/STUDENT		VALUE OF SERVICE	AVG. \$/STUDENT
<u>Dept. of General Engr.</u>									
GE 101,2,3	11	997.73	90.70	641	153.22	.24	514	5244.68	10.20
Averages	11	997.73	90.70	641	153.22	.24	514	5244.68	10.20
<u>Dept. of Mech. Engr.</u>									
ME 505				15	412.26	27.48	10	475.82	47.58
ME 416				18	141.33	7.85	14	149.59	10.68
ME 406							7	335.83	47.97
ME 382							11	134.58	12.23
Averages				33	553.59	16.77	42	1095.82	26.09
<u>Dept. of Indus. Engr.</u>									
IE 371,2,3				25	1.00	.04			
IE 382				6	.10	.02			
IE 571	6	175.00	29.17						
Averages	6	175.00	29.17	31	1.10	.03			
<u>Dept. of Prod. Tech.</u>									
PT 366,7							22	33.00	1.50
Averages							22	33.00	1.50
SCHOOL OF FORESTRY									
<u>Dept. of Forest Mgmt.</u>									
F 224				21	603.18	28.72	36	430.41	11.95
F 425				17	87.85	5.17	11	8.08	.73
Averages				38	691.03	18.18	47	438.49	9.33

	NO. OF STUDENTS	SUMMER		NO. OF STUDENTS	FALL		NO. OF STUDENTS	WINTER	
		VALUE OF SERVICE	AVG. \$/STUDENT		VALUE OF SERVICE	AVG. \$/STUDENT		VALUE OF SERVICE	AVG. \$/STUDENT
SCHOOL OF SCIENCE									
<u>Dept. of Mathematics</u>									
Mth 151	32	519.06	16.22	265	1376.75	5.19			
Mth 251	8	715.96	89.49						
Mth 351	8	148.99	18.62	40	1007.31	25.18	58	1126.61	19.42
Mth 550	29	1570.50	54.15						
Mth 352				9	114.59	12.73	20	70.60	3.53
Mth 457,8,9				27	414.29	15.34	22	488.39	22.20
Mth 161,2,3				14	23.78	1.70	195	16.91	.09
Mth 454				13	41.73	3.21			
Mth 451				25	239.77	9.59	24	511.51	21.31
Mth 488							59	1.50	.02
Mth 507							49	5.42	.11
Mth 358,9							25	450.31	18.01
Mth 352							16	155.59	9.72
Averages	77	2954.51	38.37	393	3218.22	8.19	468	2826.84	6.04
<u>Dept. of Statistics</u>									
Stat 331	19	1188.27	62.54	48	440.55	9.18	63	942.90	14.97
Stat 572							11	122.84	11.17
Stat 553							10	5.36	.54
Averages	19	1188.27	62.54	48	440.55	9.18	84	1071.10	12.75
Cost per student per quarter	155	6486.52	41.85	2532	19,035.41	7.52	2465	19,788.54	8.03



OREGON STATE UNIVERSITY COMPUTER CENTER NEWSLETTER

Corvallis, Oregon
(503) 754-2494

Volume III, Number 6
July 1, 1968

SCHEDULE OF OPERATIONS

The following schedule of operations becomes effective July 1, 1968:

Monday through Friday

8:00 AM	to	3:45 PM	OS3
4:00 PM	to	5:00 PM	CRT applications
5:00 PM	to	9:00 PM	MASTER and Systems Development
9:00 PM	to	12:00 PM	OS3

Saturday

8:00 AM	to	12:00 noon	OS3
12:00 noon	to	2:00 PM	MASTER and Systems Development

OS3 VERSION 2.0

The new version of OS3 to become operational July 1, 1968, will incorporate several additions. Full details are in the new OS3 manual, available from the Computer Center, A Control Mode Manual for OS3-Version 2.0.

Salient changes of which users should be aware include:

1. New procedure for logging in -- the Teletype user should type
job number, user number (cr)

The system responds by overwriting this information in order to blot it out. In effect, the login command is the same as before except that

LOGIN,

is omitted. Under Version 2.0, typing "LOGIN..." will cause the system to respond "illegal job number user number."

2. Errors in the following statements will cause batch jobs to abort:

EQUIP
UNEQUIP
RFP
FP
DELETE
SAVE

A new command has also been added

DESTROY, file name, file name, ...

that acts so as to equip, rfp, release, delete, and unequip a file with a single command.

In addition, FP and RFP will take a file name as an argument for saved files.

3. If a ⁷⁷88 card is read in control mode, any batch job will be aborted.
4. The job card for batch users has been amended to include an identification field following the user number up to column 72. This field will be carried over to printed output, as will all processed control cards.

CONVERSION TO OS3

The Computer Center publication, cc-68-18, Control Cards/Command Instructions for OS3, should assist users in converting their control cards from MASTER to OS3. For users experiencing difficulties with conversion, the Computer Center has provided conversion consultants who are available for answering questions. These are:

Sue Margolis	ext. 1624, room 320
Les Tovani	ext. 2018, room 72
Ken Keeling	ext. 2018, room 72

CHARGES UNDER OS3

As announced in the Computer Center Newsletter (Vol. III, No. 4, April 30, 1968), OS3 will become the principal operating system starting

July 1, 1968. The accounting strategy to be adopted was also discussed in the Newsletter (Vol. III, No. 5, May 28, 1968). OS3 charges starting July 1 will be as follows (excerpt from the OSU Computer Center Notice of June 25, 1968):

CPU time:	\$300/hour
Tape:	\$1.00/100,000 words transferred
Elapsed time at Teletype:	\$.50/hour
On-line disk storage:	\$.05/block = \$.10/track/month
Punch cards:	\$.25/100 records
Input cards:	\$.25/100 records
Line printer:	12.5¢/100 records
Plotter:	Not yet fixed, but billing will be on the basis of blocks plotted, and will be approximately \$30/hour.

CHANGE IN MASTER CHARGES

Effective July 1, 1968, charges for on-line disk storage under MASTER are reduced to \$.10/track/month.

SAVED FILES UNDER OS3

A number of inquiries have come from users who would like to have some mechanism for interrogating the catalog of their saved files. Such a mechanism is deliberately not provided in OS3. OS3 files do not carry an independent file security code; the file name itself serves in this capacity. It is suggested that a user who wishes to have a catalog of his files keep an additional file in which he includes all of his file names. A list of files currently saved under OS3 is also included with the monthly billing.

SUMMER SCHOOL INSTRUCTORS

Any instructor who wishes to make use of the Computer Center video tapes should contact the Closed Circuit Television department at extension 2675 to schedule a room and a time.

The Computer Center video tapes in use at present are:

Fortran Short Course (total 5 hours) by Dave Niess.
Introduction to the Basics of Educational Data Processing
(total 5 hours) by Kay Porter.

These courses can be shown in segments of half an hour or a full hour. It is recommended that they be shown on consecutive days in order to insure continuity and to increase student retention.

Any questions regarding the course content of these tapes may be directed to Dave Niess at extension 2062, or Kay Porter at 2494.

There is no charge for the use of these tapes.

TOURS OF COMPUTER CENTER

Tours of Computer Center facilities are available to interested persons. If you wish to schedule a tour (maximum time one hour), please contact Stephanie Jorgensen at extension 2494.

PILOT STUDY IN ADVANCED FORTRAN PROGRAMMING

The Oregon State University Computer Center is offering an advanced Fortran programming course as a pilot study on the applicability of remote terminals to a class situation under the NSF sponsored statewide project.

A basic knowledge of Fortran is assumed or some programming experience, or access to the OSU video tapes on Fortran. There is no

credit and no formal registration at Oregon State University for this course. Its purpose is threefold:

- 1) To increase the remote use of the teletypewriters during the summer.
- 2) To increase programming capability at state colleges participating in the project.
- 3) To experiment with the teletypewriter as a teaching device.

COMPUTER CENTER USERS COMMITTEE

The ad hoc Computer Center Users Committee has met several times during the past months. To date, discussions have been held on several aspects of Computer Center activities, services, and plans. A continuing invitation stands to individuals on campus to bring problems and other relevant matters to the attention of the Committee. In particular, individuals with computing problems too large to be handled effectively by the CDC 3300 are requested to make their immediate, as well as long-range, needs known.

NDEA EDUCATIONAL MEDIA INSTITUTE

In June, the NDEA Educational Media Institute received several hours of instruction about the use of computers in education. The topics discussed were:

- General Use of Computers in Education
- Computer Assisted Instruction
- Library Automation
- Audio-Visual Scheduling by Computer
- Budget Considerations
- Educational Data Processing Texts and Books

In addition to "live" lectures, the group received instruction in computer hardware and software through the video tape series, Introduction to the Basics of Educational Data Processing.

The group also toured the Computer Center facilities.

ABSTRACTS OF NEW COMPUTER CENTER PUBLICATIONS

cc-68-19 A Guide to Program Documentation for the OSU Computer Center Program Library

Programs distributed through OSU are described by an Abstract Sheet and by a program write-up in a prescribed documentation format. This publication includes descriptions of how to write an abstract sheet, how to write the more detailed documentation, and examples of both the abstract sheet and documentation format.

In compiling a complete program library, such documentation is absolutely essential. Although it may seem inconvenient to the programmer, it will be of great value to other programmers who will be using his program.

The Computer Center urges users to contribute their programs to the program library. All users should benefit and perhaps save valuable time by eliminating duplication of effort.

Any questions regarding this publication should be directed to Sue Margolis at extension 1624.

cc-68-20 Plotter Subroutines for OS3: A Description

This publication contains a list of the CalComp plotter subroutines and explains how they can be called with Fortran instructions. The subroutines are: AXISXY, SAXES, PLOTXY, RESET, and LABEL.

The CalComp plotter 1627 II is attached to the CDC 3300. It is a drum plotter with a 30 inch paper width.

cc-68-21 A Control Mode Manual for OS3 - Version 2.0

This manual includes a description of OS3, OS3 Control Mode Instructions, Job Initialization via teletypewriter or cards (batch mode), and descriptions of each instruction with an example using the instruction.

3300 REMOTE TELETYPEWRITERS

Location	Quantity	Model
Kidder Hall 141	2	35 ASR
Kidder Hall 4	1	33 ASR
Kidder Hall 4	1	33 KSR
Kidder Hall 72	1	33 ASR
Kidder Hall 70	1	33 KSR
Gilbert Hall 107	1	33 ASR
Apperson Hall 309	1	35 ASR
Apperson Hall 309	2	33 ASR
Apperson Hall 309	1	33 KSR
Rogers Hall 226	1	33 KSR
Dearborn Hall 102	1	35 ASR
Chemical Engr. 2W3	1	35 ASR
Chemical Engr. 2W3	1	33 KSR
Oceanography 428	1	33 ASR
Radiation Center	1	33 ASR
Production Tech. 203	1	33 KSR
Social Science 213	1	33 KSR
Gilmore Hall 203	1	35 ASR
N.W. Water Lab 103	1	33 KSR
Weniger Hall 503	1	33 KSR
Forestry 217	1	35 ASR



OREGON STATE UNIVERSITY COMPUTER CENTER NEWSLETTER

Corvallis, Oregon
(503) 754-2494

Volume III, Number 7
August 1, 1968

NOTICE TO ALL USERS

DESCRIPTION OF TIME AND SPACE LIMITS IN OS-3

At the time OS-3 was adopted as the principal operating system on July 1, all extant MASTER job numbers were converted to valid OS-3 job numbers, if this were not already the case. This class of job numbers was arbitrarily assigned limits of 3600 seconds, 100 save blocks and 250 scratch blocks. Users who fall into this category and wish to change these limits should contact Mary Czarnik at the Computer Center office, extension 2494. Descriptions of the three parameters follow:

- | | |
|--------------------|--|
| Time Limit | The time limit serves as an upper limit of the total amount of computer time that can be used for any job number, user number pair. The user should determine this limit based on funds available or other appropriate criteria. An estimate can be obtained by equating \$400 = 3600 seconds. |
| Saved File Space | Associated with every job number, user number pair is a saved file space limit that determines the maximum number of blocks that can be saved for on-line disk storage. A block is 510 words or 2040 characters. |
| Scratch File Space | This is the maximum space limit for scratch and output blocks. Block size is 510 words. |

PUBLIC FILES UNDER OS-3

Beginning July 29, 1968, OS-3 users will be able to create their own public files. Any file whose name begins with the character * will be accessible to any JOB/USER number. However, the file may be modified only under the JOB/USER number which created the file.

This change will require that some names currently used for public files be altered.

The old and new names of the files are as follows:

FTNLIB	becomes	*LIB
ALGLIB	"	*ALGLIB
TTT	"	*TTT
CELIB	"	*CELIB
CLIB	"	*CLIB
SYSLIB	"	*SYSLIB
DECKEDIT	"	*DECKEDIT or *DECKEDI
DECKLIST	"	*DECKLIST or *DECKLIS
CRTAB	"	*CRTAB
REMOVE	"	*REMOVE

MAGNETIC TAPE USE UNDER OS-3

The density on tape drives is under control of the operating system. EQUIP cards that do not specify the density will cause the density to be set at 800 BPI. The density can be specified on the EQUIP card by the word AT following the tape number. The density should follow the word AT with a space to separate the two. If the density is specified it must be either 800, 556 or 200. Everything after the density number, or tape number if no density is specified, is printed on the console typewriter, therefore, you can omit the word BPI.

Examples: $\left. \begin{array}{l} \text{7} \\ \text{8} \end{array} \right\} \text{EQUIP,07=MT,8976 AT 556 WITHOUT RING}$
 $\left. \begin{array}{l} \text{7} \\ \text{8} \end{array} \right\} \text{EQUIP,8=MT,1234 AT 200 WITH RING}$
 $\left. \begin{array}{l} \text{7} \\ \text{8} \end{array} \right\} \text{EQUIP,27=MT,1234 AT 800}$
 $\left. \begin{array}{l} \text{7} \\ \text{8} \end{array} \right\} \text{EQUIP,27=MT,1234}$ } These are equivalent.

PLOTTER CHARGES

Effective July 1, 1968, the plotter charge is changed from \$30 per hour to \$10 per hour. For OS-3 this charge is based on a plotting rate of 360 file blocks per hour.

OS-3 AND MASTER BACKUP

Effective August 1, 1968, backup for MASTER files will be made on Wednesday and Friday nights each week. OS-3 file backup will continue to be made each night.

JOB NUMBER SECURITY

Users are reminded that the validity code associated with a job number can be changed at the discretion of the user. This feature is intended to preclude unauthorized use of job numbers. To change a validity code it is necessary to come personally to the Computer Center main office and contact Mary Czarnik or Karen Hall.

TELETYPE TRANSMISSION PROBLEMS

Teletype users on dedicated lines experiencing suspected transmission difficulties should contact Jim Fryklund or Gary Hoselton at the Computer Center.

Teletype users who are calling in over a Dataphone or TWX line and experiencing transmission problems should LOGOFF and dial in again. This should give them another line and may clear up the transmission difficulties.

It would be helpful to the Center if a brief report were made to Jim Fryklund (ext. 754-2494) describing the difficulties encountered.

NEW VIDEO TAPES

Several new video tapes on the use of computational services available under OS-3 are currently being prepared by Walter Massie and Roger Scholl. These tapes will be shown on a scheduled as well as a special request basis starting with the Fall Term. The tapes run from approximately 15 to 45 minutes in length. Topics covered under this series include:

1. Introduction to ASR-33 Teletype
2. Introduction to ASR-35 Teletype
3. What is OS-3?
4. OSCAR
5. Basic On-line Procedures
6. Execution of Prepared Programs
7. Program Entry, Compilation, Run
8. FORTRAN With Multiple Attempts to Compile
9. RADAR
10. Tour of CDC 3300 Facility

This series is being produced under the NSF regional computer center project. Instructional materials to accompany each topic are being prepared by the Center in cooperation with the Teaching Research Division.

MASS STORAGE DISK FILE

The CDC 814 mass storage disk file has been added to the CDC 3300 configuration. The maximum storage available for this model is approximately 200 million characters of on-line storage. (A disk pack for a CDC 854 disk drive has by way of comparison a storage capability of approximately 8 million characters.) This device is presently being incorporated under OS-3.

REQUEST FOR DOCUMENTATION

The Center again requests that all users assist in the documentation of generalized routines and programs. The Computer

Center Report, cc-68-19, "A Guide to Program Documentation for the OSU Computer Center Program Library," by Susan Margolis, David Niess and Catherine Porter, was mailed to all users of record. Inquiries and questions should be directed to Susan Margolis, extension 1624.

IN-SERVICE TRAINING OF TEACHERS IN BASIC COMPUTER CONCEPTS

Oregon State University has received a grant of \$200,000 from the National Science Foundation for a two-year pilot project for upgrading secondary school teachers in computer concepts, technology and applications. These objectives will be accomplished through the following:

1. The development of multi-media self-instructional materials for training in computer concepts, technology and applications.
2. The development of resource sets for specific subject area applications.
3. The in-service training of teachers using the self-instructional materials and resource sets.
4. The testing, evaluation, and refinement of the various materials and dissemination of this and other information on computer instruction on a national basis.

The project will be based, in part, on the experience and results of the Computer Instruction NETWORK project, an E.S.E.A. Title III program for secondary school computer instruction in Oregon. Dr. D. D. Aufenkamp is principal investigator for the project.

EXCERPT FROM OSU BUSINESS AND ADMINISTRATIVE MANUAL

For the general information and guidance of the campus the following excerpt is repeated from the OSU Business and Administrative Manual pertaining to the preparation of proposals involving computational services and equipment and to the acquisition of computational services from off-campus sources.

"Proposals for research grants and contracts involving costs for computational services or the acquisition of stored program general purpose digital computers should be developed in consultation with the Computer Center to ensure accuracy of cost estimates, to justify equipment acquisitions, and to assist the Center in an orderly development of computational facilities and services.

The Computer Center will determine campus needs for backup computational facilities to meet contingencies and special user requirements and will make arrangements for such services as may be judged appropriate. All requests originating within the University for the acquisition of computational services from off-campus sources, including requests for services available via teletypewriter terminals must be approved by the Director of the Computer Center."

It is particularly vital that the Center participate in these matters to ensure an orderly and timely development of campus facilities.

INSTRUCTIONAL JOB NUMBERS

Users are reminded that all instructional job numbers are closed out at the end of each term. New job numbers are assigned at the request of the professor. This procedure enables the instructor to budget funds and curtail the possibility of any extra charges being run up after the end of the term.

COMPUTER CENTER BUILDING

The State Emergency Board has authorized construction of the new Computer Center Building. Bids on the project will be opened August 15, with an estimated completion date of mid 1969. Individuals interested in the plans for the new building are invited to inspect a copy of the working drawing available at the Center.

COMPUTER CENTER TOURS

To aid Computer Center staff members in planning for tours of facilities it is urged that requests for tours be made as far in advance of the date desired as is practical.

NEW COMPUTER CENTER PUBLICATIONS

- 68-22 "A Fortran Manual for OS-3 Version 2.0," by
Walter Massie. 6/68
- 68-24 "A Brief Description of OSCAR (Revised)," by
Joel Davis. 7/68

ABSTRACTS OF RECENT COMPUTER CENTER PUBLICATIONS

- cc-68-22 "A Fortran Manual for OS-3 Version 2.0"

This manual enumerates and discusses the special features and limitations of the FORTRAN language compiler available under OS-3. Specifications for the basic FORTRAN may be found in the Control Data Corporation FORTRAN Reference Manual. Only additions and deletions from the CDC FORTRAN Manual are described.

- cc-68-24 "A Brief Description of OSCAR (Revised)"

This manual is a revision of cc-67-14, "A Brief Description of OSCAR Part I: The Direct Mode." Principal changes include a description of the stored programming and file manipulation features of OSCAR. The manual indicates, too, those operations that have been implemented since the earlier manual was issued.

UPDATED LIST OF COMPUTER CENTER PUBLICATIONS

A list of the Computer Center publications is given below with the current status of each publication. This list should serve as a check for the user to see if he has current information for using the computer and the operating system.

Computer manuals published through the Civil Engineering Department by Walter Massie are out of date and should be replaced by Computer Center Manuals cc-68-17, 21, 22, and 27.

If no indication is given the report is considered to be current or of historical importance.

Comments	Publication Number and Name
	66-1 Music Assembler & Play for CDC 3300
revised report in preparation	66-2 Radar Report
obsolete	66-3 Time Share System Text Editor
NEBULA	66-4 Algorithms for Circulating Associate Memories
MSOS System	66-5 Data Display Demonstration
	66-6 Rapid Identification of Bacteria in Foods: Replica Plating and Computer Method
obsolete	66-7 Instruction Test Program for CDC 3300
	66-8 Information for Remote TTY Use of JOSS
	67-1 Interval Arithmetic
	67-2 Demonstration of CRT on the PDP-8
PDP-8	67-3 Rim and Dectape Bootstrap Cards
PDP-8	67-4 Binary Card Loader
PDP-8	67-5 PAL III - Modification for Card Reader
NEBULA	67-6 Floating Point Package #1
	67-7 Precision CRT Display Type 30G for PDP-8
	67-8 NEBULA Progress Report
PDP-8	67-8a Card Reader Test Routine
NEBULA	67-9 Evaluation of Three-Delay-Line Content Addressable Memory Systems
not published	67-10 Fortran Free-Form Input Routine for CDC 3300
NEBULA	67-11 Floating Point Package #2
1620	67-12 Arithmetic Calculation Program
	67-13 Report on OSU MATS System
replaced by cc-68-24	67-14 A Brief Description of OSCAR Part I: The Direct Mode
obsolete	67-15 OS-3 User's Manual
	67-16 A Free Format Numerical Input Routine for Teletypes Under OS-3
	67-17 A Complex Arithmetic Package for 3300 Fortran Library
	67-18 Identification: Card Reader Subroutine for the PDP-8 Fortran Compiler

	67-19	MATS/MASTER
replaced by cc-68-17	67-20	OS-3 Teletype Editor
	67-21	STAR (Nebula)
	68-1	Review of Computer Center Functions and Activities
	68-2	MECM - (Program to Reproduce on the 1620)
replaced by cc-68-21	68-3	OS-3 User's Manual REVISED
replaced by cc-68-22	68-4	OS-3 Fortran Version 1.4
NEBULA	68-5	Design and Evaluation of a Glass Delay Line Content-Addressable Memory System (Ph.D. Thesis)
	68-6	Teletype Operation
replaced by cc-68-26	68-7	Several Illustrated Examples of OSCAR
	68-8	Conversation Under MATS/MASTER
	68-9	DECREDIT Routine for CDC 3300/OS-3
	68-10	SCANIN, A Free Format BCD to Floating Point Converter
	68-11	DECKLIST Routine, Version 1.3 (For CDC 3300/OS-3)
replaced by cc-68-17, cc-68-21, and cc-68-22	68-12	Beginner's OS-3 User's Manual
	68-13	3300-PAL: A PDP-8 Assembler that Runs on the CDC 3300
	68-14	Computer Center User's Manual
	68-15	CAM STAR (The Associative Version of STAR) (NEBULA)
	68-16	RAM: General Purpose Disk Control with Fortran
	68-17	OS-3 Teletypewriter Editor Manual (Revised)
	68-18	Control Cards/Command Instructions for OS-3
	68-19	A Guide to Program Documentation for the OSU Computer Center Program Library

- 68-20 Plotter Subroutines for OS-3: A Description
- 68-21 A Control Mode Manual for OS-3 Version 2.0
- 68-22 Fortran Manual for OS-3 Version 2.0
- 68-23 Logical Design of Nebula Computer
- 68-24 A Brief Description of OSCAR
- 68-25 Use of Plotter: Documentation and Examples
- 68-26 Illustrated Examples in OSCAR (Revised)
- 68-27 Free Form Input for OS-3 Fortran
- 68-28 OSU Computer Center Program Library Catalog
- 68-29 Some Comments on Student Data Management (Computer-Assisted)

COMPUTER-ASSISTED SCHEDULING

Two recent projects of the Computer Center involving class scheduling are described briefly in view of the general interest of this class of problems to the campus. Support in the Center has been under the direction of R. E. "Kit" Schoenborn.

4-H Class Scheduling

The 4-H office of the Federal Cooperative Extension Service used the CDC 3300 in the scheduling of 4-H members to classes at OSU in June. 1814 students were handled by this program. One group of students had one choice which the program tried to assign and another group had six choices from which the program attempted to schedule three classes. The output consisted of punched assignment cards, a class roster list in alphabetical order and a dormitory list in alphabetical order with assignments.

Corvallis High School Scheduling

The Corvallis High School has been developing with Computer Center assistance since May a program to schedule students for all of next year. Almost 1800 students have 12 to 16 requests including two alternates for courses running 9, 18, and 36 weeks for

single and multiple periods. The program is written on the basis of the design for the OSU Computer-Assisted Registration program. Output includes the course numbers originally requested, the number of tries the computer makes in the attempt to make the schedule (with a limit of 5000 tries per student), a listing of the schedule with flags denoting alternate requests, unscheduled courses (because course is not offered, is full, is for a different class level, or contains a sex restriction). The program only puts out warning flags. It does not throw out any request that it can schedule. Merger of several courses into one was also introduced. Output also includes a punched class/grade card for interface with the previous mode of operation.

O S - 3 P R O G R A M M I N G T I P S

CHANGES TO THE FORTRAN COMPILER UNDER OS-3

With certain exceptions, all restrictions on subscripting in Equivalence statements have been removed. That is, the compiler will accept and write proper code for both multiple subscripts and/or type other variables. Subscripts may also be used for Character arrays with the requirement that the resulting subscript expression must be on a word boundary. This is a necessary restriction because of fifteen bit arithmetic performed. For single subscripts any number of the form $(4K+1)$ is legal for Character variables. Examples of statement groups which would not previously compile under either OS-3 or MASTER FORTRAN are the following:

```
DIMENSION X(8),Y(4)
TYPE INTERVAL (4) X
EQUIVALENCE (X(4),Y(1))
```

```
TYPE COMPLEX (4) Z,Q
DIMENSION Z(4,4,7),Q(498)
EQUIVALENCE (Q(249),Z(3,3,3))
```

```
REAL1 XXX
CHARACTER T,K
DIMENSION T(8),TX(2),K(5,6),XXX(20000)
EQUIVALENCE (T(5),TX(1)),(K(1,1),XXX(398))
```

Another change, of which users of REAL1 variables should be aware, is compile time optimization which causes the mode of the accumulator to be set to REAL whenever a Type REAL1 expression is in the accumulator. This causes shorter and faster code to be generated, but produces a slight change with respect to calling subroutines or functions with expressions involving REAL1 variables as actual parameters. If RRR is a REAL1 variable, the following call is unaffected by this change:

```
CALL ZIP(RRR,Q,Z)
```

CALL ZIP(2.0+RRR,Q,Z)

will be changed in that a REAL number in a temporary storage location will be transmitted instead of a REAL1 number in a temporary storage location.

For further questions and/or explanation, please contact James Meeker in Kidder Hall, Room 52, extension 3158.

VALUE OF COMPUTATIONAL SERVICES FOR CAMPUS RESEARCH AND ADMINISTRATIVE ACTIVITIES

For the general information of the campus, the value of computational services used in support of campus research and administrative activities is given in the attached table for the preceding fiscal year. These figures have been compiled from Computer Center billing records in accordance with the Departmental indication made at the time job numbers were assigned.

VALUE OF COMPUTATIONAL SERVICES
FOR CAMPUS RESEARCH AND ADMINISTRATIVE ACTIVITIES

July 1, 1967 - June 30, 1968

School of Agriculture

Ag Extension	\$	1,347.52
Total		<u>1,347.52</u>

Ag Experiment Station

Ag Chemistry	1,020.02
Ag Economics	11,142.43
Ag Engineering (see School of Engr.)	
Ag Experiment Station	1,871.93
Animal Science	4,263.92
Farm Crops	675.71
Food Science & Technology	776.95
Fisheries & Wildlife	2,379.36
Horticulture	140.01
Poultry Science	954.51
Range Management	351.74
Soils	272.95
Statistics	12,610.29
Total	<u>36,459.82</u>

School of Business and Technology

Business Administration	2,319.19
Secretarial Science	144.00
Economics	759.29
Total	<u>3,222.48</u>

School of Education

Education	753.94
Physical Education	156.02
Psychology	269.42
Total	<u>1,179.38</u>

School of Humanities and Social Sciences

Political Science	845.79
Total	\$ <u>845.79</u>

School of Engineering

Agricultural Engr.	\$	2,657.20
Chemical Engr.		3,018.83
Civil Engr.		7,650.10
Electrical Engr.		2,293.42
Engr. Experiment Station		3,618.77
Industrial Engr.		119.41
Mechanical Engr.		1,756.76
Production Technology		337.42
Total		<u>21,451.91</u>

School of Forestry

Forest Management		3,238.12
Forest Research Lab.		3,190.02
Total		<u>6,428.14</u>

School of Home Economics

Family Life		47.35
Home Economics		474.00
Home Management		620.06
Institution Management		15.04
Total		<u>1,156.45</u>

School of Science

Atmospheric Science		1,842.32
Biochemistry Biophysics		1,498.07
Botany		233.78
Chemistry		12,438.23
Entomology		997.02
General Science		806.42
Mathematics		3,873.58
Oceanography		22,566.53
Pharmacy		155.70
Physics		8,172.69
Statistics (see Ag. Experiment Station)		
Zoology		487.81
Total		<u>53,072.15</u>

Reserve Officers Training Corps

ROTC		65.87
Total	\$	<u>65.87</u>

Administrative Offices

Alumni Office	\$	7,146.05
Business Affairs		14,509.18
Comptrollers Office		20.89
Counseling Center		517.42
Dean of Students		279.69
Institutional Research		46.30
Library		29.84
President's Office		483.15
Registrar's Office		76.44
Student Health Center		950.85
Total		<u>24,059.81</u>

Research and Extension

Dean of Research		117.46
Division of Continuing Education		1,211.56
Fed. Coop Extension Service		229.24
KOAC		50.18
NDEA		70.75
Radiation Center		3,046.52
Science Research Institute		4,620.59
Water Research Institute		245.99
Total		<u>9,592.29</u>

GRAND TOTAL \$ 158,881.61



OREGON STATE UNIVERSITY COMPUTER CENTER NEWSLETTER

Corvallis, Oregon
(503) 754-2494

Volume III, Number 8
September 1, 1968

APPOINTMENT OF ASSISTANT DIRECTOR

Dr. Larry C. Hunter has accepted an appointment, effective September 1, 1968, as Assistant Director of the OSU Computer Center with the academic rank of Professor. Dr. Hunter will assume responsibility for two major activities within the Computer Center: One activity, an on-going one, is that of computational services and related developments. The second activity, largely undeveloped to date within the Center, comprises research and development in mathematical and statistical computational techniques. An additional research role will be that of a senior investigator on Project THEMIS.

Dr. Hunter was formerly Director, Electronic Defense Laboratories, Sylvania Electronic Systems - West. Dr. Hunter has his Ph.D. in Mathematics from the University of Oregon, and has been involved in operations research and systems analysis activities in both technical and managerial positions at the Electronic Defense Laboratories.

ERROR IN AUGUST 1, NEWSLETTER

In the article, Description of Time and Space Limits in OS-3, it was stated that 100 save file blocks was the assigned limit. Actually, there were 0 file blocks assigned. The user must specify the number of save file blocks he needs. If you wish to change your limits, contact Mary Czarnik at extension 2494.

2.

ESTIMATION OF SCRATCH FILE SPACE

An approximate method for estimating scratch file space is:
 $510 / (\text{number of words in a record} + 2) = \text{number of records/file block.}$

OPERATING SCHEDULE DURING REGISTRATION

During the registration period, Thursday and Friday, September 26 and 27, the hours for OS-3 will be extended from 3:45 PM to 6:30 PM and 5:30 PM respectively.

INSTRUCTIONAL COMPUTING LABORATORY

Batcheller Hall, Room 105, is being instrumented as an instructional computing laboratory for use by instructors in those courses in which on-line access to the CDC 3300 is needed, for presentation of Computer Center video tape instructional programs, and for general laboratory use by the campus at otherwise unscheduled periods.

Facilities available will include, initially, eight teletype-writers and one CRT character display on-line to the CDC 3300, two classroom TV monitors and about 35 student stations. Those instructors who would like to use this facility for either classroom or general laboratory use are requested (if they have not already done so) to contact D. D. Aufenkamp at extension 2494.

OS-3 OPERATING SYSTEM

"OS-3" is an abbreviation for "OSOSOS", which is an acronym for "Oregon State Open Shop Operating System." This time-sharing operating system, developed at Oregon State University for the CDC 3300, features remote, on-line access by many users concurrently. OS-3 is a general-purpose time-sharing system which provides its users with numerous facilities. The systems currently available to the user include the following:

ALGOL	Compiler.
COMPASS	Comprehensive Assembler.
COSY	Compressed Symbolic deck processor.
EDIT	An on-line editing routine.
FORTRAN	Compiler.
LIBEDIT	Prepares program libraries.
LOAD	Loads binary relocatable programs produced by ALGOL, COMPASS, and FORTRAN.
OSCAR	An on-line computing service.
RADAR	An on-line debugging aid, including a simple assembler and disassembler.
*SORTER	A simulated card sorter.
UTILITY	A routine that provides a number of services, including file manipulation, copying of files, generating octal memory dumps, etc.

OS-3 uses the "executive" hardware of the CDC 3300 and sophisticated software techniques to provide each user with a simulated computer that has 65,536 words of storage and a reliable, easy-to-use input/output/file-handling system. It can presently handle up to 28 users at remote stations (teletypewriters) plus one "batch" user (via the card reader), all at the same time. Core storage and backup (disk) storage are allocated and released dynamically by the OS-3 system. The user need be concerned only with the total amount of file space and the total time he needs for his job. If he is an on-line (remote) user, he can expand these space and time limits if necessary and continue running. A batch user must request sufficient time and file space to handle his job, since if either is exhausted, the job is terminated. No problem is created if a user allows himself more file space than he needs, since only the space he actually uses is allocated to him.¹

OS-3 accomplishes its feats by the use of list processing techniques to handle storage allocation and "time-slicing" and "memory swapping" to handle numerous on-line users. Time-slicing means that each active user program is run for a limited period of time. Then another program is run for awhile, etc., on a "round-robin" basis. Programs which are waiting for input or output are

¹Billing is based upon the file space actually allocated, not the amount reserved.

temporarily suspended. Memory swapping means that not all of a user's program need be in core memory at once. Portions which are not needed at the moment are "swapped out" (written out on backup disk memory), and part of another program is "swapped in" to the memory space made available. When an on-line user's program is waiting for him to type an input it is quite likely that the entire program will be swapped out to allow other users' programs to be run. A program is also suspended and may be swapped out when it has generated enough output to keep the user's teletypewriter busy awhile. To the user, it seems as though he has a computer all to himself which, of course, appears to be somewhat slower than the actual computer since the user is sharing the computer's ability with other users.

SHORT COURSE IN ADVANCED FORTRAN PROGRAMMING

During the summer the Computer Center offered an advanced FORTRAN programming course as a pilot study on the applicability of remote terminals to a class situation under the NSF sponsored regional center project. This course will be offered again during the Fall Term and will be open, in particular, to all members of the OSU campus. A basic knowledge of FORTRAN is assumed. There is no credit and no formal registration for this course.

Problem sets are provided by the Center for use by participants with the remote teletypewriter terminals. Communication between instructor and student is carried out through a user number reserved for this purpose. This file is checked daily and questions answered there or in the student's file.

Individuals interested in further information should contact Jo Ann Baughman at the Computer Center (extension 2494).

VIDEO TAPE SCHEDULE FOR OCTOBER

New faculty and students will be interested in the series of video tapes to be shown by the Computer Center during the Fall Term.

These will be offered twice in October. On the classroom TV network and channel 5 (cable TV), the schedule is as follows:

October 7-11, 4:00-5:00 PM

"Introduction to the Basics of E. D. P."

Kay Porter

October 14-18, 4:00-5:00 PM

"Introduction to FORTRAN"

Dave Niess

October 21-24, 28-31, 4:00-5:00 PM

"Introduction to OS-3"

Walt Massie

On a private line, the same programs will be shown in Batcheller Hall, Room 105. The schedule is:

October 7-11, 3:00-4:00 PM

"Introduction to the Basics of E. D. P."

Kay Porter

October 14-18, 3:00-4:00 PM

"Introduction to FORTRAN"

Dave Niess

October 8-11, 15-18, 2:00-3:00 PM

"Introduction to OS-3"

Walt Massie

Individuals interested in following one or more of these series are requested to advise the Computer Center (extension 2494). Descriptions of the three series follow:

INTRODUCTION TO THE BASICS OF ELECTRONIC DATA PROCESSING

by Kay Porter:

The purpose of this video tape is to provide the beginning

student with a broad comprehensive approach to computer and data processing concepts. It is strictly an introduction to data processing for the layman.

Topics discussed are as follows:

Monday (October 7)

What is data processing?
Four types of data processing equipment
Vocabulary
History of data processing
Punched card data processing
The card
Form design

Tuesday (October 8)

Punched card recording
Punched card processing
How a card is read
Control panel wiring
Computer data processing
Advantages of computer data processing
Magnetic tape
Vocabulary
Peripheral devices

Wednesday (October 9)

Review of vocabulary
Input devices
Output devices
Storage devices
Data processing systems
Random access
Sequential processing
Document scanners
Data communications
Teleprocessing
Programming
Types of programming
Number of systems

Thursday (October 10)

Number systems
Conversion of bases
Planning a program
Flowcharting
Systems Analyst
Program coding
Software
Hardware
Real-time processing
Magnetic tape

Friday (October 11)

Systems programming
 Languages
 Assemblers
 Compilers
 Advantages
 Report generators
 Report program generator
 Monitors
 Utility routines
 Jobs in data processing
 Review
 Vocabulary

INTRODUCTION TO FORTRAN by Dave Niess:

This video tape series is designed to teach the basics of FORTRAN for the CDC 3300. Topics discussed are as follows:

Monday (October 14)

Characters	Truncation by Integer Mode
Constants	Arithmetic Statement
Variables	Replacement Mode
Range of Numbers	Control Statements
Operators	GO TO
Mode of Arithmetic	

Tuesday (October 15)

IF Statements	Declarative Statement
Do Loops	CONTINUE
Problem	SUBSCRIPTED (dimensioned) variables
STOP n	
PAUSE n	

Wednesday (October 16)

I/O Statements
 FORMAT Statements
 Editing Codes
 Carriage Control

Thursday (October 17)

Example of Problem	Methods of Execution
EOF	Flow Charting
Examples	Examples

Friday (October 18)

Magnetic Tape	Subroutines
Example	Functions
Equipping a File	Uses of Subprograms
Sequence Cards	Examples

INTRODUCTION TO OS-3 by Walter Massie:

This series of video tapes will be shown on a scheduled and special request basis starting with the Fall Term. The series was produced, in part, under the NSF regional computer center project. A brief description of each video tape is given below. CC-68-31, An Introduction to OS-3, A Series of Video Tapes, available at the Computer Center provides information on prerequisites, manuals needed for reference and other comments peculiar to each tape.

1. ASR-33 Teletype, 32 minutes (October 8,21)
Discusses how to operate the ASR-33 Teletype, how to turn on the ASR-33 Teletype, how to punch a paper tape and how to read a paper tape.
2. ASR-35 Teletype, 37 minutes (October 9,22)
Discusses how to operate the ASR-35 Teletype, how to turn on the ASR-35 Teletype, how to punch a paper tape and how to read a paper tape.
3. OS-3 Features Available, 25 minutes (October 10,23)
Explains how the OS-3 time-sharing system works, explains such concepts as partitioned time-slicing and memory swapping. Also discusses capabilities of OS-3, text manipulation, languages available and debugging aids.
4. Basic Computer Operations, 30 minutes (October 10,23)
Discusses on-line rise of Teletype; the control mode, the assigning of logical units (Equipping a file), and using text manipulations (EDIT).
5. OSCAR, 30 minutes (October 11,24)
Discusses OSCAR, OS-3's conversational language. Two modes of OSCAR, features available under OSCAR, and various mathematical examples using OSCAR.
6. How to Use Existing Programs, 20 minutes
(October 11,24)
Discusses how to call a stored program, how to enter data, and how to execute the program from the teletypewriter.
7. Program Entry Compilation, Run, 30 minutes
(October 15,28)
Discusses how to enter a program from the paper tape reader, enter data, and execute program; how to punch a Fortran source deck and a binary deck.

8. Error Correction Using Text Editor, 30 minutes
(October 16,29)
Discusses text editor correction of errors.
9. RADAR, 37 minutes (October 17,30)
Discusses the use of RADAR, OS-3's on-line debugging aid. RADAR enables programmers to use step-by-step debugging procedures.
10. Tour of CDC 3300 in the OSU Computer Center,
30 minutes (October 18,31)
Discusses card reader, console, magnetic tape units, disk packs, central processing unit, mass storage disk file, line printer, plotter, and card punch.

STUDENT EXPERIMENTATION WITH COMPUTERS INVITED

The recent NSF grant to Oregon State University for an experimental regional computer center for the State of Oregon included as a vital part of the project funds for "unsponsored" student experimentation with computers via the remote teletypewriter terminals. All OSU students as well as those of other participating institutions are invited to avail themselves of this unusual opportunity.

The terminals are "on the air" for this purpose daily between 9:00 and 12:00 PM. In addition to OSCAR and other programming facilities presently available at the remote terminals, the Computer Center expects to add several demonstration packages to the system including computer-assisted instruction (CAI) programs during the two-year project. Furthermore, students will also be encouraged to contribute to this "library." Several introductory "short" courses, lectures, discussion groups, and appropriate materials are planned.

Instructors are invited to bring this announcement to the attention of students and to emphasize that the invitation is extended to all students.

USER CONTRIBUTED PROGRAMS

The Computer Center, in developing its program library, has requested users to contribute any relevant programs to the Center.

We would especially appreciate write-ups on programs, even very small ones, which professors are using in teaching classes. To the professor, these programs may seem elementary, but they could be helpful to the other six smaller colleges who use our computer facilities.

Please contact Ron Davis at extension 2494 for details on how to write up your contributions.

REQUEST TO USERS TO CLEAR OUT CARD RACKS

Users are requested to remove all cards from the card racks in the 1620 room and in the hallway outside this room in the basement of Kidder Hall. These shelves are not to be used for storage and all cards will be discarded by the start of Fall Term. If you wish to save your cards, please remove them.

TELETYPE ORDERING PROCEDURES

Organizations contemplating purchase of teletypewriter equipment are invited to use catalogue and ordering information compiled by the Computer Center. Standard part numbers have been arranged with the Teletype Corporation to simplify selection of the numerous options available and to insure compatibility within existing equipment. The Computer Center is willing to place and follow up orders for other customers to simplify acquisition procedures. Teletypewriters are delivered about five months after initiation of an order. Parts and Maintenance are generally available through the Computer Center. For further information contact Ron Davis, 754-2494.

TELETYPE TRANSMISSION PROBLEMS

Teletypewriter transmission problems fall into three general categories: teletypewriter mechanical troubles, telephone line faults and malfunctioning computer send-receive circuits. Since the Telephone Companies are in the best position to isolate troubles and because our type of service is relatively new to the computer and telephone industries, the Telephone Company has requested several changes in the transmission problem procedure published in the August 1, 1968 Newsletter. Please observe the following suggestions if you experience transmission difficulties:

Users of dedicated lines on the OSU campus are requested to contact Jim Fryklund, extension 2494, or Gary Hoselton at extension 3231.

Users of dial-in voice and TWX facilities are requested to hold the phone line on (don't hang up, depress CLEAR, etc.) and, using another telephone, call the Telephone Company repair service in their community so that the telephone lines being used can be checked out. Hanging up releases the lines which makes identification of malfunctioning circuits practically impossible.

Users of remote leased multiplexed telephone lines are requested to contact their local Telephone Company repair service.

Following the above procedures should yield the briefest down time and provide better service for all users. Jim Fryklund would appreciate receiving a short note describing any problems encountered.

CONSULTING STUDY FOR BONNEVILLE POWER ADMINISTRATION

The Computer Center has completed work on a consulting study for Bonneville Power Administration. The project, an Information Management Systems Study, was begun during the Winter Term and was completed in August. George Rose and Frances Spigai were the principal consultants for this work.

RESERVE ACCOUNTING PROGRAM

The RESERVE accounting demonstration program, previously developed to run with four data display units, has been rewritten to accommodate two units. This particular version is now available for demonstration purposes daily from 4:00 PM to 9:00 PM. RESERVE 2.0, presently being implemented, will have encumbrance accounting features in the purchasing phase and should be operational early in October. The Computer Center will use the present system until that time. Contact R. E. "Kit" Schoenborn for presentation of demonstration.

SALSET CAI PROGRAM

SALSET (SALEm Self Teaching Program) is now operational for demonstration purposes. This program is available on a data display unit daily between 4:00 PM and 9:00 PM. It demonstrates six different class materials in two different modes of operation. The first mode is a multiple-choice type program with reinforcement information presented (as seen in programmed text books, such as the Tutor Text's) and the second mode is the type which requires a word answer as a reinforcement method. Contact Kit Schoenborn for presentation of demonstration.

*SORTER

*SORTER is a program that simulates the operation of a card sorter. It runs under the OS-3 operating system.

Input to the *SORTER program is a file of variable length BCD records; the maximum length of any record is 136 characters. An input file may be read from the card reader or it may be stored in the system as a saved file. In the latter case, the saved file may be prepared as a card deck and copied into a saved file, or the on-line editor can be used to create the file.

The calling sequence for *SORTER is:

*SORTER,I=<lun>,T=<type>,C=<column>,P=<lun>

ATHENA COMPUTER

A UNIVAC ATHENA digital computer has been donated to OSU by the U. S. Government. This solid state computer, used by the Air Force for ground-based guidance control functions, is one of approximately twenty ATHENA computers donated by the Government to educational institutions. The ATHENA COMPUTER USERS GROUP has been formed by sixteen schools to promote the educational utilization of the computers.

With regard to educational uses, these computers are particularly helpful in demonstration of computer design and operation. The status of all registers is completely displayed on the console. Registers may be individually cleared and each bit set by pressing the indicator for that bit. A low speed, adjustable oscillator can be used in place of the regular clock and single step execution of instructions is also an operational feature. The electrical signals at all points of possible interest throughout the computer are available on test blocks.

The institutions that have these computers are using them in several ways including instruction in computer systems engineering, interfacing to analog computers in hybrid systems, programming instruction, and control of laboratory equipment in experimental research activities.

PANHELLENIC RUSH

The Computer Center will process the complete Fall rush program for the Dean of Women's Office for the first time this year. The rush procedures have been programmed on the CDC 3300. Some of the new features added to the rush program will include equalization of party attendance (i.e., an individual sorority will have an almost equal number of rushees at each party on a certain day), and matching of preferences for pledging. Fall rush will be held September 17-20.

NEW COMPUTER CENTER PUBLICATIONS

68-30	RADAR	Meeker	7/30/68
68-31	An Introduction to OS-3, A Series of Video Tapes	Massie Scholl	7/31/68
68-32	Information Management System Study	Spigai Rose	8/1/68
68-33	*SORTER - A Simulated Card Sorter for OS-3	Dayton Rose	8/21/68
68-34	DECKLIST Routine for CDC 3300/OS-3 Version 2.0	Bachelor	8/27/68
68-35	Plotter Subroutines for OS-3: A Description (Revised)	Dayton	8/28/68

STAFF ACTIVITIES

Dr. D. D. Aufenkamp, Director of the Computer Center, attended the International Federation of Information Processing (IFIP) Conference in Edinburgh, Scotland in August.

George Rose addressed a meeting of "Project Prometheus" at Southern Oregon College, Ashland, in July. His topic was "Man and Machines" which dealt with technology and human values.

Kay Porter will attend a Computer-Assisted Instruction conference at Penn State in September.

NEWS

The NEWS Command has been added so the user can inquire about changes in the system. The NEWS lists all current information first. In order to exit early from NEWS, depress break key. It will contain news from the past week and will tell about recent additions to the OS-3 operating system. This command is available to users under the OS-3 command mode by typing *NEWS.

THREE NEW PROGRAMS AVAILABLEDEFINE and DIRECT

Two new programs called DEFINE and DIRECT are now available under OS-3. They are saved in public files under the names *DEFINE and *DIRECT. DEFINE can be used to equip and unequip units, to remove and set file protection, to save and delete files and to change names of files. Several such functions may be accomplished with a single DEFINE statement.

DEFINE and DIRECT can also be used by any user to maintain a "directory" of saved files. If a user has a (private) file called DIRECTORY, then each time he uses DEFINE to do something with saved files, DEFINE will write information on the user's DIRECTORY file, indicating file names that are to be entered or removed. This information is processed by the DIRECT routine, which will update the list of file names and print it out.

A full description of the DEFINE statement will be available in the near future. Examples of DEFINE statements showing the various things that can be done are listed below:

```
*DEFINE,12,3/,25+,68-
```

```
  unequips 12 and equips it as a file;
  unequips 3;
  protects 25; and
  unprotects 68.
```

```
*DEFINE,25=100,50=12+,99=0-
```

```
  unequips 25 and equips it to lun 100 (standard input);
  unequips 50, equips it to 12, and protects it; and
  unequips 99, equips it to 0 and removes protection.
```

```
*DEFINE,5=LP,17=PROG,29=DATA+,81=XYZ-
```

```
  unequips 5 and equips it as a line printer;
  unequips 17 and equips it to a file called PROG;
  unequips 29, equips it to a file called DATA, and
  protects it; and
  unequips 81, equips it to a file called XYZ and
  removes protection.
```

NOTE: If files do not exist by the names PROG, DATA, and XYZ (in this example), empty files are created with these names.

*DEFINE,74=TESTDATA?,56=PROGBIN\$

unequips 74 and equips it to a file called TESTDATA,
if there is such a file; and
saves unit 56 under the name PROGBIN.

*DEFINE,DATA3,PROGRAM+,NEWDATA-,OLDDATA/,TT5?

creates a file called DATA3 if there is not one
already;
protects the file called PROGRAM;
unprotects NEWDATA;
deletes OLDDATA (whether or not it is protected); and
checks for existence of a file called TT5 (prints a
message if it doesn't exist).

*DEFINE;NEWDATA/OLDDATA,TT5/TTX+,*QZAP/ZORK-

changes name of file called NEWDATA to OLDDATA;
changes name of TT5 to TTX and protects it; and
changes name of *QZAP to ZORK and unprotects it.

For users who wish to use the directory feature, the following
information will enable them to get started:

*DEFINE,DIRECTRY will create a saved file called DIRECTRY.

*DEFINE,ZAP?,PROGRAM?,DAT437? will check to see if the
named files exist and will enter them in the directory or remove
them accordingly. For those that do not exist, DEFINE will
print messages stating this fact. (For batch users, a question
mark is a 0,7,8 punch.)

*DIRECT will process the user's DIRECTRY file and print a
list of the names in it on unit 61.

*DIRECT,15 will do the same, but print the list on unit 15.
(The "last referenced" date and time printed by DIRECT is the
last time the file was referenced by the DEFINE statement.)

Use of either DEFINE or DIRECT will destroy the status of
a running program, if any. Logical unit 59 is used in processing
these statements.

(For further information, contact G. Bachelor, extension 1264.)

NEW PROGRAMS AVAILABLE (Continued)

LUNLIST

The third new program, called LUNLIST, is now available under OS-3. It is saved in a public file called *LUNLIST. Any OS-3 user can use it by typing *LUNLIST. (It can also be used in a batch job.) When called, LUNLIST checks all logical units from 0 to 99 and prints a list of those which are equipped. With each unit number it prints an indication telling what kind of unit it is (LP, PUN, TTY, FILE, etc.). In the case of files, LUNLIST tells whether the file is saved and whether it is protected (a plus sign (+) denotes protection).

Use of LUNLIST destroys the status of any running program and also causes logical unit 59 to be unequipped.

(For further information, contact G. Bachelor, ext. 1264.)

_ _ _ P R O G R A M M I N G T I P S _ _ _

FLOATING POINT CONVERSION

For those who program in COMPASS, a fast method for converting 24-bit signed integers to floating point has been found. If the integer is in A, the following three instructions will leave the floating point number in AQ:

```

      SHAQ    -24
      SCA     MAGIC
      FAD     MAGIC          CONVERT TO FLOATING POINT

```

where MAGIC is defined elsewhere as follows:

```

MAGIC  OCT  20440000,00000000  UNNORMALIZED FLOATING POINT ZERO

```

COPY

Two options are available with the COPY routine now:

The truncate option (T=XX) will cause input records to be truncated to XX words in length.

The variable length option (V) will cause trailing blanks to be removed from records before output occurs.

Together, these two options are particularly useful for copying cards with sequence numbers in columns 73-80 out onto a file when it is desirable to remove the sequence numbers from the cards and remove the trailing blanks to facilitate work with the file from the teletype editor. An example for this application is:

```

COPY,OUT=FILENAME,V,T=18

```

which will trim off everything beyond column 72.

PROGRAM LIBRARY

Several new and old programs which fall into three categories are now available from the remote teletypewriters.

1. Pseudo-conversational programs where all input/output is from or to the teletypewriter.
2. Programs which have optional I/O (i.e., input from teletypewriter or files, output on teletypewriter, printer or files).
3. Programs callable from teletypewriters, but with input only from files and output only to printer or files.

PROGRAMS NOW AVAILABLE

CALL

Stepwise Multiple Linear Regression Analysis: Stepwise regression analysis including tables of means, simple correlation coefficients, sums of squares and products. Will handle 50 variables. *STEP

One Factor-Two Factor Analysis of Variance: Computes a completely randomized one factor or two factor analysis of variance with means. Will handle 40 levels of each factor. *ANOVA12

Three Factor Analysis of Variance: Computes a three factor analysis of variance with means. Will handle 10 levels of each factor. *ANOVA3

Four Factor Analysis of Variance: Computes a four factor analysis of variance with means. Only two levels of first factor allowed; other factors can each have 10 levels. *ANOVA4

Analysis of Covariance-Completely Randomized Design (one factor): Computes a single factor covariance for up to 100 levels of the factor. Also computes means and adjusted means. *ANCOV1

BMD01D-Simple Data Description: Computes mean, standard deviation, standard error, maximum, minimum, and range. Will handle 999 variables. *BMD01D

One Sample t-test: Computes mean, variance, t-test, and confidence limits for a single group of data. *TONE

Two Sample t-test: Computes means, variances, difference, standard error, t-test and confidence limits for two groups of data. *TTWO

Simple Linear Regression: Computes means, correlation coefficient, and constants (with standard errors) for linear regression equation $Y=A+B*X$. *LINREG

N-Factor Analysis of Variance: Computes analysis of variance for up to 10 factors (without means). Data must be sorted major to minor. *NANOVA

REFERENCES AND I/O OPTIONS

<u>Call</u>	<u>Reference</u>	<u>Header</u>	<u>I/O Options</u> <u>Data</u>	<u>Output</u>
*STEP	OSU Statistical Analysis Program Library	F	F	P,T,F
*ANOVA12	OSU Statistical Analysis Program Library	T,F	F	P,T,F
*ANOVA3	"	T,F	F	P,T,F
*ANOVA4	"	T,F	F	P,T,F
*ANCOV1	"	T,F	F	P,T,F
*BMD01D	BMD Biomedical Computer Programs	F	F	P,T,F
*TONE	Contact OSU Computer Center	T	T	T
*TTWO	"	T	T	T
*LINREG	"	T	T	T
*NANOVA	"	T	T,F	T

T = Teletypewriter
 F = File
 P = Printer

Although these programs have been tested, it is anticipated that some problems will occur with use. Please report any problems to Dave Niess, extension 2062, Computer Center.

Attached are two examples.

EXAMPLE 1

SAMPLE RUN FROM THE TELETYPEWRITER - USER SUPPLIED INFORMATION
IS UNDERLINED

#####

#*TONE

ONE SAMPLE T-TEST.
TERMINATE EACH ITEM OF INPUT WITH A SEMICOLON.

DO YOU WANT A 2-TAIL TEST ? YES;
WHAT IS MU ? 0;
MU = 0
CORRECT ? YES;
WHAT IS N ? 5;
N = 5.00000000
CORRECT ? YES;
ENTER DATA PTS. 3.345; 3; -3.45; 432E-3; 3.111;
WANT TO LIST AND CHECK DATA ? YES;

INDEX X(INDEX)

1	3.34500000E 00
2	3.00000000E 00
3	-3.45000000E 00
4	4.32000000E-01
5	3.11100000E 00

WANT TO CHANGE DATA ? YES;
WHAT IS INDEX ? 3; ENTER VALUE 3.45;
WANT TO CHANGE DATA ? NO;
WANT TO LIST AND CHECK DATA ? YES;

INDEX X(INDEX)

1	3.34500000E 00
2	3.00000000E 00
3	3.45000000E 00
4	4.32000000E-01
5	3.11100000E 00

WANT TO CHANGE DATA ? NO;

MEAN = 2.6676000
VARIANCE = 1.5940053
STD.ERR. = .56462471
T-VALUE = 4.7245541
TABLE VALUE(5) = 2.7760000
TABLE VALUE(1) = 4.6040000
CONF. INT.(5) FROM 1.1002018
 TO 4.2349982
CONF. INT.(1) FROM .06806785
 TO 5.2671322
DO YOU WISH TO MAKE ANOTHER TEST ? NO;

EXAMPLE 2

~~#####~~

#*NANOVA
K-FACTOR ANALYSIS OF VARIANCE

TERMINATE EACH ITEM OF INPUT WITH A SEMICOLON.

ENTER PROBLEM IDENTIFICATION. TESTCASE;

ENTER NO. OF FACTORS. 3;

K= 3.0000000

CORRECT ? YES;

ENTER ONE-CHARACTER ID FOR FACTOR 1

T; NO. OF LEVELS ? 3;

FACTOR T HAS 3 LEVELS

CORRECT ? YES;

ENTER ONE-CHARACTER ID FOR FACTOR 2

P; NO. OF LEVELS ? 2;

FACTOR P HAS 2 LEVELS

CORRECT ? YES;

ENTER ONE-CHARACTER ID FOR FACTOR 3

R; NO. OF LEVELS ? 3;

FACTOR R HAS 3 LEVELS

CORRECT ? YES;

IS YOUR DATA ON A FILE ?YES;

ENTER NAME OF DATA FILE. FREQDATA;

NAME OF DATA FILE IS FREQDATA

CORRECT ? YES;

ENTER INPUT FORMAT FOR DATA. (4F2.0);

FORMAT IS (4F2.0)

CORRECT ? YES;

ANALYSIS OF VARIANCE.....TESTCASE

LEVELS OF FACTORS

T 3
P 2
R 3

GRAND MEAN 50.55556

SOURCE OF VARIATION	SUMS OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARES
T	278.778	2	139.389
P	826.889	1	826.889
TP	1730.778	2	865.389
R	3692.444	2	1846.222
TR	1254.222	4	313.556
PR	11.111	2	5.556
TPR	3718.222	4	929.556
TOTAL	11512.444	17	



OREGON STATE UNIVERSITY COMPUTER CENTER NEWSLETTER

Corvallis, Oregon
(503) 754-2494

Volume III, Number 8
October 1, 1968

OPERATING SCHEDULE

The following operating schedule for the Control Data 3300 is effective on September 30, 1968.

Monday through Friday

OS-3 8:00 AM to 3:45 PM

MASTER and
development
work 4:00 PM to 6:45 PM

OS-3 7:00 PM to 11:00 PM

OS-3 non-prime
(without
teletypewriters)
and MASTER 11:00 PM to completion

Saturday

OS-3 8:00 AM to 12 noon

OS-3 non-prime
and MASTER 12 noon to completion

HOURS FOR KIDDER HALL

Kidder Hall will be open on the following schedule:

Monday through Saturday:

6:00 AM to 2:00 AM

Sunday:

1:00 PM to 12: midnight

2.

The Computer Center main office is open 8:00 AM to 5:00 PM Monday through Friday. The building is open for leaving and picking up computing service jobs, and for access to self-service key punches, flexowriters and teletypewriters throughout the extended hours noted.

CENTENNIAL OPEN HOUSE

The Computer Center will be open from 1:00 PM to 9:00 PM Saturday, October 26, for tours and demonstrations of Computer Center facilities.

Visitors are welcome.

CHARGES AND HOURLY RATES FOR COMPUTER CENTER SERVICES

The continuing analysis of the charges for Computer Center services is reflected in an adjustment in charges. The changes include a reduction in charges for cards read by the Card Reader and special rates for volume work performed under OS-3 during non-prime periods.

The following charges and hourly rates will be effective October 1, 1968.

OS-3 Charges (prime time)

CPU time	\$300/hour
Tape	\$1.00/100,000 words transferred
Elapsed time at Teletype	\$.50/hour
On-line disc storage	\$.05/block = \$.10/track/month
Punch cards	\$.25/100 records
Input cards	\$.15/100 records
Line printer	\$.125/100 records
Plotter	360 blocks/hr. @ \$10/hr.

OS-3 (non-prime time)

Special rates for volume work in non-prime time.

(Non-prime time is the time when the teletypewriters are not on the air). Special forms for volume work must be used and will be available at the input desk.

CPU	\$300/hr. for the first 10 min. CPU, then, \$200/hr. for CPU time over 10 min.
Punch cards	\$.25/100 for the first 2,000 records, then, \$.15/100 for all cards there- after.
Input cards	\$.15/100 for the first 2,000 records, then, \$.05/100 for all cards there- after.
Line printer*	\$.125/100 for the first 5,000 records, then, \$.05/100 for all records there- after.

*These rates are for one part paper only. If user wants multi-part paper or special forms, he will be charged for the materials used.

Warning to High Volume Users

The user should be aware that when a LOGOFF occurs, OS-3 computes both the CPU time and peripheral charges and converts this sum to a CPU time equivalent which is then subtracted from the user's remaining time limit. Since the operating system computes time used at prevailing rates for prime time a user's time may run out sooner according to the time computation than he expects with large volume runs at the rates applicable under non-prime time. In billing procedures the user will be charged at the announced lower rate. At the present time it does not appear practical to build this additional bookkeeping feature into the OS-3 automatic accounting system.

4.

Master Charges

CPU time and channel time	\$250/hour
Disc scratch segment (includes implicit reservations for input and output files)	\$1.00/hour
Quarter page of memory reserved	\$1.00/hour
On-line disc storage	\$.10/track per month
Punch cards	\$.25/100
Input cards	\$.15/100
Line printer	\$.125/100
Plotter	\$10.00/hour

Bulk users with unusual requirements should contact the Computer Center

<u>Other</u>	<u>Without operator</u>	<u>With operator</u>
IBM 1620	\$25.00	\$30.00
ALWAC III-E	3.00	8.00
CALMA 302 Digitizer	6.00	10.00
IBM 407 Tabulator	6.00	10.00
IBM 083 Sorter	2.00	6.00
Keypunching	No charge	5.00
Verifying	Not available	5.00
Programming		8.00
Magnetic Tape Reels	\$1.00/month (\$0.25 minimum)	
Disc Packs	\$20.00/month (\$1.00 minimum)	
Interpreter	\$3.00/hour	

Commercial work, including all work arising from consulting activities for privately owned companies by Faculty members, will be charged 25 percent over the above rates.

NOTE TO INSTRUCTORS PLANNING TO USE COMPUTER CENTER FACILITIES

Please notify the Computer Center if Computer Center and Control Data manuals are necessary for use in your course.

The Center must know how many manuals are needed in each instance so these manuals can be sent to the Bookstore for purchase by students.

Instructors can receive a copy of each manual needed without charge by contacting the Computer Center directly.

SCHEDULING OF IBM 1620 FOR INSTRUCTIONAL USE

Instructors who have requested IBM 1620 time for instructional use should contact John Saugen (extension 3095) to schedule time on the computer.

SHORT COURSE IN ADVANCED FORTRAN PROGRAMMING

During the summer the Computer Center offered an advanced FORTRAN programming course as a pilot study on the applicability of remote terminals to a class situation under the NSF sponsored regional center project. This course will be offered again during the Fall Term and will be open, in particular, to all members of the OSU campus. A basic knowledge of FORTRAN is assumed. There is no credit and no formal registration for this course.

Problem sets are provided by the Center for use by participants with the remote teletypewriter terminals. Communication between instructor and student is carried out through a user number reserved for this purpose. This file is checked daily and questions answered there or in the student's file.

Individuals interested in further information should contact Jo Ann Baughman at the Computer Center (extension 2494).

INSTRUCTIONAL USE OF COMPUTERS

The attached tables summarize the requests for instructional use of Computer Center facilities for the 1968-1969 academic year by School, Department and term. The number of classes involved by Department is also noted.

An important observation is that the number of courses per term for which computer time is requested this year has doubled in comparison with last year. It is estimated that only about 1/3 to 1/2 of the time requested for the current year can be covered by funds provided by the University.

This need for a regularization of funding for the instructional use of computers has been recognized by the State System and has led to a proposed budget item for this support in the Budget approved recently by the State Board of Higher Education.

TABLE 1
NUMBER OF COURSES REQUESTING OR USING COMPUTER TIME

		<u>1966-67*</u>	<u>1967-68</u>	<u>1968-69</u>
CDC 3300				
(primarily)	Fall	35	39	80
	Winter	37	43	71
	Spring	53	41	86
IBM 1620 or				
ALWAC use				
<u>only</u>		*	6	11
(Term by term				
breakdown not				
requested)				

*Records given for 1966-67 are for actual use and do not distinguish between CDC 3300, IBM 1620 use and ALWAC use.

TABLE 2
 REQUESTS FOR INSTRUCTIONAL USE OF THE CDC 3300 DURING 1968-1969
 ACADEMIC YEAR. (Time is in hours of central
 processing unit (CPU) time.)

School and Department	FALL		WINTER		SPRING	
	Number of Courses	Hours	Number of Courses	Hours	Number of Courses	Hours
SCHOOL OF AGRICULTURE						
Agriculture Economics	5	1.92	0	0	0	0
Subtotal	<u>5</u>	<u>1.92</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
SCHOOL OF BUSINESS & TECHNOLOGY						
Business Administration	13	24.38	13	30.33	15	27.55
Secretarial Science	1	.20	1	.20	1	.20
Subtotal	<u>14</u>	<u>24.58</u>	<u>14</u>	<u>30.53</u>	<u>16</u>	<u>27.77</u>
SCHOOL OF ENGINEERING						
Agriculture Engineering	1	1.00	3	3.00	0	0
Chemical Engineering	8	9.34	0	0	0	0
General Engineering	0	0	12	22.84	0	0
Civil Engineering	12	4.91	0	0	20	5.40
Elec. & Electron. Engr.	6	4.00	7	4.50	6	5.50
Mech. & Indus. Engr.	9	15.50	6	15.00	7	17.00
Subtotal	<u>36</u>	<u>34.75</u>	<u>28</u>	<u>45.34</u>	<u>33</u>	<u>27.90</u>
SCHOOL OF EDUCATION						
Industrial Education	1	3.00	1	3.00	1	3.00
Physical Education	1	1.00	1	1.00	1	1.00
Subtotal	<u>2</u>	<u>4.00</u>	<u>2</u>	<u>4.00</u>	<u>2</u>	<u>4.00</u>
SCHOOL OF HOME ECONOMICS						
Institution Management	1	1.50	1	1.50	1	1.50
Subtotal	<u>1</u>	<u>1.50</u>	<u>1</u>	<u>1.50</u>	<u>1</u>	<u>1.50</u>
SCHOOL OF FORESTRY						
Forestry	1	.40	1	.40	2	1.40
Subtotal	<u>1</u>	<u>.40</u>	<u>1</u>	<u>.40</u>	<u>2</u>	<u>1.40</u>
SCHOOL OF HUMANITIES & SOC. SCI.						
Geography	0	0	0	0	3	.50
Political Science	1	2.00	1	3.00	1	3.00
Subtotal	<u>1</u>	<u>2.00</u>	<u>1</u>	<u>3.00</u>	<u>4</u>	<u>3.50</u>
SCHOOL OF SCIENCE						
Biochemistry & Biophysics	0	0	0	0	1	1.00
Chemistry	0	0	1	1.00	2	4.00
Mathematics	8	13.34	9	14.09	8	13.34
Statistics	12	14.58	13	17.33	15	42.01
Physics	0	0	1	5.00	1	5.00
General Science	0	0	0	0	1	2.00
Subtotal	<u>20</u>	<u>27.92</u>	<u>24</u>	<u>37.42</u>	<u>28</u>	<u>67.35</u>
TOTAL	<u>80</u>	<u>97.07</u>	<u>71</u>	<u>122.19</u>	<u>86</u>	<u>133.40</u>

REQUESTS FOR USE OF THE IBM 1620

A total of 24 courses requested 436 hours of IBM 1620 time during the academic year.

8.

These will be offered twice in October. On the classroom TV network and channel 5 (cable TV), the schedule is as follows:

October 7-11, 4:00-5:00 PM

"Introduction to the Basics of E. D. P."

Kay Porter

October 14-18, 4:00-5:00 PM

"Introduction to FORTRAN"

Dave Niess

October 21-24, 28-31, 4:00-5:00 PM

"Introduction to OS-3"

Walt Massie

On a private line, the same programs will be shown in Batcheller Hall, Room 105. The schedule is:

October 7-11, 3:00-4:00 PM

"Introduction to the Basics of E. D. P."

Kay Porter

October 14-18, 3:00-4:00 PM

"Introduction to FORTRAN"

Dave Niess

October 8-11, 15-18, 2:00-3:00 PM

"Introduction to OS-3"

Walt Massie

Individuals interested in following one or more of these series are requested to advise the Computer Center (extension 2494). Readers are requested to refer to the September Newsletter for a detailed description of each series and the hours of showing of each lecture.

COMPUTER CENTER BUILDING

The State Emergency Board authorized at its meeting on September 20, 1968 the construction of the OSU Computer Center Building. The building provides adequate space for the Control Data 3300 and satellite PDP-8 complex, data preparation, access to remote terminal facilities, key staff members and the main office. Most staff members, certain instructional computer facilities and research and development projects will require housing elsewhere.

A proposal has been submitted to the National Science Foundation to augment funds currently allocated to this construction project in order to provide additional accommodations for staff and equipment.

COMPUTER CENTER SEMINARS

The Computer Center plans a series of talks again this year on developments related to computers. Participants will include Computer Center staff members as well as invited speakers from off-campus organizations.

SOCIAL SCIENCE RESEARCH LABORATORY

A Social Science Research Laboratory has been established by the School of Humanities and Social Science. Equipment anticipated initially for this Laboratory includes an IBM model 029 Card Punch and an IBM model 082 Counter-Sorter in addition to a remote teletypewriter terminal. This facility is not administratively under the Computer Center.

By recommendation of the University Computer Committee this facility will be designated as a school facility but will not be closed to use by other schools. The use of the facility is to pertain to scheduled instructional activities only.

10.

Faculty and students interested in using this Laboratory should contact the School of Humanities and Social Science directly.

The IBM model 029 keypunch cited will be the only one of this model on campus generally available for student use. Also, faculty and students who find the present location of the sorter in the Computer Center unsuitable for general classroom use may wish to avail themselves of this additional facility. Instructional activities for which the IBM Counter Sorter are appropriate, will be materially enhanced by the addition of this equipment.

Users are reminded that a simulated card sorter program (*SORTER) is now available under OS-3 via the teletypewriter terminals. For those individuals for whom the contact with the IBM Sorter can be properly isolated from the data processing techniques involved, the simulated card sorter under OS-3 together with the SORT/MERGE package and the many statistical and other programs available offer obvious advantages.

INSTRUCTIONAL COMPUTING LABORATORY

Batcheller Hall, Room 105, is being instrumented as an instructional computing laboratory for use by instructors in those courses in which on-line access to the CDC 3300 is needed, for presentation of Computer Center video tape instructional programs, and for general laboratory use by the campus at otherwise unscheduled periods.

Facilities available will include, initially, eight teletypewriters and one CRT character display on-line to the CDC 3300, two classroom TV monitors and about 35 student stations. Those instructors who would like to use this facility for either classroom or general laboratory use are requested (if they have not already done so) to contact D. D. Aufenkamp at extension 2494.

BUDGET REDUCTIONS ON NSF GRANTS

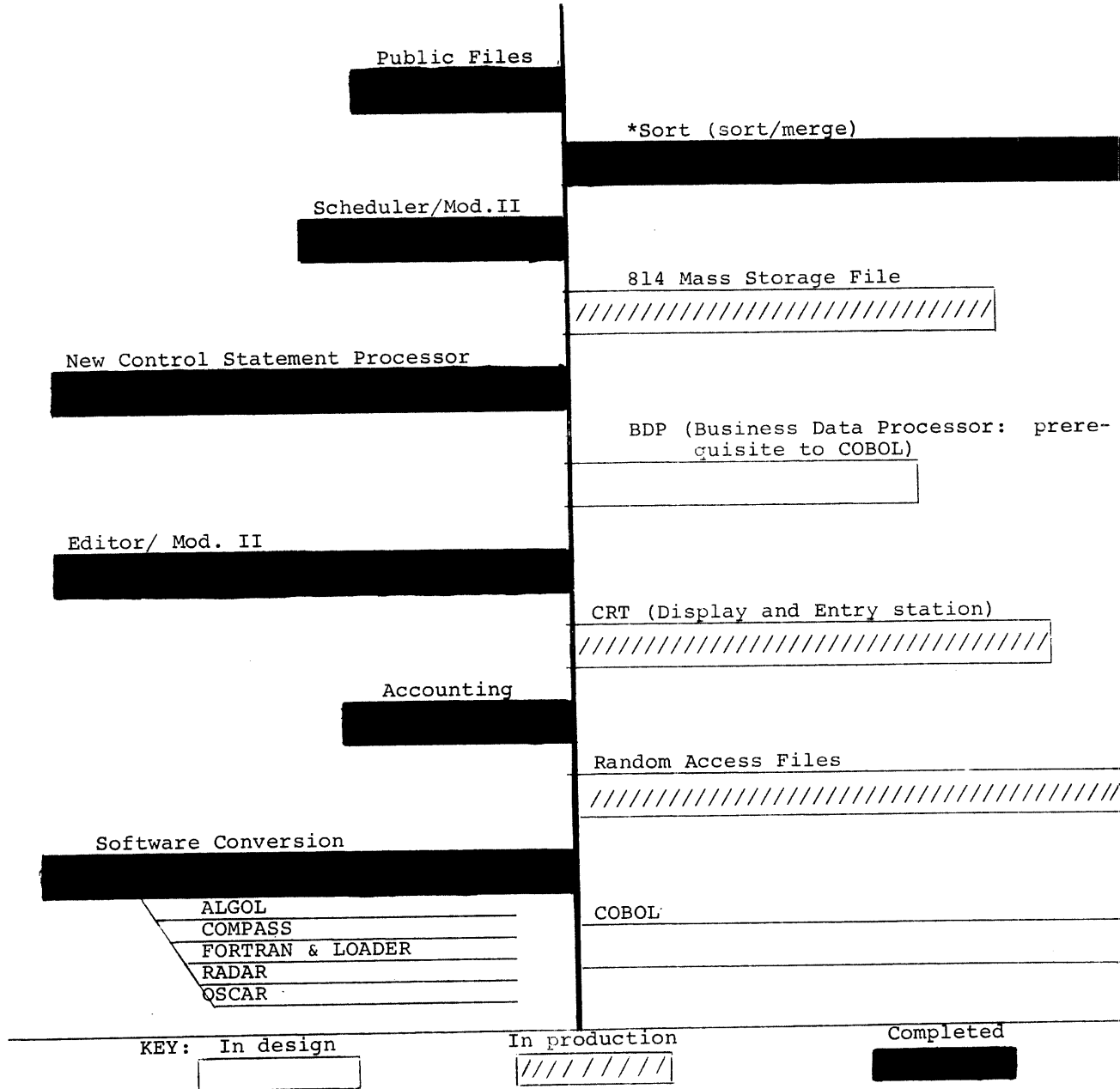
The reduction in rate of expenditures on NSF grants to the Computer Center will have a noticeable impact on services provided to the campus. Delays will be experienced, at least until July 1969, for (1) the experimentation during evening hours with the use of remote terminals announced for all OSU students (2) the additional experimentation with OSCAR in an instructional environment (over that use possible by the regular instructional support of computer time provided by the University) (3) certain improvements planned under the facilities grant.

DEVELOPMENT OF OS-3

Development of the OS-3 operating system has been intensive for more than two years. In April 1968, the Computer Center decided to define a VERSION 2 system to be scheduled for completion in early July. The Center committed itself to installation of OS-3 VERSION 2 as the principal operating system, and work was directed towards meeting the July deadline. On 1 July 1968, the new version was released, and it has proven exceptionally reliable from the onset.

Many new features and support packages have been added; some of these affect only internal system behavior and are not evident to an applications oriented user. Since it may be of interest to place this development in perspective, a chart that depicts major modifications and additions is included here.

Every bar on the chart represents a feature to be included in the system. Each such feature can be broken down into three stages: design, implementation, and qualification. The length of each bar represents the relative effort involved to install that feature. Tasks to the left of the vertical line comprise about 75 percent of the work expended between 1 May and 1 July of this year.



SORT/MERGE FOR OS-3

This program is a high-speed SORT routine that sorts fixed or variable length records according to sort keys specified by the user. Merging, if necessary, is handled automatically by the program. Pre-ordered records will remain ordered when the information in the sort keys is identical.

These SORT/MERGE programs appear under the public file name *SORT.

If merging is necessary, enough scratch file space to hold two scratch copies of the input may be needed.

A write-up will soon be available under Computer Center Report number cc-68-37.

LOGOFF

Terminal users of the OS-3 system are cautioned to LOGOFF when leaving a console. Turning the console off does not constitute a LOGOFF. In particular, if you turn off a console on a dedicated line but fail to LOGOFF, the next user of this terminal can operate under your job/user number merely by turning on the console and proceeding. This condition is complicated further for data phone users in that the break key can cause disconnects under a prolonged depression.

The current LOGOFF procedure has been established for your convenience. Should you inadvertently disconnect while using a terminal, you are still active with respect to the system and can reconnect and proceed without any loss of information. The only exception is the data phone user who may not be able to get his original line back.

DISCOSSA

DISCOSSA is an acronym for Disc-Oriented Oregon State Systems Analyzer. DISCOSSA is an executive program for manipulating information flow in a complex digital system simulation and was written specifically for problems of steady-state process system simulation, design, economics and optimization. The program is useful for digital computer calculations of systems which can be reduced to a topological structure consisting of a set of nodes interconnected by directed line segments where the nodes represent subroutines and the directed line segments represent vectors of information.

DISCOSSA provides for extensive data input, calculation of complex recycle nets automatically, intermediate output, and a detailed final report of the process system topology after convergence of all recycle nets is obtained. Many operating options, convergence techniques for recycle nets and equipment subroutines make DISCOSSA quite flexible.

DISCOSSA can be used either in a batchwise fashion or by time-sharing in the Oregon State University CDC 3300 digital computer system under OS-3 via remote teletypewriter.

DISCOSSA was developed by Young Jin Kwon, graduate student, and Dr. Eugene Elzy in the Chemical Engineering Department at Oregon State University. Partial financial assistance was obtained from the OSU Computer Center to develop DISCOSSA for educational purposes. Part of the nomenclature was taken from the PACER system written by Dr. Paul T. Shannon, President, Digital Systems Corporation.

A complete system manual with examples is available for the DISCOSSA system from the Chemical Engineering Department, Oregon State University. DISCOSSA will be used in both undergraduate and graduate courses in Chemical Engineering this year and is heavily used by current research projects in the area of process systems analysis.

Future developments of DISCOSSA include the implementation of extensive man-machine interaction by means of the remote teletypewriter and CRT so that DISCOSSA can react and communicate with man while the process system is being calculated. The primary goal is to suppress the presence of DISCOSSA and the computer so that the teletypewriter and CRT become an extension of man's thoughts while the process system is being designed.

DATA LINK BETWEEN RADIATION CENTER AND COMPUTER CENTER

The Data Link between the Nuclear Data 3300 Analyzer in the Radiation Center and the CDC 3300 computer is now undergoing final check out and testing. The Data Link is comprised of four separate efforts which are: 1) the Control Panel and Interface between the Nuclear Data 3300 Analyzer and telephone line (at the Radiation Center), 2) PDP-8 Peripheral Multiplexer and telephone line interface, 3) PDP-8/CDC 3300 controller, and 4) supporting software in the PDP-8 and the CDC 3300.

The Control Panel and Interface between the Nuclear Data 3300 Analyzer and the telephone line is now completed and ready for testing by Radiation Center personnel.

The PDP-8 Peripheral Multiplexer and telephone line interface can perform all of the required communication with the Radiation Center. The portion of this device that remains to be completed is that portion which allows for the acquisition and dissemination of data to devices other than the Radiation Center.

The PDP-8/CDC 3300 controller is the hardware device that allows the high speed transmission of data between the PDP-8 computer and the CDC 3300 computer under program control. This device has been under test for two months, and it is expected to be operational very shortly.

The final software which is necessary to handle automatically the acquisition of data from the Radiation Center as well as

other devices is presently in development and check out. Preliminary software is now available for test purposes which allows data transmissions to be initiated at the Radiation Center Control Panel. This data is acquired via the PDP-8 system, and formatted and printed out on a high speed line printer.

NEW COMPUTER CENTER PUBLICATIONS

Reports that have been recently published or are in final phases of publication are listed below:

68-26	OSCAR: A User's Manual with Examples	Baughman, Berryman	7/22/68
68-33	*SORTER - A Simulated Card Sorter for OS-3	Dayton, Rose	8/21/68
68-34	DECKLIST Routine for CDC 3300/OS-3 Version 2.0	Bachelor	8/27/68
68-35	Plotter Subroutines for OS-3: A Description (Revised)	Dayton	8/28/68
68-36	On-Line Remote Computer Based Personnel Infor- mation System	Birch, Janssen, Zook	9/04/68
68-37	SORT/MERGE For OS-3	Sullivan	9/23/68
68-38	Control Cards/Command Instructions for OS-3 (Revised)	Porter	9/23/68
68-39	Fortran: Entering, Editing, and Running from Remote Units Under OS-3	Schwendiman	9/08/68

PRINCIPAL COMPUTER CENTER REPORTS ON USE OF CDC 3300 OPERATING UNDER OS-3

To aid users of Computer Center facilities the following updated list of reports is provided on services available under OS-3, the principal operating system used by the Center for the Control Data 3300.

Publication Number and Name	Author	Publication Date
67-16 A Free Format Numerical Input Routine for Teletypes Under OS-3	Pawley	11/8/67
67-17 A Complex Arithmetic Package for 3300 Fortran Library	Pawley	11/10/67
68-6 Teletype Operation	CE Dept.	4/01/68
68-9 DECKEDIT Routine for CDC 3300/OS-3	Bachelor	4/10/68
68-10 SCANIN, A Free Format BCD to Floating Point Converter	Pawley	4/17/68
68-14 Computer Center User's Manual	Davis, Porter	4/10/68
68-16 RAM: General Purpose Disk Control with Fortran	Schoenborn	5/01/68
68-17 OS-3 Teletypewriter Editor Manual (Revised)	Dayton, Massie	5/10/68
68-19 A Guide to Program Documentation for the OSU Computer Center Program Library	Margolis, Niess, Porter	7/01/68
68-21 A Control Mode Manual for OS-3 Version 2.0	Massie	6/01/68
68-22 A Fortran Manual for OS-3 Version 2.0	Massie	7/10/68
68-24 A Brief Description of OSCAR	Davis	7/09/68
68-25 Using the Plotter: Documentation and Examples	Baughman, Pielstick	In press
68-26 OSCAR: A User's Manual with Examples	Baughman, Berryman, Davis	8/10/68
68-27 Free Form Input for OS-3 Fortran	Massie	7/23/68
68-28 OSU Computer Center Program Library Catalog	Staff	In press
68-30 RADAR	Meeker	7/30/68

68-31	An Introduction to OS-3 A Series of Video Tapes	Massie, Scholl	7/31/68
68-33	*SORTER - A Simulated Card Sorter for OS-3	Computer Center Staff	In press
68-34	DECKLIST Routine for CDC 3300/OS-3 Version 2.0	Bachelor	8/27/68
68-35	Plotter Subroutines for OS-3: A Description (Revised)	Dayton	8/28/68
68-37	SORT/MERGE for OS-3	Sullivan	In press
68-38	Control Cards/Command Instructions for OS-3 (Revised)	Porter	In press
68-39	FORTTRAN: Entering, Editing, and Running from Remote Units Under OS-3	Schwendiman	In press

NOTE TO FORTRAN USERS

The section and paragraph numbering in the report "A FORTRAN Manual for OS-3 Version 2.0" by Walter W. Massie, cc-68-22, refer, where appropriate, to that used in the Control Data "3100/3200/3300/3500 FORTRAN Reference Manual", Publication Number 60057600 Rev. B. The Computer Center report discusses only additions and deletions to the Control Data manual.

TAPE DUMP FILE

There is a new file on the OS-3 system, called *TAPE DUMP.

The deck setup is as follows:

```

7
8JOB,<JOB NO.>,<VALIDITY CODE>,<USER IDENTIFICATION>

7
8EQUIP,1=TAPE NO.

```

(continued)

TAPE DUMP FILE (continued)

7
8 *TAPEDUMP

7
8 BEGINNING IN COL. 1, punch BBBB/LLLL/FFFF/SSSS/P

BBBB=NUMBER OF RECORDS PER BLOCK

LLLL=NUMBER OF LINES TO BE LISTED

FFFF=NUMBER OF FILES TO BE DUMPED

@1 SSSS=NUMBER OF FILES TO BE SKIPPED

@2 P =PARITY DESIRED

@1 FILES SKIPPED BEFORE DUMPING TAKES PLACE

@2 TAPEDUMP WILL FIND ITS OWN PARITY IF YOU ARE WRONG

FOR A BCD DUMP, USE ZERO PARITY

FOR A BINARY DUMP, USE ONE PARITY

LOCATION OF TELETYPEWRITERS ON-LINE TO CDC 3300

The location and expected numbers of teletypewriters on-line to the CDC 3300 as of October 1 are indicated below. Present plans for installation of additional units are also noted.

Building & Room	33KSR	33ASR	35KSR	35ASR	Comments
Apperson 309	1	2		1	Instructional Lab. for Civil Engr. open to campus use. (5 units to be added)
Batcheller 105		5			Instructional computing Lab. open to campus. (3-7 units to be added in October)
Chemical Engr. 2W3	1			1	(4 units to be added)

20.

Building & Room	33KSR	33ASR	35KSR	35ASR	Comments
Dearborn 102				1	Also used for making tapes for Hybrid system.
Extension 208	1				
Forest Research Lab. (Room no. not yet available).		1			(2 units to be added).
Forestry 217		1			
Gilbert 107		1			
Gilmore 203				1	
Kidder 10	1				Primarily for use by Stat. Dept.
64		1			Primarily for use by Stat. Dept.
69	1				Primarily for Computer Center use.
70	1				Instructional use by Stat. Dept.
72	2			5	Open to campus. (3 units to be added).
108					(2 units to be added).
128			1		Computer Room
144				1	TWX and Data Phone Service for special use.

<u>Building & Room</u>	<u>33KSR</u>	<u>33ASR</u>	<u>35KSR</u>	<u>35ASR</u>	<u>Comments</u>
Library					(1 unit to be added).
Oceanography 210	1				
428		1			(2 units to be added for Oceanography)
Pacific Northwest Water Lab.	1				
Production Tech. 203	1				Available except during classes.
Radiation Center Instrumentation Rm.		1			(1 unit to be added for Radiation Center).
Rogers 226	1				Available except during classes.
Social Science 208	1				Social Science Research Lab.
Weniger 503	1				(1 unit to be added in Weniger).
Wilson	1				Open to students.
Oregon College of Education				2	(33ASR is on Data Phone).
Portland State College				1	
Eastern Oregon College				1	
Southern Oregon College				1	

22.

<u>Building & Room</u>	<u>33KSR</u>	<u>33ASR</u>	<u>35KSR</u>	<u>35ASR</u>	<u>Comments</u>
Oregon Technical Institute				1	
Lane Community College				1	
Teaching Research Division (Monmouth)		1			(Data Phone Service)

A total of 28 terminals can be active concurrently including facilities for accommodating three data phone terminals and one TWX terminal.

Present plans call for approximately 50 terminals on-line by the end of 1968 with an average of about 30 terminals active concurrently.

----- P R O G R A M M I N G T I P S -----

The LABEL Command will automatically equip logical unit 62 as a punch if it is not defined when a command of the form

LABEL,62/INFORMATION

is used. In the near future, the card reader system will not equip 62 as a punch. The effect of this is primarily that jobs which do not label the punch will be aborted if they attempt to write on it.



OREGON STATE UNIVERSITY COMPUTER CENTER NEWSLETTER

Corvallis, Oregon
(503) 754-2494

Volume III, Number 10
November 1, 1968

JOB NUMBER SECURITY

Users are reminded that the validity code associated with a job number can be changed at the discretion of the user. This feature is intended to preclude unauthorized use of job numbers. To change a validity code it is necessary to come personally to the Computer Center main office.

VIDEO TAPE SCHEDULE

Computer Center video tapes will be shown again in November. The tapes will be shown in Batcheller 105 and on channel 5 on the cable.

I. Introduction to the Basics of EDP by Kay Porter

Nov. 11-14, 4-5 PM, Nov. 15*, 4-5 PM

*Nov. 15 the tape will be shown in Kidder 20 and on channel 5, but will not be shown in Batcheller 105.

II. Introduction to Fortran by Dave Niess

Nov. 18-22, 4-5 PM

III. Introduction to OS-3 by Walt Massie

Nov. 25-27, Dec. 2-6, 4-5 PM

Individuals interested in following one or more of these series are requested to contact the Computer Center (ext. 2494). These courses are open to all interested students and faculty.

The Center is very much interested in comments on these presentations as well as in suggestions for additional topics to address via this medium.

ADDITIONAL TELETYPES TO BE INSTALLED

Twelve Teletypes are being added to the Computer Center facilities. These will be installed as follows:

Oceanography	1
Weniger	2
Radiation Center	1
Social Science	1
Kidder 72	2
Forest Research Lab	1
Chemical Engr. Bldg.	2
Apperson Hall	2

The facilities for accommodating teletypewriters will be improved with the completion of the CDC 3300/PDP-8 complex. Connections for 50 teletypewriter terminals are planned initially for this system. The number of active terminals at any time will be less than this number.

A test panel is part of this arrangement to be used in the isolation of malfunctions associated with use of the remote terminals.

CRT I/O UNDER OS-3

Four Control Data 210 display and entry terminals (CRT's) are now available as remote consoles working under the OS-3 operating system. Although execution of any of the control mode commands may be accomplished from a CRT, many of the supported subsystems have not yet been converted to be compatible with this type of terminal. There is, however, an elegant version of RADAR, known as SONAR, available at the present time. Editing and other routines will follow shortly.

The logical unit conventions adopted for CRT's are consistent with other terminal configurations:

Unit 60 is CRT input and unit 61 is CRT output.

MOTOROLA REMOTE READER

The Computer Center recently acquired a desk-top reader (made by Motorola) capable of acquiring data from pencil-marked documents, pencil-marked cards, punched cards, or combined pencil-marked/punched cards. The device can be located remotely from the computer and can transmit data to the computer similar to the standard remote keyboard consoles. It is anticipated that the reader can be used in several applications of interest to the campus which involve input data in the above forms.

As soon as the engineering and systems work has been completed to accommodate this device as part of the CDC 3300/PDP-8 configuration the unit will be made available for demonstrations.

OS-3 USAGE STATISTICS

For the information of the campus we are providing general statistics on the use of the OS-3 system. The use given here is the total accrued for all users of the system.

In future newsletters we shall attempt to provide additional data on the system.

For the dates October 1 to October 24, OS-3 usage was as follows:

Number of batch jobs run:	2,200 jobs
Number of console runs (Logon-Logoff):	6,977 jobs
Percent of use from consoles:	53.7 percent
Percent of use from batch:	46.3 percent
Number of consoles hours used:	1,850 hours
CPU time used by all consoles:	32 hours
Total number of hours OS-3 was on the air: (11 3/4 hours Mon.-Fri., 4 hours Sat.)	190 hours
Average number of console users:	10 users
Amount of CPU time used by an average user for one hour of console time:	61.2 seconds

COMPUTER CENTER OPEN HOUSE

The Computer Center open house on October 26 as part of the Centennial celebration, included a tour of the computer room, and various demonstrations on four teletypewriters and a cathode ray tube display. Visitors played Tic-Tac-Toe and NIM with the CDC 3300 and experimented with OSCAR and other languages. It is estimated that approximately 300-400 people visited the Center during the day.

NSF SITE VISIT ON BUILDING PROPOSAL

A site visit was made to OSU on October 9 and 10 concerning a proposal to expand the Computer Center building now under construction. The expansion, if approved, would increase the gross number of square feet from 23,000 to 30,000. Certain research laboratories could be completed and additional office space would be provided for about sixty staff and students associated with the Center.

MEETING OF REGIONAL COMPUTER CENTER PROJECT

D. D. Aufenkamp reported on the OSU Regional Computer Center Project at the meeting of project directors on October 7 and 8 in Washington, D. C. called by the National Science Foundation. Copies of the report submitted on the OSU project are available. There are currently ten regional computer center projects in the country supported, in part, by the National Science Foundation.

SWAP MEETING

R. E. "Kit" Schoenborn attended the SWAP meeting for users of CDC lower 3000 computers in Newport Beach, California on October 20-23. "Kit" chaired a panel discussion on "On-Line Systems" and also presented a paper on the RESERVE accounting system developed for use within the OSU Computer Center. Copies of his notes on the meeting are available at the Computer Center.

COMPUTER SEMINAR OFFERED BY OSU CIVIL ENGINEERING DEPARTMENT

The OSU Department of Civil Engineering is now offering a computer seminar which is intended to acquaint all Civil Engineering students with the CDC 3300 computer facilities. The one-hour course is built around the series of video tape lectures - AN INTRODUCTION TO OS-3. Each student in the course is expected to acquire the ability to perform the teletype operations necessary for running a canned program and for loading and debugging a program that he might write for future courses. The course consists of one hour of formal lecture per week, at which time one of the tapes is shown on TV. The remaining time in each hour is spent on discussion and problem assignment. Assignments relating to the tape material are made in the course. In addition to the one-hour lecture, help sessions are offered two evenings each week at which time the students work on the computer consoles in Apperson Hall.

NEW COMPUTER CENTER PUBLICATIONS

Reports that have been recently published or are in final phases of publication are listed below.

cc-68-25	Using the Plotter: Documentation and Examples	Baughman, Pielstick	July, 1968
cc-68-40	A Pilot - An On-line Library Acquisition System	Spigai, Taylor	January, 1968
cc-68-41	Oregon State University Computer Center	Aufenkamp	October, 1968
cc-68-42	OS-3: A User's Manual with Examples	Baughman, Berryman, Pielstick	Sept., 1968
cc-68-43	Report on OSU Regional Computer Center Project, April 1, 1968 - September 30, 1968	Aufenkamp	October, 1968
cc-68-44	DECKEDIT Routine for CDC 3300/ OS-3, Version 2.0	Bachelor	October, 1968

P R O G R A M M I N G T I P STAPE DUMP FILE (Correction of October 1 Newsletter)

*TAPEDUMP

The deck setup is as follows:

```

7 JOB,<JOB NO.>,<Validity Code>,<User Identification>
8

```

```

7 EQUIP,1=MT,<Tape Number>
8

```

```

7 *TAPEDUMP
8

```

BBBB/LLLL/FFFF/SSSS/P

{ This is the parameter card and
information should be punched
beginning in col. 1

Explanation:

BBBB = Number of records per block

LLLL = Number of lines to be listed

FFFF = Number of files to be dumped

@1 SSSS = Number of files to be skipped

@2 P = Parity desired

@1 Files to be skipped before dumping takes place.

@2 TAPEDUMP will find its own parity if you are wrong.

For a BCD Dump, use zero parity.

For a Binary Dump, use one parity.



OREGON STATE UNIVERSITY COMPUTER CENTER NEWSLETTER

Corvallis, Oregon
(503) 754-2494

Volume III, Number 11
December 1, 1968

ATTENTION: FACULTY MEMBERS

The Computer Center, in a continuing effort to extend the knowledge of computer languages and applications throughout the campus, has initiated the following two activities:

- (1) Provide Funds to Acquaint Faculty Members with the Central Computing Facilities.

The Computer Center has a limited amount of funds available for faculty use in becoming familiar with the facilities available under the OS-3 operating system. Any faculty member can request up to five minutes of central processor time for this purpose. The Center will be available to provide programming guidance, manuals, or any other assistance which may be required.

- (2) Provide Special Faculty Seminars on a Departmental Basis.

The Computer Center is offering special computer seminars to all departments whose members are interested in learning more about computer languages and uses. These seminars are introductory in nature and can be specially oriented to meet the requirements of individual departments. Subject matters which are often of interest include Computer Center operations, Fortran, OSCAR, and currently available library programs.

Any faculty member interested in either of these two programs should contact Dr. Larry C. Hunter in the Computer Center, ext. 2494.

2.

PROGRAMMING ASSISTANCE

Programming assistance is available from 1:00 PM - 5:00 PM Monday through Friday in the ALWAC room (Kidder 76, extension 2626).

However, this campus facility does not provide programming assistance for students taking computer-related courses. The needs of students are met by the teaching assistants assigned by the instructing department.

DR. D. D. AUFENKAMP

Dr. D. D. Aufenkamp will be leaving January 1 for one year. He will be working for the National Science Foundation in Washington, D. C. He is scheduled to return January 1, 1970. Dr. Larry Hunter will be the acting Director of the Computer Center during Dr. Aufenkamp's absence.

"A BRIEF DESCRIPTION OF OSCAR" (SECOND REVISION)

The second revision of this OSCAR manual by Joel Davis will be available after December 16th. The publication number is cc-68-45.

NEW PROGRAMS AVAILABLE:

The following programs are available when called from a remote terminal or batch:

*STEP	Stepwise Multiple Linear Regression Analysis
*ANOVA 1 - 2	1 - 2 Factor Analysis of Variance
*ANOVA 3	3 Factor Analysis of Variance
*ANOVA 4	4 Factor Analysis of Variance
*ANCOV 1	1 Factor Analysis of Covariance
*ANCOV 2	2 Factor Analysis of Covariance
*ANCOV 3	3 Factor Analysis of Covariance
*BMD01D	BMD01D Simple Data Description
*BMD03D	BMD03D Correlation with Item Selection

*BMD03M	BMD03M General Factor Analysis
*BMD05M	BMD05M Discriminant Analysis for Several Groups
*BMD03V	Analysis of Covariance for Factorial Design
*GTTEST	TTEST001
*LINREG	Simple Linear Regression Analysis

Abstracts for these programs are available from the Computer Center.

ERRATA SHEET (OSCAR: USER'S MANUAL WITH EXAMPLES)

An ERRATA SHEET for cc-68-26, "Oscar: A User's Manual with Examples", is available as an update for the manual. Users should come by the Computer Center and pick up their ERRATA SHEET so their manuals will be up to date.

HOLIDAY SCHEDULE

The Computer Center office will be closed and machine operations suspended for the holidays on the following dates:

December 25th

January 1st

MIMIC NOW AVAILABLE

MIMIC is a program which simulates an analog computer. It has now been converted to run on OS-3.

For questions about the use of MIMIC, users should call Dave Skinner, ext. 3158.

OS-3 USAGE STATISTICS

For the information of the campus we are providing general statistics on the use of the OS-3 system. The use given here is the total accrued for all users of the system.

In future newsletters we shall attempt to provide additional data on the system.

4.

For the dates November 1 to November 23, OS-3 usage was as follows:

Number of batch jobs run:	5576 jobs
Number of console runs (Logon-Logoff):	8091 jobs
Percent of use from consoles:	66.3 percent
Percent of use from batch:	23.7 percent
Number of console hours used:	2890 hours
CPU time used by all consoles:	63.8 hours
Total number of hours OS-3 was on the air: (11 3/4 hours Mon.-Fri., 4 hours Sat.)	204 hours
Average number of console users:	14.1 users
Amount of CPU time used by an average user for one hour of console time:	52.6 seconds

STATEWIDE PROJECT

The Oregon State University two-year Regional Computer Center Project supported by the National Science Foundation has successfully completed its first six months. The purpose of the grant is to develop and appraise instructional uses of computers. These terminals are at Oregon College of Education, Portland State College, Eastern Oregon College, Southern Oregon College, Oregon Technical Institute, Lane Community College. The use of these terminals has increased by a factor of ten from the one or two faculty and a dozen students that were using the facility last Spring. Eastern Oregon College has ordered two additional teletypewriters to relieve the load of their terminal and are planning on acquiring two more next Fall. The second Regional Computer Center Conference attended by representatives from each school is being held December 5 in Corvallis. There are ten such projects throughout the United States.

ATTENTION: INSTRUCTORS TEACHING COMPUTER COURSES

Instructors who teach computer classes should send their requests to the Computer Center by December 13th for any manuals to be used for Winter term.

LIBRARY AUTOMATION

The OSU Computer Center played host to 35 participants from the Pacific Northwest attending Part II of the Office of Education-sponsored Library Mechanization Workshop, Friday, November 15. A live demonstration of the on-line, time-shared Library Automation Pilot Project, developed at the Center, was given utilizing closed-circuit TV displaying the screen of a cathode ray tube. The demonstration was followed by short demonstrations of the on-line film scheduling system being developed for OSU's Audio-visual Department, and of text manipulation capabilities using EDIT. Participants were given the opportunity to obtain "hands-on" experience with on-line files, using the four teletypewriters and the CRT available to them after the demonstrations. There was enthusiastic response to the potential applications of on-line, time-shared systems to library problems.

A PARTIAL LIST OF UNIVERSITY PROJECTS

The following is a list of some of the projects run by campus users since July 1st.

<u>Department</u>	<u>Project</u>
Entomology	Bumblebee Behavior
Soil Physics	Linear Regression
Forest Research Laboratory	Eigen Values
Oceanography	Activation Analysis
Radiation Center	Fission Products
Physical Education	Steroid Hormone X
Oceanography	CO2 Project
Department of Entomology	C-J Experiment
Oceanography	Weather Analysis
Agricultural Economics	Regression
Agricultural Economics	Utility Analysis
Agricultural Economics	Stepwise Project 544
Honors Program	Honors Program
Forest Research Laboratory	Shrinkage of Wood
Agricultural Economics	Production
Statistics	Mite Survey
Agricultural Economics	Air PollutionP550
Civil Engineering	Terrain Radiation
Biochemistry Biophysics	Sedimentation
Forest Management	Water QualityF803
Dean of Women	Panhellenic Rush
Forest Research Laboratory	Hydrology 1H

Department

Oceanography
Physics
Food Science
Statistics
Oceanography
Agricultural Chemistry
Water Resources Research Institute
Chemistry
FPED Office
Agricultural Economics
Civil Engineering
Radiation Center
Fisheries and Wildlife
Civil Engineering
Statistics
Agricultural Economics
Farm Crops
Geology University of Oregon
Botany
Agricultural Economics
Botany
Division of Continuing Education
Agricultural Economics
Agricultural Economics

Project

Speciation
Photo Emission
Bacteria Study
Rabbit Simulation
Program Development
Rats-Dieldrin WP3
Oregon Lakes
CH 443--Experimental Physical Chemistry
Weather Project
Rec Demand Analysis
CE Library
Monte Carlo
Intrinsic Rate Study
Civil Defense
Biometry Class Work
Economy of Water Pollution
Analysis of Variance
Sediment Texture
Seed Number Estimated
Filbert Project
Fungicides
Scentral or Project
Klamath Lake
Beef

Department

Planning and Institutional Research
Agricultural Economics
Agricultural Economics
Food Science and Technology
Agricultural Economics
Mechanical Engineering
Range Management
Oceanography
Fisheries and Wildlife
Biochemistry Biophysics
Mechanical Engineering
Home Management
Chemistry
Mechanical Engineering
Mathematics
Science Education
Forest Research Laboratory
Statistics
Zoology
Forest Research Laboratory
Electrical Engineering
Civil Engineering
Home Management
Civil Engineering
Chemistry
Alumni Office

Project

Institution Research
Big Game
Water
1968 Green Pea
Pear Project P856
Fluids
Botanical Comp
Marine Ecology
Regression Analysis
Ultra-Cent
Thermoplume Analysis
Management Problems
Crystal Structure Analysis
Heat Transfer
Turing Machine
Matrix Analysis
Forest Product Research
Simulation of Animal Trp
Plethodon
Evaporation Prediction Techniques
Simulation of Power Systems
Dynamic Analysis
Time Records
Beam Design
Thioacetate
Miscellaneous Programs