C.S.I.R.O.

DIVISION OF COMPUTING RESEARCH

NEWSLETTER NO. 30 - 1st DECEMBER, 1967

I.   GENERAL

Publications Issued this Month

NL - Newsletter No. 30.

LM - Library Accession List No. 19. November, 1967.

Other Publications Available

G7 - CSIR PROMAX Rotation to Oblique Simple Structure in a
     Factor Analysis. Author: J.C. Mudge, c/- D.C.R., Canberra.

TN - Technical Note No. 20. Use of Paper Tape on the 3600 Computer.
     T.S. Holden. This Technical Note has been reprinted with minor
     revisions. While it is not being mailed automatically, copies
     are available from the Publications Assistant, D.C.R., Canberra.

Basic Fortran Courses

Sydney - A Basic Fortran Course will be given in Sydney during the week
commencing 22nd January, 1968. All those from whom applications have been received
have been sent an invitation to this course. Anyone else wishing to attend should
apply to the Education Officer, Division of Computing Research, C.S.I.R.O.,
Canberra.

Melbourne - A Basic Fortran Course will be given in Melbourne during the
week commencing 5th February, 1968. Those interested in attending should
contact the Head of the Melbourne Branch of the Division (c/- David Rivett
Laboratory, P.O. Box 160, Clayton, or telephone 5446757) from whom further
information will be available.

Seminar

At 2.00 p.m., 7th December a seminar on
                DOCUMENT MANAGEMENT IN THE DAD SYSTEM
will be presented by T.S. Holden of the Division of Computing Research in the
Lecture Room of the Division, Clunies Ross Street, Black Mountain, A.C.T.
The operation of "Shutdown", "Startup" and "Flush" will be described and current
proposals and difficulties in implementing the disc document-reservoir system
will be discussed.

Reprint

Copies of the paper "DAD, The C.S.I.R.O. Operating System" by B.J. Austin, T.S. Holden and R.H. Hudson and published in Comm. A.C.M. 10, 575-583 (September, 1967) may be obtained from the Publications Assistant, D.C.R., Canberra.

Charges for Computing Services

While the original charge for computing services provided by the Division has remained essentially unchanged since 1964, the software for both machines has been improved considerably and the running cost of the various computers has increased.

Taking these factors into account, the Executive of C.S.I.R.O. has decided that as from 1st July, 1968, the standard rate of charge for computer time will be:

> 3600 central processing unit time and equivalent peripheral
> time at $140 per hour, and
> 3200 time at $50 per hour.

Charges for Computer Materials

The Executive has also decided that the Division of Computing Research shall make a charge for the magnetic tapes and Control Data manuals which it supplies to computer users. In the case of both items the charge made will be "at cost" and will take immediate effect.

All manuals were originally provided free of charge by Control Data but this is no longer the case. One objective of debiting Divisions is to encourage the sharing of manuals. Although this is the policy of some Divisions it is felt that generally there is much greater scope for this practice to be followed.

There is no intention of charging for ordinary use of magnetic tapes. The charge will be applied only in those instances where tapes are held by users for more than three (3) months. After the charge has been made the tapes will be the property of the Division concerned, but the Division of Computing Research will be prepared to house them in the normal way if so requested. The purpose of the new charge, in the case of tapes, is to provide an added incentive to users to release unwanted tapes and thus to effect economies in the operation of the computer network.

Telex Facilities

A Telex machine has now been installed in the Computer Room at Canberra and any messages for the Division of Computing Research, Canberra, should be sent direct, using Telex AA62145.

In the near future Telex will also be installed in our Branches in Sydney and Melbourne. The Branch at Griffith, N.S.W., can of course be contacted using the Division of Irrigation's number AA69990.

Analogue Computing Courses

For the first time, E.A.I. are giving a course on analogue computing in Canberra. This will be held from 11th to 15th December, inclusive, at the Research School of Physical Sciences, A.N.U. This course will be repeated in Sydney and Melbourne next February or March. Following the Melbourne course, M.J. Cumming of the Simulation Group, C.S.I.R.O. Division of Chemical Engineering will hold a two-day course on the E.A.I. 8800 operated by his Group and available to all Divisions of C.S.I.R.O. No prior knowledge of analogue techniques is necessary for participants in the E.A.I. courses. There is a registration fee of $30.00 for the Canberra course which includes lunch. Further information can be obtained from T.M. Rickard, E.A.I., Sydney (telephone 437522).

Statistical Programs

The Division of Mathematical Statistics has prepared a list of statistical routines capable of use on C.S.I.R.O. computers. This list includes routines written within the Division of Mathematical Statistics as well as routines previously available from COOP and other sources. Copies of this list may be obtained from Dr. R.T. Leslie at Alpha House, Newtown, N.S.W. 2042.

An up-to-date index of all subroutines in the D.C.R. Library is in the course of preparation.

Staff News

Mr. N. Pummeroy will join the Canberra headquarters of the Division as an Education Officer during December. Mr. Pummeroy has been lecturing on programming at Preston Technical College, Victoria and at the Royal Melbourne Institute of Technology.

II. 3600

Fortran BCD Input

In the past an input error has caused an execution diagnostic on the standard output unit followed by an abnormal exit. However by use of the new subroutine BCDERSET, the user may specify that execution is to continue either unconditionally or pending a check by the library function INBCDCKF.

The option of admitting input errors is achieved by the Fortran statement:-   CALL BCDERSET (I,J)
where I is the logical unit number, (with I=0 for DECODE). If J=0 (or BCDERSET is not called at all) execution will cease if a BCD error is encountered on logical unit I. If J=1 execution will continue and the user may check whether an error occurred. This check may be made by means of the library function INBCDCKF(I) which returns a value of 1 if an error occurred and 2 if not. In the manner of the end-of-file check (EOFCKF) an unchecked BCD error will cause an abnormal exit at the next attempt to use the logical unit. If J=2 execution continues without the need to check for an error, however, INBCDCKF(I) may still be used to check the error status for the previous READ.

This facility has been available on the 3200 for some time.

Display Program

A new program, LISTAPES, by P.M. Ewens has been added to the display library. When called, LISTAPES provides a list of the labels of all tapes which are currently mounted on magnetic tape units. This program can be used to ascertain whether a tape required for the execution of a job is available. If a tape is not available when a job is initiated by use of BREAKIN the job will be aborted.

VISTA

The DAD system has been changed in its handling of Vista interrupts (halt, function button, error or lightpen). Previously, words 0 to 9 of the Vista buffer were read into the 5 (48-bit) core locations immediately preceding the interrupt address. This feature has been removed, and it is now incumbent on the programmer to read this information, should he require it. In particular, the internal Vista (lightpen) interrupt must be cleared by the programmer, by reading location 1 of the Vista buffer.

CSQRT

The description of CSQRT in the 3600 Library Function Manual (60056400) should read:-

Normal Return: The real part is greater than or equal to zero. It is left in the A register and the imaginary part in the Q register. If the real part is zero then the imaginary part is positive.

(So it really does the sensible thing, that is, $\sqrt{4}$ = +2 not -2 and $\sqrt{-4}$ = 2i not - 2i)

Mathematical Method:

$$\text{Compute} \quad C = \sqrt{\tfrac{1}{2}(|x| + \sqrt{x^2 + y^2})} \text{ and } D = \frac{y}{2C}$$

OSERIES Programs

A set of statistical programs developed by Dr. P.C. Owen for use within the Division of Land Research have, in the past, been available to these and other users from a magnetic tape. An alternative is now available as a drum document (CBC*****, ØSERIES). In future, users should use this form of the programs rather than the tape. Slight modifications to the deck structure are necessary and the details of this are contained in a Memorandum available from Dr. P.C. Owen (40455 ext. 739) or Mrs. G. Keig (40455 ext. 714).

III. 3200

FORTRAN 2.2

In addition to removing several errors in the previous version, FORTRAN 2.2 which is now implemented on each 3200 allows the user to assign programmer units to the L, A, X, I, P, R FORTRAN control card options.

   (i)   L=u, subprogram listing option; standard output assumed
              if = u is absent.

  (ii)   A=u, assembly listing option; standard output assumed if = u
              is absent.

 (iii)   X=u, binary output for load-and-go; 56 assumed if = u is absent.
              Note that if a program unit is assigned the programmer
              must rewind u before loading e.g. by $\frac{7}{9}$ REWIND, u.

  (iv)   I=u, source input unit; if I or = u is absent standard input
              is assumed.

   (v)   P=u, punch option; if = u is absent the standard punch unit is
              assumed.

(vi) R=u, reference listing unit; if = u is absent standard output is
      assumed. This option provides the user with a list of
      variables and statement numbers and their corresponding
      locations in the assembled program.

COMPASS

SCOPE in columns 10-14 may be used as an alternative to FINIS. This
also applies at the end of a Fortran deck stack.

ALGOL 1.1

ALGOL 1.1, which corrects many of the errors contained in ALGOL 1.0 is
now on the 3200 system library. In addition the following changes have been
made:

1. The message "PROGRAM BEGINS" is output to denote the line on which the
    compilation started.

2. The alarm "MISSING PROGRAM" is used in certain cases where "END's MISSING"
    was used.

3. The message "NON-FORMAT STRING" denotes a string not suitable for use in a
    call to INPUT, OUTPUT or FORMAT.

4. A new format character, H, inputs eight 6-bit characters into one integer
    variable or outputs eight characters from one integer variable. A real
    variable cannot be used.

5. The interior form of a string is the same as it is written on the source
    card, except that blanks imbedded in the left-most quote are suppressed.
    This, plus the new format character H, permits the reading of a format
    string into an array. Thus, a call to INPUT, OUTPUT, or FORMAT may
    reference an array or a string. For example:

            INPUT (60, ARRAY, ...)

    is permitted.

6. The compiler structure permits compilation of several precompiled
    procedures or programs in one call of the compiler. A source deck stack
    must end with a FINIS card (FINIS in columns 10-14).

7. The C-option is removed from the control card. Its replacement is the
    symbol "CODE" and number prior to the procedure.

A typical deck structure follows:

```
7
9  ALGOL,L,S,R
       'CODE' 1.,

            .
            .
            .

         'EOP'
       'BEGIN'

            .
            .
            .

       'END'
         'EOP'
       'CODE' 2.,

            .
            .
            .

         'EOP'
       FINIS
```

8. The D-option is no longer available.

9. The reserved word "SEGMENT" is removed. The associated "SEGMENT" is also removed.

3200 Disc Access

Programmer access to an area of the disc is expected to be available by 1st January, 1968. The first system under which it is to be implemented will be termed CSIDISC 3.0.

In addition, the 3200 Equip system has been upgraded to conform completely to the description in Manual Supplement 16 (revised) to be issued shortly.

Briefly, the additional features provided are:-

(1) The load-and-go unit (lun 56) is automatically assigned to a disc area unless defined by the programmer to be magnetic tape.

(2) No programmer unit may be equivalenced to lun 56 unless it is first defined explicitly by an Equip card before any compilation or assembly.

(3) The programmer may obtain access to the disc scratch area by an Equip card of the form

```
7
9  EQUIP, u = DR
```

or   *EQUIP, u = DR

(4) The size of this disc scratch area is 80K 24-bit words. Every record written will be padded to an exact multiple of 64 words and a gap of 64 words is left between each record.

(5) Usage is analogous to the usage of magnetic tape and appropriate packing of information allows the most efficient use, for example, if single card images are written only 1000 cards may be stored in the disk scratch area, at an efficiency of 25%.

IV. PUZZLE CORNER

Four people, V. Bary, Miss J. Clarke, G. Petru and J. Tindale, submitted correct answers to last month's probability puzzle. One of these had an answer half that given below because allowance was made for the possibility that the pieces were the same colour! If the Rook is placed on one of the 4 centre squares, it threatens 14 squares and is threatended diagonally by 13 squares for a total of 27. This total is 25 for the squares bordering the centre, 23 for the squares bordering these and 21 for the outer border. The probability is therefore

$$\frac{4}{64} \cdot \frac{27}{63} + \frac{12}{64} \cdot \frac{25}{63} + \frac{20}{64} \cdot \frac{23}{63} + \frac{28}{64} \cdot \frac{21}{63} = \frac{13}{36} = 0.361$$

This month the puzzle is one submitted by L. Dixon and is for the solution of the numeric crossword (or is it crossnumber?) below.

All the entries are numbers and each is a perfect square. That is, 1, 5, 6, 7 across and 2, 3, 4, 5 down are perfect squares. The eight numbers are all different and there are no leading zeros.