OREGON STATE UNIVERSITY
COMPUTER CENTER NEWSLETTER

Corvallis, Oregon
(503) 754-2494

Volume IV, Number 2
February 1, 1969

OS-3 HOUR EXTENDED

The Computer Center is pleased to announce that effective about February 15, 1969, the OS-3 operating system will be on the air during the following hours:

Monday - Friday	8 AM - 11 PM
Saturday	8 AM - 12 Noon

An announcement of the exact effective date will be sent to all Computer Center users. This represents another milestone in the continuing development of this OSU time-sharing system. OS-3 has been widely accepted since its successful adoption as the main operating system on July 1, 1968. The many favorable user comments on the utility of OS-3 have been greatly appreciated by the Computer Center.

Other services (MASTER, MSOS, etc.) will continue to be offered on an overnight-batch basis.

NEW I/O ROOM

Effective February 3rd, all input and output will be processed through Kidder 152, across from the computer room. All batch users should submit data and pick up results from room 152. The hours for this room will be:

Monday - Friday	7:30 AM - 11:30 PM
Saturday	7:30 AM - 1:00 PM

RANDOM ACCESS FILES

Random access files are now running under the OS-3 operating system. This feature permits users random access to data items in files.

OPERATING STATISTICS

For the dates January 1 to January 27, 1969, OS-3 usage was as follows:

No. of batch jobs run:	3,374
No. of console runs (LOGON-LOGOFF):	8,211
Percent of use from consoles:	63.8 percent
Percent of use from batch:	36.2 percent
No. of console hours used:	2,966
CPU time used - console and batch:	74.1 hours
Total number of hours OS-3 was on the air: (11 3/4 hrs. Mon.-Fri.; 4 hrs. Sat.)	227.5 hours
Average number of console users:	13.1
Amount of CPU time used by an average user for 1 hour of console time:	57.6 seconds

ATTENTION: FACULTY MEMBERS

As mentioned in the last Computer Center Newsletter, funds are available to interested faculty for two activities:

1). Unsponsored research.

Any faculty member can apply for allocation of computer time for unsponsored research efforts. Student requests must be approved by the major professor. Applications are available from the Computer Center. Individual allocations are normally limited to $1,500 of computer time.

2). To acquaint faculty members with Computer Center facilities.

Any faculty member can request up to five minutes of CPU time for this purpose. The Center is available to provide programming guidance, manuals, or any other assistance required.

SALSETS

SALem SElf Teaching Systems is now available at the Computer Center for demonstration and use. This particular system was developed to allow the user to develop his own educational material and logical sequence of presentation and have it presented via the computer on the CRT without the user being concerned about the computer operations. Contact "Kit" Schoenborn for information on how to make use of the system and for demonstrations.

STATEWIDE PROJECT

Nineteen people attended the teletypewriter maintenance school held January 4 at Corvallis. The purpose of the workshop was to teach students in statewide-project schools about Teletype maintenance. The workshop was conducted by Al Williams of the OSU Computer Center. Eastern Oregon College, Lane Community College, Oregon College of Education, Southern Oregon College, Portland State College and Oregon Technical Institute were represented. Eastern Oregon College and Oregon College of Education now have three teletypewriter terminals; Oregon Technical Institute will soon have two terminals. The other schools each have one teletypewriter connected to the CDC 3300.

PDP-8/CDC 3300 LINKAGE

As mentioned in previous Newsletters, the PDP-8 will serve as a subsystem (satellite) to the CDC 3300. The hardware configuration has been completed and software is being tested. The system will be operational in the near future.

COMPUTER CENTER PUBLICATIONS

cc-68-45	A Brief Description of OSCAR (Second Revision)	J. Davis	11/68
cc-68-50	An Outline for Tape No. 5, "OSCAR" to supplement videotape series, "An Introduction to OS-3"		11/68
cc-69-1	DEFINE and DIRECT (for CDC 3300/OS-3)	Bachelor	1/69

WORKSHOP IN COMPUTER INSTRUCTION

George Rose and Kay Porter held a demonstration of the OS-3 system and the OSCAR language at the Computer Instruction Workshop in Salem. The workshop was offered to secondary teachers. It was sponsored by the Computer Instruction NETWORK of Salem.

OSCAR was compared to BASIC (G.E.) and APL (IBM). Both BASIC and APL appear to be smaller subsets of the OSCAR language. OS-3 and OSCAR have combined advantages of the other languages. OSCAR is much more powerful and flexible than the other conversational languages demonstrated.

*KWOC

A keyword-out-of-context (KWOC) processor is now available in the OS-3 operating system. The program is filed under the name *KWOC.

The routine can be used to generate a "permuted index" to a set of document titles, or, more generally, to a set of variable length records stored in some file. This index then serves as a subject index for the document store.

Subject indexing is conventionally an intellectual effort that relies on knowledge of a subject area and the use of a structured vocabulary from which to choose index terms. Thus, manual subject indexing requires both training and ability and entails a time lag between receipt of a document and its subsequent availability through an index or catalog. The KWOC processor is intended to accomplish subject indexing quickly and automatically.

Input to the program consists of a set of variable length records in the file that is to be indexed. Output is:

1). An alphabetically ordered permuted index, and

2). An alphabetically ordered set of keywords.

Specific program parameters and their default values are as follows:

I= file name or lun of input file; defaults to logical unit 60.

O= file name or lun of output file; defaults to logical unit 61.

S= file name or lun of suppressed word list. This file should contain any words (1 word/record) that are not to be used as keywords. A file of commonly suppressed words is available under the name *SUPPRES. Defaults to a null file.

L= line size, in characters, of output records; default value is 110 characters per line.

B= An internal BCD code used to break an output line if the total output record exceeds the specified line size. Output will then occur in two or more consecutive lines. If B exceeds $(100)_8$ the line will be broken exactly at L characters. Default value is $(60)_8$ = space.

X= delimiting character, not an alphabetic or numeric, where scanning is to begin in each input record. X is an internal BCD code. If no X is specified, scanning will commence at the beginning of each input record.

Y= delimiting character, not an alphabetic or numeric, where scanning is to stop in each input record. Y is an internal BCD code. If no Y is specified, scanning will continue until the end of each input record.

Ordinarily, only the parameters I, O, and S would be given, the other parameters being allowed to default to their preset values.

A detailed manual will be available from the Computer Center in the near future. Questions about use should be directed to G. Rose at the Computer Center (extension 2494) or Frances Spigai at the Library (extension 2917).

An example of the program is given here. A set of titles is contained in the file named TEST. Output is directed to a file named EXAMPLE.

```
#COPY,I=TEST
   KWOC INDEXING, ITS USES AND ABUSES
   LITTLE KNOWN FACTS ABOUT KWOC INDEXING
   MARY HAD A LITTLE LAMB
```

```
#*KWOC,I=TEST,O=EXAMPLE,S=*SUPPRES,L=35
```

```
#COPY,I=EXAMPLE
       ABUSES
                KWOC INDEXING, ITS USES AND ABUSES
       FACTS
                LITTLE KNOWN FACTS ABOUT KWOC
                INDEXING
       HAD
                MARY HAD A LITTLE LAMB
       INDEXING
                KWOC INDEXING, ITS USES AND ABUSES

                LITTLE KNOWN FACTS ABOUT KWOC
                INDEXING
       KNOWN
                LITTLE KNOWN FACTS ABOUT KWOC
                INDEXING
       KWOC
                KWOC INDEXING, ITS USES AND ABUSES

                LITTLE KNOWN FACTS ABOUT KWOC
                INDEXING
       LAMB
                MARY HAD A LITTLE LAMB
       LITTLE
                LITTLE KNOWN FACTS ABOUT KWOC
                INDEXING

                MARY HAD A LITTLE LAMB
       MARY
                MARY HAD A LITTLE LAMB
       USES
                KWOC INDEXING, ITS USES AND ABUSES
       ABUSES
       FACTS
       HAD
       INDEXING
       KNOWN
       KWOC
       LAMB
       LITTLE
       MARY
       USES
```

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

*ECAP

ECAP is an Electronic Circuit Analysis Program.

ECAP is now available under OS-3. The following is a deck structure for using ECAP through batch operation:

```
7
8 JOB,(user #),(identification code)
7
8 TIME = 120
7
8 *ECAP

C   ECAP deck
    goes here

  END
7
8 LOGOFF
```

ECAP can be used through the teletypewriter, but there is a very large amount of output generated.

PARAMETER STRINGS

Parameter strings for the loader may now include names as well as logical unit numbers. However, the library and standard input units, if specified, must refer to logical unit numbers. For example:

```
#LOAD,56
#LOAD,ZIP
#LOAD,37,ZIP,ZAP,SWISH,83
#LOAD,I=56
```

are legal loader calls, although

```
#LOAD,I=ZIP
```

is illegal.

OVERLAYS

In the creation of overlays, the loader equips the logical unit as a file if it is not already defined.

CRT

The loader now accepts records from the CRT displays. However, it will not write a MAP directly onto the screen.

FORTRAN INPUT

The Fortran input routines have been modified so that they unpack EDIT files and/or COSY decks. This feature is automatically invoked on the appearance of data in the format. Certain restrictions on BUFFER I/O on standard units have been removed; however, it is illegal to do both standard or BUFFER I/O on a unit that is being (or has been) used to unpack EDIT files. If more than one logical unit number is used to refer to an EDIT file, the I/O routines will terminate abnormally.

RANDOM ACCESS FILES

Random access files are now available under OS-3. The hardware type is 10_{10} and a random access file may be equipped with a statement of the form:

```
#EQUIP,13=RAF
```

Random access files are devoid of any system-imposed structure and are consequently record-less except as defined in user programs. Random access files should be used only for purposes which require that information be processed in a near-random order. Detailed information on RAF structure will become available in a subsequent write-up.

#

A routine is available on the Fortran library to locate to a word in a random access file

```
CALL SEEK(LUN,IADDRESS)
```

or

```
IF (SEEK(LUN,IADDRESS)) GO TO 6
```

where SEEK is a value defining function whose value is true if IADDRESS is beyond the end of the RAF.

OREGON STATE UNIVERSITY
COMPUTER CENTER NEWSLETTER

Corvallis, Oregon
(503) 754-2494

Volume IV, Number 3
March 1, 1969

NEW OPERATING SCHEDULE

As mentioned in last month's Newsletter, the Computer Center is pleased to announce that effective February 17, 1969, the hours for the OS-3 operating system are from 8 AM to 11 PM Monday through Friday.

Effective Saturday, February 22, 1969, and on the following Saturdays through March 15th, the OS-3 operating system is on from 8 AM to 5 PM. The Saturday hours have been extended to meet the increased demand as the Winter Quarter nears completion.

CHECK-IN WINDOW

The new check-in window in Kidder 152 is open during the following hours:

Monday through Friday 7:30 AM to 12 midnight
Saturdays 7:30 AM to 5 PM through March 15th

Faculty, staff, and private users will receive special service at the door of 152.

PROGRAMMING ASSISTANCE

Programming assistance is available for non-student users.

Hours Monday - Thursday 1:00 - 4:00
in Kidder 76

DIGITIZER RATE

The digitizer rates have been changed to:

(1) $5.00 without operator
(2) $7.50 with operator

OPERATING STATISTICS

For the dates February 1 to February 21, 1969, OS-3 usage was as follows:

No. of batch jobs run:	7058
No. of console runs (LOGON-LOGOFF):	8912
Percent of use from consoles:	55.8 percent
Percent of use from batch:	44.2 percent
No. of console hours used:	3421
CPU time used - console and batch:	67.3 hours
Total number of hours OS-3 was on the air: (11 3/4 hrs. Mon.-Fri.; 4 hrs. Sat.)	211 hours
Average number of console users:	16.2
Amount of CPU time used by an average user for 1 hour of console time:	43.7 seconds

SITE VISIT MADE BY CALIFORNIA OFFICIALS

Several members of the State College System of California visited the OSU Computer Center during February. Visitors included the Director of Instructional Studies, Dean of Academic Planning, Vice President of Academic Affairs, and the Director of Information Systems.

The State College System of California will be installing a CDC 3300 at San Jose State and at the Los Angeles campus. The Computer Center gave demonstrations on the OS-3 time-sharing systems and described the uses of the CRT and Teletype terminals.

Demonstrations of OSCAR, SALSET, UNIQUE, UPDATE and the conversion of A/V records to computer control were included. Various Computer Center projects were discussed and demonstrated. The Library Automation project, the Regional Computer Center project, the Inservice Training of Teachers project, the THEMIS project and computer registration and records were central topics of the meetings.

The group was given a tour of the campus audio visual facilities. The application of closed circuit television for instructional purposes was of interest to the visitors.

DAD'S WEEKEND TOURS

Saturday, March 1, 1969, the Computer Center conducted tours and demonstrations of the OS-3 system for Dad's Weekend. About 300 visitors attended.

PERT/TIME

PERT/TIME has been converted for use on the OS-3 system. For questions regarding its use, contact Dave Skinner, ext. 3158.

REGIONAL COMPUTER CENTER MEETING

A Regional Computer Center winter term meeting is scheduled for March 14, 1969, in Corvallis. Representatives from Eastern Oregon College, Oregon Technical Institute, Oregon College of Education, Lane Community College , Portland State College, and Southern Oregon College will attend.

LIBRARY AUTOMATION PROJECTS

The Administration of Oregon State University has funded the OSU Library Automation Projects beginning January, 1969.

Work is underway in two areas:

(1) to provide computer assistance to the Acquisitions Department of the Library

(2) to provide additional coverage and subject access to depository material and information useful to OSU as a Sea Grant Institution.

A demonstration pilot project utilizing a CRT on-line to the 3300 simulates record-keeping procedures used by the Acquisitions Department. Using the pilot demonstration as a base, suggestions from Librarians regarding record formatting and query logic have been incorporated into 1) a comprehensive record format design which should accomodate any bibliographic record; and 2) searching logic and automatic text editing facilities for the records on file.

A general I/O program accepting on-line input of bibliographic data and automatically creating indexes to these records is expected to be completed in March. Input of requests processed by the Acquisitions Department should begin toward the end of March on a batch basis. When the files have been established with an adequate number of records, on-line input can begin in early April. The computer-aided system will parallel the manual one until all procedures are working to the Acquisitions Department's satisfaction. This time period is anticipated to be between 6 months to 1 year. Depending on the success of the automated acquisitions procedures, procedures in the Serials, Catalog, and Circulation Departments will be attempted next.

The OSU Library is a National depository for progress reports on 3 projects administered by the Bureau of Commercial Fisheries. At the present time, access to these reports is by accession number only; however, a machine-readable catalog and a computer-generated KWOC (Keyword-out-of-context) index to these projects are being created. Descriptive information for approximately 2/3 of these projects has been input. A catalog and KWOC index will be available at the Library by March 15. Information retrieval systems and indexing schemes are being studied for depth subject coverage of the individual progress reports within each project.

A project to provide cumulative author and subject indexes to the last 15 years of Commercial Fisheries Abstracts will be started March 3. This should be completed within 3-4 months.

LOGIN

Effective immediately, the status of teletypewriters for users who are not logged on has been changed. A user must now depress control shift A to enable OS-3 to recognize the LOGIN. After the teletype prints the #, the user has twenty seconds to type his job/user number and a carriage return.

Teletype I/O is unchanged for users who are logged on.

Extensive improvements in the Fortran library have been made. Anyone experiencing unusual problems should contact Jim Meeker in Kidder 52. The previous Fortran library is available under the name *LIB01 for purposes of comparison. (EQUIP,63=*LIB01 to use it in place of *LIB)

SCOOP

By typing *SCOOP a user can get the time in seconds left under his job number.

NEW COMPUTER CENTER PUBLICATIONS

cc-69-2	*KWOC - Automatic Indexing by Keyword	G. Rose F. Spigai	Feb., 1969

COMPUTER REGISTRATION

The following is an excerpt from the Oregon State University Faculty Newsletter.

> Computer Registration: Russell Dix explained that as registration becomes computerized, no radical changes will be made in the current format. Student advisement during preceding term, dean's approval, and use of Coliseum will continue as at present. Instead of making out a schedule, however, the student will submit a "Course Request Card" on which the names and numbers of the courses he would like to take are listed. The data on these cards will be summarized the evening of the first day, adjustments made by department heads in course offerings to fit demand, and an individual schedule run off for each student. The schedule handed to the student the next day will include also an itemized bill of the amount he needs to pay to become registered. Within a few weeks, Mr. Dix said, a parallel run will be made based on last fall's registration and the results of this run made available to students and faculty for comment and suggestion.
>
> For the information of the Council, Registrar Gibbs outlines the step-by-step process by which the new registration program had been developed since 1962. He said that the system is designed to provide for continuing refinement and adjustment. He said the new system might be expected to provide:

1. Maximum attempt to satisfy student's request for courses (5,000 tries).

2. A schedule which fits the course offerings of every school and department on campus into an optimum arrangement.

3. Complete fairness, in accord with institutionally accepted policies, in accepting student's requests for courses. (The computer knows only how to follow instructions.)

4. Balancing of sections, if desired.

5. An eventual integrated student information system which will make possible the processing of endless numbers of reports, all from one basic source.

6. Reduction of information requested from students for registration.

7. Use of remote consoles at many locations on campus to permit instant retrieval of information desired by various offices.

8. The eventual virtual elimination of punched cards as essential documents in data processing.

9. A backlog of information so accurate and complete that it will be possible to project course and staff needs several years in advance at the same time enrollment estimates are being made.

Registrar Gibbs said we could not expect from the change:

1. Opportunities for students in courses where staffing is not adequate to meet the demands. (No registration system can do that.)

2. A registration system as sophisticated and streamlined in the beginning as it will eventually become. Each change must be as thoroughly tested as possible.

3. An error-free system in the beginning. (No new system can be error-free. The present system is susceptible to errors by students and staff, but as will be the case with the new system, ways are developed to correct the errors.)

In summary, Gibbs said that much work has been completed but a good deal remains to be done. When ready, the complete plan will be presented to the Council.

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

OPTIMIZATION HINTS

The following is a list of hints on how to optimize your FORTRAN coding in order to achieve better accuracy in calculations and to increase the speed of execution of your programs in general.

1. Analyze the problem before programming. The information obtained can be used to simplify the problem and speed up the numerical procedure.

2. Use a minimum of mixed-mode arithmetic. The extra coding generated can in some cases take more time to execute than the arithmetic itself. Use X=0.0 instead of X=0, I=0 instead of I=0.0.

3. Avoid using SUBROUTINES and FUNCTIONS for small repeated tasks.

4. Arrange the program logic to avoid branches whenever possible.

5. Make the most probable result of all logical IF statements a simple drop through instead of a branch.

6. Use logical IF's instead of arithmetic IF's.

7. Choose variable types to avoid conversions (i.e., mixed modes) whenever possible.

8. Reduce input-output to the minimum necessary.

9. Use implied DO LOOPS in input-output in place of I/O within ACTUAL DO LOOPS where possible.

10. Calculate all quantities which are constant through a program at the beginning, and calculate all quantities constant throughout a loop outside the loop.

    For example:

```
    DO 20 I=1,450
20  C(I+3,2*I+1)=(D*(I+2))**(2*K+E-2*L-1
```

should be written

```
    M=2*K
    F=E-2*L-1
    DO 20 J=3,452
20  C(J+1,2*J-3)=(D*J)**M+F
```

11. Use as few subscripts as possible on arrays (i.e., use A(720) instead of A(12,6,10))

12. Use UNCONDITIONAL GO TO's instead of COMPUTED GO TO's.

13. (a) Use logical IF's instead of 2-way GO TO's.

e.g. Inefficient

```
    IF(DOG)14,23,14
 14 X=X+1
    =
    =
 23 X=X-1
```

Good

```
    IF(DOG.EQ.0)GO TO 23
    X=X+1
    =
    =
 23 X=X-1
```

Better

```
    IF(DOG.EQ.0)23,14
 14 X=X+1
    =
    =
 23 X=X-1
```

Best

```
    IF(.NOT.DOG)GO TO 23
    X=X+1
    =
    =
 23 X=X-1
```

Using a logical IF here is more efficient because it generates less coding and executes faster than the arithmetic IF.

14. Using IF statements to determine conditional branches of more than three labels is less efficient than using unconditional or computed GO TO's. The computed GO TO uses more overhead time and space than the unconditional GO TO but it still is better than a set of IF statements.

15. Where possible pass variables to SUBROUTINES through COMMON instead of using parameter lists; this saves much time because addresses do not have to be passed down to the subroutine for the variables in the calling sequence. However, do not pass index variables through COMMON. Use of the VALUE declaration is best in the case of index variables.

16. Do not test for equal using floating-point variables, because of roundoff error in low-order bit. Use .GE. or .LE.

17. Use SQRT instead of **.5, since the SQRT routine is faster than the logarithms routine used to evaluate expressions of the form X**R.* X**R is computed through e(R*LNX).

18. For small powers, use A*A*A... or A**I with I=R instead of A**R, where R is a floating point integer; values

raised to integer powers are computed by repetitive multiplication, whereas values raised to real powers are computed by using logarithm and exponential routines.

19. Use Buffer I/O for scratch units or Binary I/O as a second choice. FORMATS waste time and space.

CHANGES IN THE OS-3 FORTRAN COMPILER

Numerous improvements have been made in the OS-3 Fortran Compiler.

The following three declarative statements have been added:

COMPLEX List	a type declaration which declares the variables in the list to be of type COMPLEX.
DOUBLE PRECISION List	a type declaration which declares the variables in the list to be double precision real.
VALUE List	a declaration which may appear in a subroutine or function. The effect is similar to the VALUE declaration in ALGOL in that more efficient code is generated. Identifiers in the list must be formal parameters and used as simple variables within the program unit.

The TYPE other List declaration has been modified so that as many as four other names may be used. COMPLEX, DOUBLE PRECISION, and REAL1 declarations each subtract one from the number of type other names that may be used. Mixed mode arithmetic between two type others is not allowed. For example, if X is COMPLEX and D is DOUBLE PRECISION, statements of the form X=D or X=X+D, etc. will generate appropriate compiler diagnostics.

Along with other improvements in declarative statements, the limit of only 64 declarations has been removed.

Two improvements have been made in the handling of constants. The question mark on a teletype (^ on a CRT or Line Printer) was

previously the internal representation for end-of-line. This resulted in a syntax error in format statement or hollerith constant when attempts were made to put it into hollerith constants or format statements. The internal code for end-of-line has now been modified so that all 64 characters are legal in both places.

For example:

```
      101 FORMAT (X'WHO IS THE FAIREST IN THE LAND?')
and       K=4HZAP?
```

are both legal now.

A new type of constant has been implemented. Two word decimal integers may be compiled by adding a D after the last digit.

For example:

```
      X=78D
```

will have the same effect as

```
      X=0000000000000116B
```

This is particularly useful since the FORTRAN equivalent of

```
      7
      8EQUIP,8=61
```

may be represented as

```
      CALL EQUIP(8,61D).
```

In addition, numerous improvements have been made in the quality of FORTRAN Assembly listings and the code written for Fortran programs.

For any questions regarding this compiler, contact Jim Meeker at extension 3158.

OREGON STATE UNIVERSITY
COMPUTER CENTER NEWSLETTER

Corvallis, Oregon
(503) 754-2494

Volume IV, Number 4
April 1, 1969

Acting Director: Larry C. Hunter

Editor: Kay Porter

VIDEO TAPE COURSES

The Spring schedule for the Computer Center video tape courses is as follows:

Introduction to EDP by Kay Porter; April 14-18; 4-5 p.m.; Channel 5; Batchellor 105

Introduction to FORTRAN by Dave Niess; April 21-25; 4-5 p.m.; Channel 5; Batchellor 105

Introduction to OS-3 by Walt Massie; April 28-May 1; May 5-8; 4-5 p.m.; Channel 5; Batchellor 105

These courses are open to all University professors and students.

NEW COMPUTER CENTER DEVELOPMENTS

1) The Computer Center has added an additional 16K (words) of computer memory to the 3300 system. This was done to:

a. Expand terminal network

b. Provide improved response time for terminal users

2) PDP-8 will become operational during the first part of April. One of the main functions of the PDP-8 will be to serve as a time division multiplexor for remote terminals. With the PDP-8, up to 60 concurrent teletypewriter users may be on-line to the CDC 3300.

DEMONSTRATION ON OS-3

A presentation and demonstration of the OS-3 operating system was given to two groups of Control Data Management and Systems personnel in Minneapolis on March 27 and 28.

CDC commented that OS-3 was a "really impressive operating system". CDC is interested in OS-3 for time-sharing applications on the CDC 3300/ 3500 computer systems.

NEW PROPOSALS SUBMITTED BY COMPUTER CENTER

Proposal submitted to NSF:

The Computer Center of Oregon State University requested National Science Foundation support over a two-year period for a project to promote an improved understanding of and training in computers for all faculty and students. It was proposed to (1) develop instructional materials suitable to the needs of the variety of individuals and groups who use the computer facility, (2) expand the existing network of on-line terminals on campus, and (3) establish an instrumented instructional computer laboratory. This laboratory will include console facilities, staff assistance and instructional materials for use by all of the University in learning and understanding computers and computing.

This project will complement the on-going and rapidly expanding curricular developments at OSU involving computer use in regular academic course offerings.

Proposal submitted to CDC:

The operating system developed at OSU is receiving wide-spread recognition as providing a powerful time-sharing computing utility for the Control Data 3300, the Center's primary computer system. Serving as a regional computer center, a network of more than seventy remote computer terminals has been installed on campus and at other colleges in Oregon, and access to the full facilities of the CDC 3300 is now available from administrative offices, laboratories and classrooms over some thirty ordinary telephone lines.

The Oregon State University Computer Center has requested support from Control Data Corporation to assist in the continuation of this research program and to extend the scope of certain projects. This research support would be divided into four general categories:

1. Operating System Development
2. Language Development
3. Management Information Systems
4. Scientific Applications Programs

A Control Data Corporation sponsored research grant for a one-year period is requested to assist the Oregon State University Computer Center in continuing the computing research program. The use of an additional 32K words of system storage for the same time period is also requested as a part of the grant. The additional storage capacity is required for the proposed operating system development. Specifically, the expansion of OS-3 to accommodate additional users and new remote computing products and capabilities. Up to eighty concurrent users are planned for the system.

PERT/COST

PERT/COST has been converted for use on the OS-3 system. For questions regarding its use, contact Dave Skinner, ext. 3158.

NEW COMPUTER CENTER PUBLICATIONS

cc-69-3	DECKLIST Routine for CDC 3300/OS-3 Version 2.2	Bachelor	3/69
cc-69-4	OSU Computer Center Program Library Catalog		3/69

OPERATING STATISTICS

For the dates March 1 to March 25, 1969, OS-3 usage was as follows:

No. of batch jobs run:	12,423
No. of console runs (LOGON-LOGOFF):	12,797
Percent of use from consoles:	51 percent
Percent of use from batch:	49 percent
No. of console hours used:	4,896
CPU time used - console and batch:	107.2 hours
Total number of hours OS-3 was on the air: (15 hrs. Mon.-Fri.; 9 hrs. Sat.)	291 hours
Average number of console users:	16.8
Amount of CPU time used by an average user for 1 hour of console time:	44 seconds

REGIONAL COMPUTER CENTER MEETING

The Regional Computer Center Meeting was held on March 14. Jo Ann Baughman, Project Director, discussed the NSF Meeting of all regional computer centers that was held on March 12 in Washington, D. C.

Evaluation of the project was discussed and Greg Thomas (Teaching Research Division) told of the need to assign individual job numbers for students, or classes, so more detailed data can be collected for evaluation. Each school has been assigned ten job numbers with a maximum of 1,000 validation codes.

Jim Haefer (OTI) presided over a discussion of the project in general. Suggestions were offered by Carl Schwendiman (SOC) to create a data bank of information on the state of Oregon on a public file basis so that each school might have access to items such as (1) economic data, (2) status of bills in the legislature, and (3) what courses in data processing are taught around the state. SOC is currently formulating its own data bank on a public file.

It was discussed that each school has a problem of knowing what the other schools are teaching in the area of computer courses.

The schools talked about the problem of freeing teaching staff to learn to use the computer. Many instructors have expressed the need for more time (release from teaching assignments) to learn the computer. It was suggested by Harold Mason (OCE) that we might appeal to the Inter-institutional Committee on Computer Activities for a joint meeting to discuss this problem. Recommendations for the next year included:

1) Establish a data base.
2) Release staff from teaching assignments to use the computer.
3) Establish test banks.
4) Make course calculations more complex so instructors can use the machine to do calculations. This must originate within the faculty, however.

Other problems discussed were:

1) Shortage of Teletype terminals - the volume and number of users has presented problems.
2) Some faculty members have shown resistance to innovation until under pressure from students. We need to get faculty more involved.
3) We have created a computer culture. It is expanding. Now we need:
   a) more terminals
   b) more CPU time
   c) more on-line time
4) Measurement of student attitudes should be evaluated.

Dr. Hunter (Acting Director, Computer Center) talked about "where we go from here".

What we have accomplished thus far:

1) OS-3 hours have been extended. This gives users more available time.
2) PDP-8 will be up beginning Spring term. We will get more data phones soon. We will be able to support sixty teletypes simultaneously.
3) We will have an additional 16K soon

Longer range plans:

4) System will be up graded in Fall, 1969 to a CDC 3500 with 98K and a maximum of 80 active users.
5) Remote Job Entry will be available some time in April.
6) Seminars in OSCAR and FORTRAN have been given to departments and graduate students. The departments have been quite receptive to the seminars.

Interim reports were due from each participating school on March 21 for Winter term.

The big report from each school for the whole year should be in to Jo Ann Baughman by July 1.

NEW VERSION OF OSCAR

A new version of OSCAR (V54) has been released. There are a number of changes and improvements over version 53. Changes include:

1) Change from @ to $
2) Change in READCHAR statement
3) In & commands, OSCAR will now use the first 8 characters of long names

Improvements include:

1) ENTIER and FP
2) $ can be substituted for ;
3) In & commands for stored programs, error messages now indicate which step was being executed
4) OSCAR translator can handle longer lines
5) References to constants
6) OSCAR V54 tells user when a record is too long (more than 136 characters)

Other features have been extended and new features have been implemented.

There will be an addendum issued shortly to be added to the existing OSCAR manual. This addendum discusses all changes and additions in the new version of OSCAR.

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

TEXT EDITOR FOR CRT'S

A text editor is now available for CRT terminals. It is called EDIT and is effectively the same as the teletype editor with three primary changes: the send mark is equivalent to return followed by an escape; the return mark is the same as the return on a Teletype. Several commands may be put on the screen by ending each one with a return mark, as long as each one except the last does not create output or enter into text mode.

Note that insert, replace, append should be ended with a return mark and the associated text should be typed on the following lines.

OREGON STATE UNIVERSITY
COMPUTER CENTER NEWSLETTER

Corvallis, Oregon
(503) 754-2494

Volume IV, Number 5
May 1, 1969

Acting Director: Larry C. Hunter

Editor: Kay Porter

COMPUTER CENTER DEVELOPMENTS

PDP-8 Interface/Multiplexor

The PDP-8 satellite computer has been operating on-line since April 9. The system acts as a multiplexor for the remote terminals. The system has served up to 45 remote users simultaneously.

CCI Remote Terminal

The CCI remote terminal, which looks like a teletypewriter to the CDC 3300 computer but can be used much as the CRT data displays, is now being used on the OSU campus. To facilitate the use of this device to its fullest capability for the Fortran programmer, a utility package written in Compass is available from the Computer Center Program Library. This allows the Fortran user to have at his command most of the function codes which are handled in ASCII code. Contact the Computer Center office for a copy of this set of subroutines. The package is on-line; *CCI is a Cosy 'deck' of the program and *XCCI is the binary 'deck'. For further explanation of operational details of this utility package contact 'Kit' Schoenborn or Harvey Thoennes.

Charges for OS-3 Saved File Blocks

An increase in the monthly rates charged for OS-3 saved file blocks is being planned for July 1, 1969. An analysis has shown that the current rate for on-line file storage is too low to recover the actual costs of the disk hardware. The Computer Center will be glad to discuss on-line storage costs, particularly for those applications which have unusually large storage requirements. New charges will be determined and announced by June 1.

OPERATING STATISTICS

For the dates April 1 to April 25, 1969, OS-3 usage was as follows:

No. of batch jobs run:	4,216
No. of console runs (LOGON-LOGOFF):	12,673
Percent of use from consoles:	75 percent
Percent of use from batch:	25 percent
No. of consoles hours used:	4,503
CPU time used - console and batch:	109.4 hours
Total number of hours OS-3 was on the air: (15 hrs. Mon.-Fri.; 4 hrs. Sat.)	286 hours
Average number of console users:	15.7
Amount of CPU time used by an average user for 1 hour of console time:	60.1 seconds

NEW COMPUTER CENTER PUBLICATIONS

cc-69-5 MIMIC - A Digital-Analog Simulator by Dave Skinner.

cc-69-6 New Version of OSCAR (Addendum to "A Brief Description of OSCAR" cc-68-45) by Gil Bachelor.

cc-69-7 RADAR (Revised) by James W. Meeker.

PERSONNEL

Thomas Brantner, previously an Assistant In for the Computer Center, is Assistant to the Director, effective April 1. He will assume many administrative and business activities of the Computer Center.

PAPERS PRESENTED

AEDS Convention, May 6-9

Dr. Larry C. Hunter will present two papers at the National Association for Educational Data Systems Convention in Portland this month. The first paper is on the Regional Computer Center Project at OSU, and will be given jointly by Dr. Hunter and Mrs. Jo Ann Baughman. The second paper is on Time Sharing in Higher Education.

The OSU time sharing system and its uses in higher education will be described. The conference is to be held at the Hilton Hotel in downtown Portland.

Spring Joint Computer Conference, May 14-16

George Rose will present a paper on the Oregon State Open Shop Operating System (OS-3) to the SJCC being held in Boston this month. The paper was written by Jim Meeker, Ron Crandall, Fred Dayton and George Rose, all of the OSU Computer Center.

FOCUS Meeting, May 27

George Rose will give a paper about the OS-3 system to the FOCUS meeting May 27 in Minneapolis. FOCUS is the computer user's group for Control Data Corporation.

NSF Presentation

Jo Ann Baughman was in Washington, D. C. in April to assist in a presentation of OS-3 given to NSF by Dr. D. D. Aufenkamp. Dr. Aufenkamp addressed a Computer and Information Sciences Seminar on the topic of "Educational Use of Computers at Oregon State University." Selected examples of instructional, research and institutional management uses were illustrated at a television-like console connected through the telephone network to the OSU computer in Corvallis.

While in the east, Jo Ann visited Woods Hole, on Cape Cod. Woods Hole is an Oceanographic Center in the area.

She also visited the University of Michigan in Ann Arbor and toured the computer center facilities there. The University of Michigan has done much research on computers in college learning.

DATES SET FOR SPRING REGIONAL CONFERENCE

The spring meeting of the Regional Computer Center schools has been set for June 5 and 6. The meetings will be concerned with evaluation of the project and curriculum development. Representatives from Eastern Oregon College, Southern Oregon College, Oregon Technical Institute, Oregon College of Education, Portland State University, and Lane Community College will attend the conference.

COMPUTER ASSISTED SCHEDULING

During the Spring term registration the final parallel run of computer assisted scheduling was completed. Data from 12,300 students was entered, about 88,000 cards, of which approximately 63,000 were course cards, were handled.

The summary of course requests were completed within the specified time. This is the summary that will be presented to the Deans and Department heads during the Fall 1969 term. From this they will be able to determine the best administrative action to take with respect to opening, closing and combining course offerings, before the students are actually scheduled by the computer.

The scheduling run for the 12,000+ students was completed in an amazing record time (slightly over eight minutes of CPU time). The program was quite large and required that the OS-3 system swap parts of it during operation. Kit Schoenborn, Research Associate/ Systems Analyst stated that the present program was capable of handling 60,000 students and that the program, as it is to be modified for the Winter term, will allow for 240,000 students to be scheduled at one time with complete backup/restart capabilities. Further, he has stated that if the program were to be rerun at this time, with the additional 16K of memory, completion time would be significantly reduced. It is estimated that the on-line student data management system now being implemented under SIDIR will be capable of handling complete university records of 60,000 students.

IN-SERVICE TRAINING OF TEACHERS IN COMPUTER CONCEPTS

The Oregon State University Computer Center is implementing a two-year pilot project (NSF GJ116) for the ultimate upgrading and expansion of secondary school teachers in computer technology and applications. This is being accomplished through:

1. The development of multi-media audiovisual materials for training in computer concepts.
2. The development of resource sets for subject area applications.
3. The pre-service and in-service training of teachers using the tested materials and resource sets.

This project is being carried out with the cooperation and assistance of the Teaching Research Division of the Oregon State System of Higher Education and the Computer Instruction NETWORK, an E.S.E.A. Title III program for secondary school computer instruction.

The course is being taught in eleven experimental classes thoughout the state of Oregon during Spring term, 1969. It is offered for 3 hours credit, under the Division of Continuing Education. The course is called: Ed. 507, "Introduction to Computers for Teachers." Over 500 teachers are enrolled in the course.

"COMPUTERS/TEACHERS: A BEGINNING"

Course description of Ed. 507, Introduction to Computers for Teachers.

COMPUTERS/TEACHERS is designed as a non-technical course for secondary teachers from all subject areas. It introduces teachers to the computer: its nature and use, its impact on education and the curriculum, and its effect on society. The materials developed will support 30-40 classroom hours of instruction. The five major sections are:

I. What is a Computer?

Relative capabilities of man and computer, man's role in a machine system, components of a computer system, computer functional units and hardware, the binary number system, data representation, and the generations of computers.

II. How Does a Computer Solve Problems and Make Decisions?

Man's problem-solving processes, computer problem-solving techniques, decision making bases - qualitative or quantitative, preparing problems for computer solution, problems suited to computer solution, special problem-solving techniques of Management Science.

III. How Can I Communicate with a Computer?

Man-man communication and man-machine communication, programming in machine, assembly, and compiler level languages, the compilation process, time-sharing systems, teleprocessing.

IV. How are Computers Used in Education?

Computer-Assisted Instruction, Computer-Managed Instruction, Computer-Extended Instruction, the computer as the object of instruction, the computer as a problem-solving tool. Specific curricular applications in mathematics, science, social studies, business education.

V. What are the Social and Cultural Implications of the Computer Age?

The work ethic, the computer and personal privacy, the computer utility, projections to the year 2000.

Broad course goals are to remove the mystery and misconceptions about computers, to place man and machine in perspective, to increase the creative use of computers as tools by the teacher, and to provide a basis for further study.

EXPRESS KEYPUNCH SERVICE

An express keypunch service will be offered by the Computer Center. For express work a user must have no more than 200 cards to be keypunched and the job will not be verified. Any express jobs in by noon will be completed by noon the following work day. If you wish express keypunching be sure to call it to the attention of the acting keypunch supervisor, Verna Wohlers.

CHANGES IN SATURDAY OS-3 SCHEDULE

Starting May 17, the Saturday hours will be extended from 8:00 a.m. to 5:00 p.m. every Saturday.

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

In Fortran, when comparing two real cells, containing Hollerith (character) values, for character equality, a floating point subtract (FSB) is performed. This can produce an indication of equality between two values which are not equal in the Hollerith sense but are equal in the floating point sense.

Example:

```
.
.
.
X = 8HAEMO0083
Y = 8HAG99-021
IF (A.EQ.B) STOP 111
.
.
.
```

This simple set of statements will indicate equality between A & B.

OREGON STATE UNIVERSITY
COMPUTER CENTER NEWSLETTER

Corvallis, Oregon
(503) 754-2494

Volume IV, Number 6
June 1, 1969

Acting Director: Larry C. Hunter

Editor: Kay Porter

BURSTING AND DECOLLATING SERVICE

The Computer Center now offers a bursting and deleaving (decollating) service. The rate is $5 per hour. The burster can burst up to 6-ply, and is equipped with an edge and center trimmer. It will handle widths from 4" to 20" and lengths from 2 5/6" to 11".

The deleaver handles forms from 4" to 20" in width and 7" to 14" length folds. Forms can be either unfastened or crimped.

SCHEDULE OF SHORT COURSES

The summer schedule for the Computer Center videotape short courses is as follows:

Introduction to EDP - July 7-11
Introduction to FORTRAN - July 14-18
Introduction to OS-3 - July 21-24, July 28-31

Videotapes will be shown in K 278 and K 280 from 3-4 p.m. The courses are open to all university professors and students.

NEW RATES ON DISK STORAGE

The new rate for saved file blocks is 15¢/file block, effective July 1. A file block = 512 words or 2048 characters.

PERSONNEL

Dorothy (Dot) Brown has joined our staff as the new senior secretary. She will replace Karen Hall, who has moved to California.

Gary Hoselton has joined the Computer Center staff on a full-time basis as an Assistant In. Gary has been employed for four years on a part-time student basis at the Computer Center and has contributed much in regards to research work done on the Nebula Project, the PDP-8 Message Switching System and in several other areas. Gary will be assigned additional responsibilities in hardware research and development activities in the On-Line Hardware and Software Development Group, managed by James Fryklund.

REGIONAL COMPUTER CENTER SPRING MEETING

The Spring meeting of the Regional Computer Center schools was held June 5 and 6. Members of the ICCA (Interinstitutional Committee on Computer Activities) were guests at the meeting. July 1 will mark the end of the first year of the two-year Regional Computer Center grant.

OPERATING STATISTICS

In the last two weeks of May, sixty terminal users have been on-line simultaneously.

For the dates May 1 to May 28, 1969, OS-3 usage was as follows:

No. of batch jobs run:	11,541
No. of console runs (LOGON-LOGOFF):	18,385
No. of console hours used:	5,814
CPU time used - console and batch:	141.3 hours
Total number of hours OS-3 was on the air: (15 hrs. Mon.-Fri.; 9 hrs. Sat.)	346 hours
Average number of console users:	16.8
Amount of CPU time used by an average user for 1 hour of console time:	49.5 seconds

USASCII COBOL

USASCII COBOL is being included under the OS-3 operating system. A preliminary version of the COBOL computer will be available for limited use in June. A detailed announcement will be issued soon, but interested users can contact the Computer Center now for more information.

NEW COMPUTER CENTER PUBLICATIONS

cc-68-8 Using the Plotter: Documentation and Examples (Revised) by Jo Ann Baughman and Dean Pielstick

cc-68-9 An Introduction to the ATHENA Computer by Brian Dumont

cc-68-10 OSU Computer Center User's Manual (Revised) by Ronald A. Davis and Catherine M. Porter

COMPUTER REGISTRATION

Wallace Gibbs presented to the Administrative Council the following recommendations from the Registration and Scheduling Committee:

1) Implementation of Computer-assisted registration Fall Term, 1969.

The outline of the new plan follows:

a. Registration Day (September 25, 1969; January 5, 1970; March 30, 1970)

8:00 - 6:15 - Coliseum procedure of students picking up Course Request Cards. Seniors first, 8:00 a.m. - 9:45 a.m., and others 10:00 a.m. continuously to 6:15 p.m. by alphabetical sequence.

6:30 p.m. - 9:00 p.m. - Summarizing Course Request Cards to form Course Request Summary. (Computer Center)

9:30 p.m. - 11:00 p.m. - Review of Course Request Summary by deans and department heads. Updating Schedule of Classes to meet demand. (Kidder or Dearborn Hall)

b. Second Day (September 26, 1969; January 6, 1970; March 31, 1970)

12:00 midnight - 7:00 a.m. - Sectioning of students and printing of Class Schedules. (Computer Center)

1:00 p.m. - 3:00 p.m. - (9:00 a.m. to 11:00 a.m. Winter and Spring Terms) Distribution of Class Schedules and Payment of Tuition and Fees. (Payment of fees to continue for several days in a central location, as determined by the Business Office)

c. Classes Begin

Fall term - 8:00 a.m., Monday, September 29, 1969
Winter term - 1:00 p.m., Tuesday, January 6, 1970
Spring term - 1:00 p.m., Tuesday, March 31, 1970

2) Free Time

a. Work - students who must work part-time will be protected from class scheduling during hours that have been verified as necessary to be available for work by the employer. Confirmation of hours must reach the Office of the Registrar at least seven days before the first day of registration for the term in question.

b. Varsity athletics - student-athletes participating in varsity athletics will be protected from class scheduling under the following conditions:

Sport	Term	Times
Football	Fall	2:00 p.m. and after
Basketball	Fall, Winter	2:00 p.m. and after
Track	Spring	3:00 p.m. and after
Baseball	Spring	All afternoon
Wrestling	Winter	3:00 p.m. and after
Swimming	Winter	4:00 p.m. and after
Golf	Spring	2:00 p.m. and after
Tennis	Spring	3:00 p.m. and after
Crew	Spring	4:00 p.m. and after

Appropriate lists for each sport must reach the Office of the Registrar at least 7 days before the first day of registration for the term in question.

c. Conflicts - in the event that a time conflict is unavoidable in the areas outlined above, the class schedule will take precedence.

d. Lunch hour - in any event, one of the three hours (11:00 a.m, 12:00 noon, or 1:00 p.m.) will be reserved for lunch.

e. Student groups - Talons and Thanes service organizations will be permitted to register with the seniors because of their assistance with the registration procedures.

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

NEW PROGRAM: *RECORD

Frequently, a CRT user would like to have a "hard" copy of the information which is on his screen. A new program, called *RECORD, is now available for this purpose. To use it, the CRT user types

≠*RECORD,(lun)

on his screen and presses SEND. The words HIT SEND will appear on the screen. The use can blank out these words, or change anything on the screen he desires, or leave it as is. When he presses SEND, *RECORD will read the entire screen, and write 20 records of information on the specified logical unit (lun). The first two characters of each record will be blanks, and the records will be from 1 to 13 words long, as necessary. Carriage return marks and anything to the right of a carriage return will not be recorded. When *RECORD is finished, it returns the user to control mode (≠).

If the specified logical unit is not equipped, *RECORD will equip it as a file. Use of *RECORD destroys the status of any program which may have been running. However, *RECORD runs in upper memory and does not destroy any information in lower memory. Hence, it is possible to return to certain lower memory programs that recognize manual interrupt (≠MI). OSCAR is an example of such a program. (OSCAR also has a RECORD mode, in which all inputs and outputs that are displayed on the screen, are also recorded.)

CHANGES IN DEFINE AND DIRECT

Some changes have been made in DEFINE and DIRECT since the publication (cc-69-1) was issued. One change allows users to specify a directory name other than the usual DIRECTRY. In using DEFINE, one can include an argument of the form D=(name) to specify the name of a directory. For example:

*DEFINE,3=PROG,ZAP?,D=DIR,DAT5/OLDDAT

the D parameter is effective only for the particular DEFINE statement in which it occurs. (It has no effect on subsequent DEFINE statements; DEFINE will always use DIRECTRY as the directory name unless there is a

D parameter in the statement.)

To specify a directory name when using DIRECT, simply include the name as a parameter. For example:

*DIRECT,12,DIR

This will cause DIRECT to use DIR as the directory, and it will print the directory on logical unit 12. In using DIRECT, one can specify a logical unit number for printed output, or a name for the directory, or both or neither of these. DIRECT uses 61 for printed output if no unit is specified, and it uses DIRECTRY as directing name if no name is specified.

Another change has been made in DEFINE. When used at a CRT, and errors occur, DEFINE displays all the error messages at once. When the user has finished reading the messages, he may press SEND to return to control mode.

DEFINE now runs in upper memory, and does not destroy any information in lower memory. It does, of course, destroy the status of any program that may have been running when DEFINE was called.

Some users have had the experience of "losing" their DIRECTRY's. This is quite likely to happen if the system goes "down" while the user is using EDIT. The reason is that, when EDIT is called, it immediately equips the user's DIRECTRY (if he has one) and keeps it equipped until the user types the EDIT command]EDIT, or calls a library program. Thus, if one is using EDIT and has referred to any saved files in EDIT commands, his DIRECTRY is in an "unsafe" condition, and will be lost if the system fails.

One can also get a spurious indication that his DIRECTRY does not exist. If two people are using the same job/user number, and one of them is using EDIT, then the DIRECTRY is not available to the other user. A defect in OS-3 causes it to give the "non-existent" indication, when it should say that the file is "busy".

DIMENSION INFORMATION

OS-3 FORTRAN now allows dimension information to be included in type declarations. For example, the following declarations are legal:

```
INTEGER X(20,20),Q,S,(2,3,3)
COMPLEX Z(30,30),BETA(200)
```

*LIBBIBL

*LIBBIBL is a public file of names of other files containing bibliographies on various subjects. *LIBBIBL is experimental; comments are welcome - call Larry Auld, Library (ext. 1641).

LABEL PROGRAM CONVERSION

Effective immediately, users that have programs producing labels, please convert the carriage control character on all lines except the first of every label to a W. The carriage control character for the first line is a 3. This causes a skip to level 6 on the carriage tape. Level 6 happens to be 1 inch apart all the way around the carriage tape.

Example:

```
500 Format (1H3,'OSU Computer Center'/1HW,
'Kidder Hall'/1HW,'Corvallis, OR 97330')

Write (61,500)
```

SOME STUDENT COMMENTS ON TIMESHARING

During Winter quarter, a one-hour class was offered in use of the OS-3 timesharing system at a college which also has an IBM 1130. The purpose of the class was to teach students the operation of the teletype and generate additional faculty and student interest in the remote terminal. At the end of the class, the students were asked to evaluate the teletype as a remote terminal. One of the questions asked the students was "In your opinion, how does running a Fortran problem on the teletype compare with running one on the 1130?" Seven out of ten of the students thought that running a problem on the teletype was much easier and faster than on the 1130. They like the editing capabilities of the teletype. Some of their comments to this question follow:

"Running a Fortran problem on the teletype is faster and easier than running one on the 1130. The keyboard on the teletype is more convenient than the keyboard on the keypunch."

"You can make corrections easier and faster...It is more enjoyable because we have direct contact with it (the computer), and we run it ourselves."

"The teletype system seems to be a quicker, easier system to operate as far as executing a Fortran program. This is due to the fact that the syntax errors can be easily corrected. And, what seems to be the big factor, is computer availability. Once connected to the teletype system, time loss due to waiting to be on the system is not limiting as with the 1130."

"I felt that it was easier, after the initial orientation, to run a program on the teletype...I would rather use the teletype than the 1130."

"I feel that running a Fortran program on the teletype is much more efficient than with the 1130. With the 1130 you must have your control cards and the program must be punched on cards which must then be run to find your errors. With the teletype, you can type your program directly into a storage area, run a list, and make your corrections much quicker and much more efficiently. I think one of the biggest advantages of the teletype over the 1130 is the ability to use free form input where the 1130 requires exact formating on input data."

Other comments indicate that there was little difference or they preferred to use the 1130. Some of their comments follow:

"It is my personal preference to utilize the 1130 over the teletype for running a Fortran problem. Possibly this is only because of my more familiar background with the 1130. The computer center at OSU seems very "remote" and in light of my limited background, I find it hard to comprehend the mechanics of what is happening there. On the other hand, the hardware of the 1130 is visible, and to me, easier to comprehend in terms of operation, e.g., input, processing, and output."

"I thought it was very similar in the method of setup. In actual running, it depended on traffic as to how fast it was. I thought the teletype would be useful for short answer problems, but for any detailed output it would be impractical."

"Running a Fortran problem on the teletype is the same as the 1130 for the programs that I have run."

Another question was "Do you think there is a need of the teletype on our campus?" "Why?" All of the students replied in the affirmative. Some of their responses follow:

"Yes! For each teletype it is almost the same as another computer on campus. The possibilities are almost unlimited. It would be to the advantage of each department to know of its capabilities pertaining to their field. And a great advantage to business administration majors to learn of the possibilities of time-sharing."

"There will be a definite need for the teletype in years to come when the computer is in steady use. Also to run programs that the 1130 is not capable of handling."

"Yes. Remote computer access becomes of increasing importance; the teletype provides actual experience for the student who may become involved with such a system upon graduation. The OSCAR language aspect of the teletype provides a tool for research and to applied mathematics problems. The statistical public files available through the teletype should prove quite valuable to the students and faculty once their existence is more widely known."

"The teletype adds the resource of the CDC 3300 which is physically a larger and more complete computer. It gives the student a chance to enlarge the scope of his knowledge of computers that would not be available without the teletype system. It can and I believe has been used for research as well as instruction. This is a factor that cannot be overlooked. With this facility and the other computer, a school can offer the student a very broad introduction to computers."

"Yes, there is a need for a teletype on our campus for purposes of research and familiarization of students, such as myself, who are interested in this type of system. It is good to be able to communicate with the facilities at OSU. The potential through the use of the teletype is much greater than what can be done with the 1130. This system would make it practical for people from several different schools to do work on the same project together."

PUBLICATIONS

J. Fryklund and W. A. Loveland published a paper in the January, 1969 issue of the "IBM Journal of Research and Development", titled Use of a Time-sharing Computer in Nuclear Chemistry. The data-link between a pulse-height analyzer at the Radiation Center and the Time-sharing system at the Computer Center was discussed, noting the advantages of this type of facility.

DECUS MEETING

James Fryklund presented a paper on the PDP-8 Message Switching System in Boston, Massachusetts. The paper was authored by James Fryklund and Dr. W. A. Loveland and discusses the PDP-8 Message Switching System characteristics and applications. James Fryklund is on the Computer Center staff as Manager of the On-Line Hardware and Software Group and Dr. Loveland is an Assistant Professor in the Nuclear Chemistry Group.

OREGON STATE UNIVERSITY
COMPUTER CENTER NEWSLETTER

Corvallis, Oregon
(503) 754-2494

Volume IV, Number 7
July 1, 1969

Acting Director: Larry C. Hunter

Editor: Kay Porter

SHORT SEMINAR IN THE USE OF STATISTICAL ANALYSIS PROGRAM LIBRARY

A special short seminar is being planned for early Fall in the use of the Statistical Analysis Library. This will provide the opportunity for staff members to learn how to set up data for processing under the programs and to have some of their questions about the program library answered. Dave Niess of the OSU Computer Center staff has worked closely with the library and will conduct the seminar. If you are interested in attending, please fill out the form on the back page with the dates most convenient for you. A final date will then be set and will appear in the Newsletter.

SCHEDULE OF SHORT COURSES

The summer schedule for the Computer Center videotape short courses is as follows:

Introduction to EDP - July 7-11
Introduction to FORTRAN - July 14-18
Introduction to OS-3 - July 21-24, July 28-31

Videotapes will be shown in Kidder 278 and Kidder 280 from 3-4 p.m. The courses are open to all University professors and students.

LARGE OUTPUT FILES

Please try to insure that no large output files are submitted through OS-3 when termination time is close at hand. On plotting, this is especially critical since the plotter is a relatively slow device. Any lost output due to the above cause will have to be settled through the com-

puter supervisor (Glenn Wolfe) to determine if you have a reasonable cause for credit.

OS-3 HOURS

Monday - Friday	0800 - 2300
Saturday	0800 - 1700

PRICE CHANGES

NCR Paper Tape Converter

The cost for the NCR paper tape to magnetic tape conversion service will change effective August 1. The new prices are: $7.50 without operator, $10.00 with operator.

Initial instruction in NCR operation is $10.00.

Keypunching Charges

Effective August 1, 1969, the keypunching rates will be increased from the current $5.00 per hour to $6.00 per hour. Inquiries concerning keypunching services should be directed to Mrs. Verna Wohlers, Acting Keypunch Supervisor, ext. 1726.

Programming Charges

The new programming charges which are to be effective August 1, 1969, are listed below. The new rates will be broken down by the classification of the programmer: $6.00 for programmer, $9.00 for senior programmers, $12.00 for programming analysts.

IBM 1620 GONE

The IBM 1620 has been moved to the Electrical Engineering Department for use in experimental instruction, so it is no longer available to Computer Center users.

MEETING OF REGIONAL COMPUTING ACTIVITY PROJECT DIRECTORS HELD AT OSU, JULY 8-10

The project directors of the NSF Regional Computing activities held their summer meeting at OSU. OSU is one of several universities who have received NSF grants to establish regional computer centers. Representatives attending the conference were sent by: Carnegie-Mellon Uni-

versity, University of California, University of Texas, Saint Ambrose College, the Southern Regional Education Board, St. Anselm's College, Massachusetts Institute of Technology, Cornell University, MERC, California Technology Institute, NCCOP, S. U. N. Y. at Buffalo, University of Iowa, Illinois Institute of Technology, Stanford University, Washington State University, Dartmouth College, and Oregon State University. Representatives from these schools met with Dr. Andrew Molnar of the U. S. Office of Education, and Dr. Arthur Melmed, Dr. Lawrence Oliver and Dr. D. D. Aufenkamp of NSF. The group was welcomed by Dean Milosh Popovich and Dr. Arthur Melmed of NSF.

In the morning sessions, annual reports of progress were given by participants. In the afternoons, smaller groups met together to discuss mutual problems and solutions.

The last meeting included a discussion of the direction of activities for the coming year, suggestions for project evaluation and future meetings.

STUDENT DATA MANAGEMENT SYSTEM-PHASE 1

As has been noted previously, all the records of students being admitted to OSU have been entered directly on-line to the CDC 3300 since January 1, 1969. As of June 1, 1969, the on-line input has been directly from the Admissions Office using the CCI remote terminal. This terminal looks like a Teletype to the computer but can be programmed like a data display for the user. All up-dating of newly admitted students are also handled on-line. Admissions reports are presently being run in batch mode but will, in the future, be available to be run by remote also.

STUDENT GRADES AND RECORDS NOW BEING IMPLEMENTED ON CDC 3300

On June 23, 1969, OSU Summer School started and the Computer Center began the assumption of responsibility for running all Admissions, Registrar, and Business Office reports for the coming academic year. 4300 students registered during the first week of Summer School. Class and grading lists are being provided weekly as required by the needs of the starting and ending of classes at various times throughout the summer.

COMPUTER ASSISTED SCHEDULING OF 4-H STUDENTS

For the second year the Computer Center has run the Computer Assisted Scheduling of 4-H students for the Extension Service. High School students applying for the courses are hand-assigned to the dorm and the younger members of the group are allowed two requests and are assigned to a single course schedule. The older group of students have nine choices from which one to three assignments are scheduled (1-hour, 2-hour and 4-hour courses) plus the assignment of a discussion group. After the scheduling using the new program (80 seconds for 1833 students), three general purpose programs for translating coded material, sorting, formatting and printing were used to generate the four different kinds of listings and a file of punched cards. The scheduling program allows for changes in the number and location of courses as well as all associated data.

Further information about this scheduling procedure can be furnished by Kit Schoenborn at extension 2494.

STATISTICAL ANALYSIS PROGRAM LIBRARY

NAME _____

DEPARTMENT _____

CAMPUS ADDRESS _____ PHONE _____

PREFERABLE DATES:
(CIRCLE ONE)

September 15 - 19

September 22 - 26

September 29 - October 3

October 6 - 10

October 13 - 17

COMMENTS:

Please complete and mail immediately, if interested.

COMPUTER CENTER

Oregon State University

Corvallis, Oregon 97331

OREGON STATE UNIVERSITY
COMPUTER CENTER NEWSLETTER

Corvallis, Oregon
(503) 754-2494

Volume IV, Number 8
August 1, 1969

Acting Director: Larry C. Hunter

Editor: Kay Porter

TO: Computer Center Users

FROM: Dr. Larry Hunter

The Computer Center would like to apologize for the unprecedented down-time experienced during the month of July. It was the only extended down-time of more than a few hours that has occurred in the last year.

This down-time period was caused by the failure of the Digital Equipment Corporation's PDP-8 computer. As you know, the PDP-8 has been functioning as a satellite system to the CDC 3300, multiplexing all teletypes into the system. This failure, therefore, disrupted all teletype operations. The CDC 3300 system and OS-3 operating system were operational during this time, but only for batch and CRT terminals, which are not interfaced through the PDP-8.

The Center was particularly disappointed that DEC could not find and repair the PDP-8 malfunction in a shorter time.

We are concerned that the reliability of the PDP-8 and the maintenance provided by DEC on the PDP-8 can not measure up to the high quality of service that the Computer Center seeks to provide to its users. At present, the Computer Center staff is evaluating some new procedures which will enable us to pursue other alternatives to insure that a failure of the PDP-8 cannot cause other such inconveniences in the future.

We thank you for bearing with us while the repairs were being completed and appreciate your patience and good humor.

IBM 407 GONE

The IBM 407 has been moved to the Electrical Engineering Department along with the IBM 1620. Card listing services are available on CDC 3300.

FILE SPACE NEEDED

Due to the expanded use of computer facilities, demand for saved file space is increasing. If you are not using all your files, please eliminate those files which do not need to be on-line.

In a few months, user files will be automatically transferred to off-line magnetic tape storage if the file has not been accessed for more than a 30-day period. Charges associated with tape storage and transferring a file back on-line will be announced at a later date.

NEW COMPUTER CENTER

Work on the new Computer Center building has been progressing. Construction of the building is hoped to be completed by the latter part of Fall term, 1969.

OPERATING STATISTICS

For the dates July 1 to July 31, 1969, OS-3 usage was as follows:

No. of batch jobs run:	5,734
No. of console runs (LOGON-LOGOFF):	10,476
No. of console hours used:	3,311
CPU time used - console and batch:	96.6 hours
Total number of hours OS-3 was on the air: (15 hrs. Mon.-Fri.; 9 hrs. Sat.)	351 hours
Average number of console users:	9.4
Amount of CPU time used by an average user for 1 hour of console time:	62.5 seconds

REGIONAL COMPUTER CENTER FACILITY EXPANDING

The Regional Computer Center facility will be expanded this fall to 29 teletypes on the 6 Regional Computer Center campuses. The following terminals will be installed:

Oregon Technical Institute	5
Portland State University	5
Southern Oregon College	5
Eastern Oregon College	5
Oregon College of Education	5
Lane Community College	4

The Regional Computer Center project is also purchasing multiplex equipment to be installed in Portland, Ashland, LaGrande, Klamath Falls and Eugene. This equipment will enable users in these cities to dial data phones in their city rather than dialing long distance. The multiplex units will eliminate the long distance line costs now incurred by remote terminals.

RESOURCE SET MATERIALS TO BE EVALUATED BY OREGON HIGH SCHOOLS

Eight high schools in Oregon have been selected to aid in the evaluation of resource sets developed by an NSF project (NSF GJ116) at the Computer Center. The resource sets consist of problems which utilize the computer as a problem-solving tool in the secondary school. Problem sets have been developed in the areas of Mathematics, Science (Chemistry, Biology, and Physics) and Business. Eight teletype terminals will be installed in September and will remain in the high school for the 1969-1970 school year. The schools participating are:

Jackson High School (Portland) - Lynn Cooper - Science
Madison High School (Portland) - Frank Wheeler - Business
Adams High School (Portland) - John Williamson - General Evaluation
Lake Oswego High School - Chuck Geldaker - Mathematics
Neah Kah Nie High School (Rockaway, Oregon) - Jim Benesch - Mathematics, Science, Business Coordinator

Corvallis High School - Lewis Schaad - Science
Lee Spitznogle - Business
Rulon Parham - Mathematics
Ashland High School - Keith Garrett - Mathematics

For further information on this project, contact Kay Porter at the Oregon State University Computer Center.

REGIONAL COMPUTER CENTER SUMMER INSTITUTE TO BE HELD

A Regional Computer Center Institute will be held the week of September 8-12 for schools participating in the Regional Computer Center project. The institute will include afternoon sessions on the use of:

Calcomp Plotter
*Catalog Programs
Editor
OSCAR
FORTRAN

The morning sessions will be spent in group meetings in specific curriculum areas.

NEW COMPUTER CENTER PUBLICATIONS

cc-69-11	ALGOL: A User's Manual with Examples	Baughman, Berryman	6/69
cc-69-12	OSU: The Computer and Instruction	Baughman, Jorgensen	6/69
cc-69-13	Operations Manual for Nebula FORTRAN System	Murray	6/69
cc-69-14	Report on OSU Regional Computer Center Project; July 1, 1968-June 30, 1969	Baughman	6/69
cc-69-15	OSCAR V55: With Character String Processing	Bachelor	6/69

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

OSCAR V55: With Character String Processing (cc-69-15)

A new version of OSCAR (V55) has been released. The most important new feature of V55 is the improved character string processing facility. A full discussion of this facility appears in the report cc-69-15.

Previous versions of OSCAR had some ability to process character strings (add, subtract, compare). Version 55 has several new features which make it possible to do general character string manipulations. These features include subscripting and sub-array notation to refer to parts of character strings, a search feature and DECODE and ENCODE functions. To indicate the possibilities, three simple applications which have been programmed for OSCAR V55 are a "form letter" processor, a Markov Normal Algorithm processor and a simple expression translator (from algebraic expressions to Polish strings).

The internal representation of character strings in OSCAR has been changed. In previous versions, a string was terminated by a quote mark ("). This meant that a quote mark could not be included in a string. The new representation includes an integer (internally) that tells how many characters the string contains. This makes it possible to include any characters in a string.

Character strings can be "added", "subtracted" or "compared".

The OSCAR user can define functions of his own which take character strings as arguments or produce character strings as values, or both. However, there are several "pre-defined" functions available in OSCAR which can be used with character strings. These are:

DECODE If X is a character string, then DECODE(X) is an integer in the range 0 to 63, giving the internal (OSCAR) code for the first character of the string. If X is an empty character string, then DECODE(X) has the value -1.

ENCODE If N is an integer in the range 0 to 63, then ENCODE(N) is a one-character string containing the character whose internal code is the specified integer.

SRCH If X and Y are character strings, then SRCH(X,Y) is an integer telling where string Y occurs within X, if it does occur. If it does not occur, the value of SRCH is zero. For example, SRCH ("ABCDE","CD") has the value 3. (CD occurs within ABCDE, starting at the third character of ABCDE.) If Y occurs in X in more than one place, SRCH indicates the location of the left-most occurrence of Y.

SAR IF X, Y and Z are character strings, the value of SAR(X,Y,Z) is a character string formed in the following manner: X is searched for an occurrence of Y (using SRCH); if found, a new string is constructed in which the part of X that matched Y is replaced by Z. This new string is the value of SAR. If Y does not occur within X, the value of SAR is simply X. In any case, X, Y and Z are not changed. For example, SAR("OSCAR","CAR","WALD") has the value "OSWALD".

SIZE If X is a character string, SIZE(X) is an integer (0 or larger) telling how many characters the string X contains.

KIND KIND(X) produces a character string telling what kind of value X has.

OREGON STATE UNIVERSITY
COMPUTER CENTER NEWSLETTER

Corvallis, Oregon
(503) 754-2494

Volume IV, Number 9
September 2, 1969

Acting Director: Larry C. Hunter

Editor: Kay Porter

OPERATING STATISTICS

For the dates August 1 to August 25, 1969, OS-3 usage was as follows:

No. of batch jobs run:	4,838
No. of console runs (LOGON LOGOFF):	11,761
No. of console hours used:	3,784
CPU time used - console and batch:	107.7 hours
Total number of hours OS-3 was on the air: (15 hrs. Mon.-Fri.; 9 hrs. Sat.)	276 hours
Average number of console users:	13.7
Amount of CPU time used by an average user for 1 hour of console time:	71.2 seconds

A SUGGESTION FOR TERMINAL USERS

If a user is logged in for an hour or more, it is suggested that he periodically file his data. In case of a system failure, this method will usually insure the saving of the files with which he has been working.

OS-3 CHANGES

New memory allocation techniques have been made in the scheduling algorithm for the OS-3 system. These changes should improve throughput by about 20%, and should also improve response time.

NEW COMPUTER CENTER

The new Computer Center building is nearing completion. It appears that some of the staff functions of the Computer Center will move into the new building in November. The CDC 3300 and its associated hardware will be moved at a later date (perhaps during Christmas vacation) in order to cause as little inconvenience to users as possible.

MULTIPLEXORS TO BE INSTALLED

The Computer Center is purchasing new multiplex equipment under the Regional Computer Center project. This equipment will allow a large number of teletypes to be operated over a single, leased voice-grade telephone circuit. There will be two lines initially into the Computer Center: one line serving LaGrande and Portland; and another serving Eugene, Medford, Ashland, and Klamath Falls. A multiplex line to Monmouth is also planned at an early date.

Up to 18 teletype channels are planned for each line. Using these multiplexors, there will be dial up service (data phones) available in addition to the teletypes which are permanently wired into the network. These data phones are to be used by the Computer Materials Project (another NSF project) to connect terminals at eight Oregon high schools with the CDC 3300 system. It is expected that the multiplexor network will be installed in September. It should be operational by October 1.

The Regional Computer Center schools will have 29 terminals in operation.

OTI - 5
PSU - 5
SOC - 5
EOC - 5
OCE - 5
LCC - 4

PDP 12A COMPUTER TO BE INSTALLED IN PSYCHOLOGY DEPARTMENT

A PDP 12A computer has been ordered for research and laboratory control use by the Department of Psychology. The University of Oregon Medical School will also use a PDP 12A for laboratory use. The Computer Center at OSU is to be administratively responsible for the PDP 12A computer and will provide maintenance and programming support to the Department of Psychology. The Department of Psychology is planning to do neuro-physiological research programs on system which require the following characteristics:

1) Analog to digital data converters.
2) A computer executive program which insures a minimum of programming to conduct these experiments.
3) A CRT data display for monitoring experiments.
4) Magnetic tape or discs for storage.
5) Sufficient processor speed for response of a few milliseconds.

The Psychology Department will conduct research in neurophysiology, biochemical bases for retardation, and other biochemical measurements.

It is also planned that data gathered by the PDP 12 will eventually be sent to the 3300 for further analysis.

ATTENTION BATCH USERS

When OS-3 batch users fill out their cover card, be sure that the time on the cover card corresponds with the time on the time card. Depending on the computer work load, the jobs that come under the volume category may have to be held until after 7:00 p.m. even if the job was not submitted with a volume work request.

Jobs that are known core hogs will also be held until after 7:00 p.m., depending again on computer workload for that day.

OSCAR V56

The next version (V56) of OSCAR will be released in the near future. As usual, this version will correct some bugs in version 55, and will probably have some bugs of its own. There will be some changes which may affect some users. One change is in character string comparison. In version 55, special characters (+,*, space, etc.) are considered to be greater than letters and digits. This results in peculiar ordering if one is sorting strings. For example, "CLARK, JOE" will come after "CLARKE, BOB" because comma is greater than "E". In version 56, special characters will be treated as being less than digits and letters. However, the character codes used in the DECODE and ENCODE will remain the same as in V55.

Other changes in V56: KIND ([]) will be "UNDEFINED" instead of "EMPTY".

The BCD function has been implemented.

PROD and SUM are no longer reserved words, but PRODUCT and SIGMA are reserved, not yet implemented.

When OSCAR is used at a teletype, V56 will print a mode indicator when ready for input: @ is normal mode; & denotes command mode; and \ (reverse slant) denotes data input mode. (The "\" will not be printed if OSCAR is waiting for input and the teletype is not at the left margin.)

DON,EXIT,EXIT TO, and STOP have been implemented.

&ASCII: command now allows simple variable as arguments (values must be integers).

[] is now allowed as input to a READ statement; it will cause the variable being read to become undefined.

DIRECT REVISED

As a safety measure, the program *DIRECT has been revised to make it more critical of its parameters and of its input data. As mentioned in a previous newsletter (June, 1969), one can specify a name other than DIRECTRY for DIRECT to process. If DIRECT is mistakenly used on a file that is not a directory, it can really scramble the information in the file. The latest changes in DIRECT should reduce considerably the danger of this happening. One change is in the parameter processing. DIRECT will accept at most two parameters. If two are present, one must be a number (specifing the unit for the listing), the other must be a name (the name of the directory file), and there must be a comma between them. If no number is specified, the listing will be written on unit 100 (61 in a batch job). If no name is specified, DIRECTRY will be used.

The other change is that DIRECT is now very "fussy" about the information it reads from the directory. The records must be BCD records, and the first word of each record must be such as to specify a date in the range 1964-1998. (The latter requirement means that the first character of each record must be a 4,5, or 6,.) If these requirements are violated, DIRECT prints a message of the form (name): INPUT ERROR and leaves the file unchanged.

EDITING DIRECTRY'S

In the past, some people have tried to use EDIT to revise their file directorys, especially to remove names. This used to produce strange results, due to the fact that EDIT writes variable length records when the OUT command is used, and DIRECT did not handle this situation properly. DIRECT has now been revised to eliminate this difficulty. So, it is now possible to use EDIT, to "FIN" a directory, revise it, and "OUT" it again. However, after doing this, it is advisable to use DIRECT right away, to get rid of the file mark that EDIT writes at the end of the file. If the file mark is allowed to remain, subsequent information entered in the file may be lost.

NEW VERSION OF DECKEDIT

Version 2.1 of DECKEDIT has been released. There are several improvements and new features.

1. BCD cards (including EXS cards) are now allowed. They are treated as being part of the preceding binary deck.

2. Any cards (BCD or binary) preceding the first IDC card on the old library unit are copied directly to the new library unit, and the message MISC. CARDS COPIED is printed, if this occurs.

3. DECKEDIT will now abort with the message RECORD TOO LONG any records longer than 40 words are read.

4. If no punching is specified, DECKEDIT will not equip unit 62 as a file. (It used to do this.)

5. There is now a no-reward option on the old library unit. An "X" is used to specify this, as in the example below.

```
*DECKEDIT,L(25/X,32)N(56)$
```

   When the X is present, DECKEDIT will not revise the old library unit (25 in this example) before reading from it. It will still release the new library unit before writing on it, and it still rewinds both library units after using them.

6. DECKEDIT is now easier to use from a CRT. If there is no "$" in the initial control statement used to call DECKEDIT, DECKEDIT will clear the screen with two blotches indicating the area (100 characters) that will be read in for further parameter processing. DECKEDIT will read from the screen and clear it again if no $ is present. After getting a $, the next thing shown on the screen will be the revisions log (list of programs copied, deleted, held, etc.). Up to 19 lines will be shown at a time. The word - (more) - at the bottom of the screen means more output is coming. The user can either press SEND to see it, or type #MI and press SEND to suppress further outputs. When DECKEDIT is finished, it will display the last output lines, with a # in the corner. At this point, the user is back in control mode.

A REVIEW

The organization, instruction set, and operation of the content addressed memory (CAM), which is a part of the NEBULA computer, is discussed by P. T. Rux in the July 1969 issue of IEEE Transactions on Computers (Vol. C-18, No. 6). This CAM allows binary equality and magnitude searches to be made of 2048 35 bit words in one processor time while the processor is fetching the next instruction. During the search, operations can be performed upon selected words in CAM and upon the word preceding and the word succeeding the first word or all words which satisfy the search criterion. Examples of search and operate command combinations are given, and some interesting implementation problems are discussed.

Formerly with the OSU Computer Center, Dr. Rux is presently a member of the Bell Telephone Laboratories staff, Whippany, N.J. The NEBULA computer is a continuing project within the Computer Center, and is available for research in several hardware and software areas. Of particular interest is the design of compilers and search apparatus using CAM and conventional random-access approaches and the implementation of other memory techniques and I/O devices.

COMPUTER CENTER PUBLICATION NOW AVAILABLE

You may pick up cc-68-25 Supplement now in the Computer Center Office.

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

NOTES TO FORTRAN USERS

The EOD function should only be used for sensing for the end-of-tape marker on magnetic tape. As indicated in previous communications, the value of the seek function should be used only as a logical (true or false) value.

OS-3 Fortran now allows dimension information to be included in type declarations. For example, the following declarations are legal:

```
INTEGER X(20,20),Q,S(2,3,3)
COMPLEX Z(30,30),BETA(200)
```

OREGON STATE UNIVERSITY
COMPUTER CENTER NEWSLETTER

Corvallis, Oregon
(503) 754-2494

Volume IV, Number 10
October 1, 1969

Acting Director: Larry C. Hunter

Editor: Kay Porter

MOVE PLANNED TO NEW COMPUTER CENTER BUILDING

The Computer Center will move into the new Computer Center building on one of these two dates: November 8th or the week immediately preceding Thanksgiving weekend. When the date is selected, the Computer Center will notify users so they may make plans accordingly.

ATTENTION: FACULTY MEMBERS

Funds are available to interested faculty for two activities:

1) Unsponsored research

Any faculty member can apply for allocation of computer time for unsponsored research efforts. Student requests must be approved by the major professor. Applications are available from the Computer Center. Individual allocations will be limited.

2) To acquaint faculty members with Computer Center facilities

Any faculty member can request up to five minutes of CPU time for this purpose. The Center is available to provide programming guidance, manuals or any other assistance required.

VIDEO TAPE COURSES

The Fall schedule for the Computer Center videotape courses is as follows:

Introduction to Electronic Data Processing, October 13-17, Channel 5, Kidder 292, 4-5 p.m.

Introduction to Fortran, October 20-24, Channel 5, Kidder 292, 4-5 p.m.

Introduction to OS-3, October 27-30 and November 3-6, Channel 5, Kidder 292, 4-5 p.m.

These courses are open to all University professors and students.

COMPUTER REGISTRATION

Computer registration was held September 25-29. The computer read in 150,000 cards on Thursday, plus free time requests, scholarships and other miscellaneous information. From this data, the computer generated both the student's schedule and his bill simultaneously, also punching a fee card which went to the Business Office. When the student paid his bill, the fee card was validated and returned to the Computer Center to record the fact that his bill was paid.

STATISTICS FOR REGISTRATION

Course request cards punched by machine	263,000
Scheduling clerk master file cards	17,000
In case of computer failure, schedule cards with class sections were punched	198,000
Student activity cards (insurance)	112,000
Student traffic cards	6,000
Major department cards	30,000
Scholarship cards	3,900
Hold items (money owed by student from last year)	200
Free time requests	3,000
Schedule revision cards	8,000

6,700 courses were represented by the schedule request cards. With the addition of labs and recitations, a total of 8,000 sections were punched and updated.

The basic Student Information Directory (SIDIR) was compiled from 67,000 student data cards obtained from the Registrar's Office. These cards formed the SIDIR data file which was updated and generated into the disk. The SIDIR has received 7,000 new student files, and the whole file will exceed 18,000 students when it is completed. The SIDIR file works entirely on alphabetic name. If there is a conflict, then Social Security number is checked also. Under this system, the student is no longer a number, but again a name! Admissions are up 13% above

last year.

Students previously filled out multiple forms of name, address, schedule, etc. Now a Student Data Review Sheet is included in the registration packet, and the student updates the copy and turns it back in. The multiple forms have been replaced by 13 hours of printing on the computer. The schedule copies then go to departments such as Dean of Women or Men and the Student's advisor.

Registration required a total of 24 hours of computer printing between Thursday noon and Monday morning in order to complete class lists and other lists necessary in the registration procedure.

REGIONAL COMPUTER CENTER MEETINGS HELD

A summer institute for Regional Computer Center participants was held September 8-12 on the OSU campus. The week-long meeting was attended by fifty professors and administrators from the regional schools.

In the mornings, the group was addressed by Computer Center staff members who spoke on various aspects of the Computer Center programs. George Rose spoke on "OS-3 and Time Sharing", Jim Fryklund on "Design of a Real Time Computer System", Kit Schoenborn on "Student Data Management System, (Computer Registration at OSU)" and Kay Porter on "Computers in the High School." After the lectures, the large group gathered in small academic workshop sessions which included groups in:

Business-Management-Economics
Chemistry
Physics
Mathematics
Psychology-Education-Sociology
Electronics

In the afternoons, computer skills sessions were conducted in OSCAR, Plotting, *Catalog Programs, Using the Terminal (for beginners), Entering and Running Fortran Programs and Fortran Programming.

The sessions were well attended and interest was expressed to the Computer Center staff in having additional workshops next summer.

REGIONAL COMPUTER CENTER PROJECT DIRECTORS MEETING

The Fall meeting of the Regional Computer Center Project Directors will be held October 9-11 at Eastern Oregon College.

WIRE BOARD

Since the IBM 407 is no longer available at the Computer Center and since there is an occasional one-time need to have a special listing of selected data from a card file, it seemed necessary to develop something fairly simple to fulfill the need. Hence, WIRBRD program. The first card says, PUT YOUR JOB CARD HERE. This is followed by system and binary program cards after which are available 80 card column cards and 130 print column cards. The user selects card input column and print output column in alternate cards... much as he did when wiring a board for the 407. Only those cards selected will affect the input and output, all other areas are blank. The 'card' and 'print' column cards may be preceded by a 'double space' card; otherwise, printing will be single spaced. The I/O cards are followed by a special 'data' card and the user's input deck. The input deck is followed by two cards marked 'next to last card' and 'last card'.

A special feature has been added since the original development. The I/O cards may be preceded by a special 'PUNCH' card in which case the 80 card column cards still represent the input card column but the first 80 print column cards represent the 80 column of the output punched cards. This allows the user to make a new deck of cards while shifting the input data to other columns.

WIRBRD is available from 'Kit' Schoenborn at the Computer Center in Kidder Hall.

NEW COMPUTER CENTER PUBLICATIONS

cc-69-16 Home Economics Institutional Management Demonstration Package, by Yvonne Yapp and Jo Ann Baughman

cc-69-17 ECAP-Electronic Circuit Analysis Program as Applied to the CDC 3300, by Donald Amort

cc-69-18 *EZPLOT, by Jo Ann Baughman and Dave Fuhrer

cc-69-19 The "Core" Package: A Self-Learning Package for Computer Programming Using a Time-Sharing Terminal, by Robert Pinneo

cc-69-20 A Resource Set: Computer Programs in Science for Secondary Schools, by Walt Bell

cc-69-21 A Resource Set: Computer Programs in Mathematics for Secondary Schools, by Charles Geldaker

cc-69-22 A Resource Set: Computer Programs in Business for Secondary Schools, by Phil Collins

cc-69-23 Report on OSU Computer Materials Project (NSF GJ116), by Judy Edwards and Catherine Porter

cc-69-24 OSCAR: A User's Manual with Examples (Revised 9/69) by Jo Ann Baughman, Mary Lynn Berryman and Joel Davis

cc-69-25 A Brief Description of OSCAR (Third Revision), by Gilbert Bachelor and Joel Davis

COMPUTER RATES

OS-3 Charges (prime time)

CPU time	$300/hour
Tape	$1.00/100,000 words transferred
Elapsed time at Teletype	$2.00/hour
On-line disk storage	$.15/block=$.30/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 are 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 thereafter

Input cards	$.15/100 for the first 2,000 records, then, $.05/100 for all cards thereafter
Line printer*	$.125/100 for the first 5,000 records, then $.05/100 for all records thereafter

*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.

Master Charges

CPU time and channel time	$250/hour
Disk scratch segment (includes implicit reservations for input and output files)	$1.00/hour
Quarter page of memory reserved	$1.00/hour
On-line disk 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.

Other	Without Operator	With Operator
IBM 083 Sorter	$2.00	$6.00
Keypunching	no charge	6.00
Verifying	Not available	5.00
Programming		Programmer 6.00 Senior Prog. 9.00 Prog. Analyst 12.00
Magnetic Tape Reels	1.00/mo. (.25 minimum)	
Disk Packs	20.00/mo. (1.00 minimum)	
Interpreter	3.00/hour	
Burster & Decollator	5.00	
NCR Paper Tape Converter	7.50	10.00

FALL TERM INSTRUCTIONAL REQUESTS 1969

The following classes have requested computer time to be used for instructional programs on the OSU campus. Students will use CPU time for programming and general instructional use of the computer.

School of Agriculture

Ag. Economics

AEc 311
AEc 524
AEc 525
AEc 585
AEc 586
AEc 414
Thesis
Marine Advisory Program

Ag. Engineering

AE 371
AE 421
AE 540
AE 405

Fisheries and Wildlife

Wld 503
Wld 457

School of Business & Tech.

Business Administration

BA 131
BA 211
BA 311
BA 427
BA 481
BA 505
BA 531
BA 491
BA 235
BA 499
BA 235X
BA 447

School of Education

Education

Ed 501
IEd 501
IA 371
Ed 408F

School of Engineering

Chemical Engineering

ChE 426
ChE 461
ChE 325
ChE 550

Civil Engineering

CE 539
CET 447
CET 335
CE 561
CE 361
CE 526
CE 527
CE 411
CE 564
CE 310X
CET 221
CE 471

Electrical Engineering

EE 474
EE 491
EE 507
EPT 301
EE 541
EE 431
EE 507
EE 503

General Engineering

GE 102,3

Mech., Indus., Nuclear Engr.

ME 457
ME 441
ME 527
ME 505
IE 571
IE 271
NE 411
MET 421
ME 567

Mech., Indus., Nuc. Engr. (cont.)

ME 416
ME 454
MT 421
ME 302
NE 511

Production Tech.

PT 406
PT 366

School of Forestry

Forestry

F224
F220
FP 210
F327
F425
F503
FE 222

School of Home Economics

Institutional Management

IM 520

Home Management

HM 503
HM 440

School of Physical Education

Physical Education

PE 423
PE 433
PE 194
PE 294
PE 394
PE 494
Cancer Research

School of Humanities & Soc. Scs.

Geography

Ggs 511
Ggs 561

School of Science

BioChem-BioPhysics

BB 564

Botany

Bot 503

General Science

SED 503

Mathematics

Mth 161-163
Mth 151
Mth 351
Mth 352
Mth 358
Mth 457
Mth 451
Mth 353
Mth 405,505
Mth 551
Mth 322
Mth 487

Oceanography

Oc 501

Physics

Ph 503
Ph 553
Ph 574

Statistics

St 331
St 442
St 571
St 574
St 531
St 591
St 503
St 505
St 506

Zoology

Z501
Z503
Research
Bi 370

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

COSY

COSY now has a new operation which allows the user to position to the end of a series of COSY decks. The operation is of the following format:

ENDSRCH/LUN

Where LUN is a number in the range 00 to 99, and is positioned after the first file mark after the last COSY deck. If a log was specified on the COSY call, then all deck identifier records on the LUN which are searched over will be listed on it.

Teletype Parity

At some future time, the operating system will return all eight bits from the teletype on CTI instructions. Since some teletypes generate a parity character, programs which read text from teletypes with non-system routine would ignore the 200 bit.

Copy, Date, Dump Utility Programs

The copy, date and dump utility programs now take full advantage of the capabilities available from type 210 CRT terminals. Copy now has the features that were available previously only in *TVCOPY, as well as the S, T, and V parameters which are not in *TVCOPY.

OS-3 Version 3.0 Released on September 13, 1969

There are three minor differences between it and the current system:

1) *FILES will not be file-protected by the system. The person who creates the file must file-protect it by performing the command

FP,*NAME

where *NAME is the name of the file. This procedure should be adopted immediately by users who maintain *FILES.

2) There will be a distinct bit in the I/O status (bit 16) to indicate address errors on seek instruction. Overlays created prior to September 4, 1969, will not detect address errors on RAF files if they use the Fortran seek function. However, if they do not run into

error conditions, they will still work properly. The seek function now returns the A/U and the new AE bit as its value. (This is the reason why the value of the seek function is logical and not integer.) If a program using the old seek function runs into an address error, it will be terminated by the system.

3) The PAL assembler for the PDP-8 will no longer be available under the name PAL. A file called *PAL has replaced it, and is now available for general use. *PAL will accept files created by the editor, and has the standard convention for rewinding its input unit.

New memory allocation techniques have been added to the OS-3 operating system which should result in significantly improved response times.

Notes to Fortran users:

The EOD function should only be used for sensing for the end-of-tape marker on magnetic tape. As indicated in previous communications, the value of the seek function should be used only as a logical (true or false) value.

OS-3 Fortran now allows dimension information to be included in type declarations. For example, the following declarations are legal:

```
Integer X(20,20),Q,S(2,3,3)
Complex Z(30,30),BETA(200)
```

OREGON STATE UNIVERSITY
COMPUTER CENTER NEWSLETTER

Corvallis, Oregon
(503) 754-2494

Volume IV, Number 11
November 1, 1969

Acting Director: Larry C. Hunter

Editor: Kay Porter

THOMAS YATES JOINS THE COMPUTER CENTER STAFF

The Computer Center is pleased to announce that Mr. Thomas Yates has joined the Center as Manager of Administrative Systems Development. This new position reflects the current extensive activities and development in the areas of (a) computer-assisted registration, (b) student admissions, (c) on-line student-based information systems and (e) on-line personnel data administration systems.

In this new position, Mr. Yates will be responsible for directing these activities and for planning and implementing new administrative system developments.

SAVED FILE SPACE

The amount of available saved file space is becoming critically short. The Computer Center urges users to remove all files which are no longer needed on-line. Files can be copied on magnetic tape for future use.

When copying or creating saved files using the EDITOR, it is recommended that the FILE and COSY,OUT commands be used. These commands take less saved file space than the OUT command and are more economical for the user.

In the near future, files that have not been accessed for a 30-day period will be automatically removed from the disk and stored on magnetic tape. When the file has been removed, an A/U (abnormal/unavailable) or (A) response will be received whenever a user tries to read the file. Once the user references a file and finds it abnormal, the operating system will automatically initiate a call for the file and it will reappear

on-line during the next 24-hour period. Thus, these files are automatically placed on-line again.

The user should be aware that if he deletes a file which is off-line, the automatic recovery will not take place.

COMPUTER CENTER MOVING

A tentative date for moving the computer to the new building has been set for Tuesday, November 25 (the Tuesday before the Thanksgiving holidays). Computer services will not be available during the move. We expect to resume services by the first day after Thanksgiving vacation, Monday, December 1.

TEKTRONICS GRAPHIC TERMINAL ON DISPLAY

A Tektronics Graphic Terminal, the T-4002 is now on loan to the Computer Center. It is located in the main Computer Center office in Kidder Hall, 130.

The terminal operates at 2400 baud in an alphanumeric or graphics mode. In the A/N mode, the terminal screen displays 37 lines of 85 characters per line.

It operates in three graphic modes:

1) Vector Plot - terminal will draw a straight line between any two specific points.
2) Point Plot - a dot is displayed at each addressed point.
3) Incremental Plot - this mode is the usual standard mechanical incremental plotter.

Any users interested in more information regarding the terminal should contact Jim Fryklund, extension 2494.

DATA POINT 3300 TERMINAL DEMONSTRATED

In October, the Computer Terminal Corporation from San Antonio, Texas, gave a demonstration of their CRT terminal, a Data Point 3300. The terminal operates over telephone lines and is interchangable with a standard teletype. The set operates at 110, 150, 300, 600, 1200, 2400 or 4800 BPS. The screen

displays 25 lines of 72 characters each. It also has a magnetic tape cassette which can be used to record data. The terminal sells for $4500 and rents for $145.00 per month.

Users interested in obtaining more information should contact Gary Hoselton, extension 2494.

OPERATING STATISTICS

For the dates October 1 to October 28, 1969, OS-3 usage was as follows:

No. of batch jobs run:	6,019
No. of console runs (LOGON LOGOFF):	12,628
No. of console hours used:	3,454
CPU time used - console and batch:	88.3 hours
Total number of hours OS-3 was on the air: (15 hrs. Mon. - Fri.; 9 hrs. Sat.)	329 hours
Average number of console users:	10.5
Amount of CPU time used by an average user for 1 hour of console time:	57.3 seconds

REGIONAL COMPUTER CENTER PROJECT DIRECTORS MEETING

The Fall meeting of the Regional Computer Center Project was held October 9-11 at Eastern Oregon College in La Grande.

Representatives from Southern Oregon College, Oregon Technical Institute, Eastern Oregon College, Oregon College of Education, Portland State University and University of Oregon Medical School attended, contributing to an excellent interchange of ideas and frank discussions of real problems, successes and innovations experienced by each school.

The Winter conference is scheduled for January 15-16, 1970 at Portland State University. The emphasis of this meeting will be on the instructional use of computers in the academic areas of Business and Physics.

MULTIPLEX EQUIPMENT

The multiplex equipment which will be installed through the Regional Computer Center Project is being tested and checked out by ADS personnel. The system should be fully operational by December 1, 1969. Four data

sets will be installed in Portland and one in Ashland. Users who have data phones will be able to call the numbers in Portland and Ashland and will be connected directly to the CDC 3300 in Corvallis without incurring a long distance charge. Additional teletypes will also be "hard wired" to the multiplex equipment, thereby being directly connected to the OSU computer. The schools in Portland, La Grande, Eugene, Ashland and Klamath Falls will be connected to the multiplex equipment. Additional data sets can be added in the future as well.

COMPUTER RATES

Two charges were incorrectly stated in the October newsletter. They are the on-line disk storage charge under MASTER and the verifying charge. They should be changed to $.30/track per month for on-line disk storage and $6.00/hour for verifying.

EXPRESS KEYPUNCH SERVICE

An express keypunch service is offered by the Computer Center. For express work a user must have no more than 200 cards to be keypunched and the job will not be verified. Any express jobs in by noon will be completed by noon the following work day. If you wish express keypunching be sure to call it to the attention of the keypunch supervisor, Verna Wohlers.

MEDIUM SIZE KEYPUNCH JOBS

All keypunch jobs of 1000 cards of less on 80 column coding forms will be keypunched and verified, if wanted, in two working days or less. All other jobs of 1000 cards or less and not on coding forms will be keypunched on a regular first come basis. The completion time for these jobs is subject to the work load at that time.

THE COMPUTER MATERIALS PROJECT

The high schools which are testing the Computer Materials Project packages started using terminals in their classrooms in September.

HIGH SCHOOL	CPU(hrs)	WCT(hrs)	PRINTER	NUMBERED LOGONS	SFBLKS
Madison					
(business)	.0116	2.8	0	6	4
CPU/WCT ratio = .0042					
Neah Kah Nie					
(business)	.0374	7.2	0	53	33
CPU/WCT ratio = .0052					
(science)	.0637	10.2	0	55	32
CPU/WCT ratio = .0062					
(math)	.0614	6.06	0	42	14
CPU/WCT ratio = .0101					
Jackson					
(science)	.0656	20.7	0	131	18
CPU/WCT ratio = .0032					
Corvallis					
(science)	.0048	.78	0	5	2
CPU/WCT ratio = .0062					
(math)	.0751	16.37	0	124	18
CPU/WCT ratio = .0046					
Lake Oswego					
(math)	.0571	9.56	0	32	15
CPU/WCT ratio = .0060					
Ashland					
(math)	.0007	.38	0	3	0
CPU/WCT ratio = .0019					
Adams					
(experimental)	.1336	74	0	203	0
CPU/WCT ratio = .0018					
Neah Kah Nie					
(experimental)	.0923	16.65	0	119	77
CPU/WCT ratio = .0055					

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

Version 3.1 of the OS-3 Operating System will be released shortly. Some of the changes from 3.0 are:

A. Semi-public files have been established. These files permit access from all validity codes under a given job number. *NEWS will contain more information on semi-public files.

B. On CTI instructions the system will return all eight (8) bits of the ASCII character instead of always ORing in 200 bit.

C. On CTO instructions the system will no longer mask the character to eight (8) bits and will output the entire contents of the A register.