C.S.I.R.O.

DIVISION OF COMPUTING RESEARCH

NEWSLETTER NO. 34 - 1st MAY, 1968

I.   GENERAL

Publications Issued this Month

NL - Newsletter No. 34

M6 - Manual Supplement No. 31. Disc File System.

   This is Chapter 23 and Appendix XIV of the DAD System Programmers'
   Manual. Additional copies are available from the Branches or from the
   Publications Assistant, Canberra.

LM - Library Accession List No. 23 - April, 1968.

Seminars

The following seminars will be held at 2.00 p.m. in the Lecture Room of the
Division of Computing Research, Clunies Ross Road, Black Mountain, A.C.T.   Each
is on a Thursday.

May 2nd   - Computer Systems and Operation Techniques in a Multiprocessing
            Environment.
            (D.A. Harragan, Computer Service Centre, Bureau of Census and
            Statistics, Canberra)

May 16th - A Computer Graphics System for Plane Region Maps.
            (R.B. Stanton, Dept. of Electronic Computation, University of
            N.S.W.)

May 30th - The PDP-8 Teletype System and Techniques Used in its Development.
            (B.J. Austin, Division of Computing Research, C.S.I.R.O.,
            Canberra).

Basic Fortran Courses

Sydney   - May 13th, 1968.

Brisbane - June 3rd, 1968.

Canberra - Two courses will be held in June, on the 3rd and 24th respectively.
A few places are still available for the second of these. Anyone wishing to
attend should apply to the Education Officer, Division of Computing Research,
C.S.I.R.O., Canberra.

Melbourne - July 8th, 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).

Advanced Fortran Lecture

A talk and demonstration of a package of programs which enable the Fortran programmer to produce graphical output on the VISTA display device will be given by Dr. G. Shearing. The talk will be at 9.30 a.m., Friday 10th May, 1968 in the Lecture Room at the Division of Computing Research, Canberra and will occupy most of the morning.

Anyone planning to attend should inform the Education Officer, D.C.R., Canberra.

Analogue Computer Courses

During May, Electronic Associates Pty. Ltd. is running five-day courses on analogue computing in Sydney and Melbourne. Following these, a two-day course (27th and 28th May) will be held in Melbourne in the Simulation Laboratory of the C.S.I.R.O. Division of Chemical Engineering. This course assumes a general knowledge of analogue programming and is confined to specific details of patching and operating the EAI 8800.

Anyone interested in this last course should contact Mr. M.J. Cumming, C.S.I.R.O., Division of Chemical Engineering, P.O. Box 4331, Melbourne or telephone 640251, extension 531.

New Equipment

A PDP-8 computer has now been installed in Canberra. It is currently being adapted to function as a controller to enable five teletypes to be connected to the Control Data 3600. The design and construction of the interface has been carried out as a research project within the Division. It is anticipated that eventually a number of new devices will be linked to the 3600 through the PDP-8 and the interface.

Telex Facilities in Melbourne

A Telex machine is now available at the Melbourne Branch of the Division. The number is AA30356.

Charging for Magnetic Tapes

As from 1st July, 1968 the Division of Computing Research will charge for magnetic tapes on a Divisional or Departmental basis, as distinct from the individual charge code basis which has applied previously.

This policy enables the resources of a Division to be pooled in the sense of the number of tapes purchased.

Should there be a Divisional requirement to retain the individual charge basis, written notification is required by 15th June, 1968.

From the 1st July also, all monthly reminder notices will be issued from Canberra via the Branches, enabling the consolidation of tape holdings throughout the network.

Jobstacking from the Branches

As is well-known, card decks are sent daily from the Branches to the Canberra Centre by means of a "jobstacking" program which is then "unstacked" in Canberra. The cards are written on magnetic tape with the Branch card reader operating at full speed (about 1250 cards/minute).

Recently the volume of cards to be written has become very large, so that in some areas the length of time to form the jobstack tape(s) is becoming of the order of one hour. One reason for this appears to be that some users repeatedly submit card decks containing large numbers of cards, and it seems that only minor amendments have been made on successive submissions.

Although there is no objection to the single submission of a large card deck to the 3600 either through the jobstack or at the Centre, users should be aware that their colleagues may be seriously affected by the repeated submission of large decks, in that considerably less time is available for the prime check-out function of the 3200's.

A request is therefore made that when a user submits a job of more than about 500 cards in length, if this job is to be resubmitted for amendments (to either program or data), he should contact his local Branch who will advise him of the preferred methods of operation.

Staff News

Mr. R. Smith of the Sydney branch has resigned his position as Senior Computer Operator to take up a position with Overseas Containers Ltd.

II. 3600

Disc Control Statements

The following control statements have been added to the system.

      *DFLIST

      *DFLISTAL

      *DFLOCATE

      *DRLOCATE

      *DRCOPDF

```
*DRDELDF

*DFCOPDR

*DFDELDR

*DFDEL
```

These statements enable users to hold documents on the disc file system
and to retrieve them as required. Currently the disc is cleared at weekends so
that documents cannot be preserved over the weekend in this way.

A full description of these statements, together with some examples for
their use, is given in Chapter 23 of the DAD System Programmers' Manual (issued
as Manual Supplement 31).

MSU System

As from June 3rd, the MSU statistical system routines will only be available
as system documents resident on the disc, necessitating changes in control cards
to access these documents. A complete discussion of disc control statements
can be found in Chapter 23 of the DAD System Programmers' Manual (issued as
Manual Supplement 31). Consideration of the content of his load-and-go unit may
enable the user to achieve a deck structure tailored to his specific purpose.
For most purposes, however, the following structure is suggested in which one
unit is used for each system required (CORE, COMFAC etc). The ERASE control
statement forces first reference on the unit and is necessary since the charge
codes do not agree.

```
        *JOB,cc,id,t
        *DESC,DF
        *ERASE,1
        *ERASE,2

             :    :    :

        *DFCOPDR,1,CBC****,CORE
        *DFCOPDR,2,CBC****,COMFAC

             :    :    :

        *FTN,X,L
             SUBROUTINE PLANT
             END
                 SCOPE
        *LOAD,1         (loads CORE)
        *LOAD           (loads PLANT)
        *RUN
             Data for CORE
        *LOAD,2         (loads COMFAC)
        *LOAD           (loads previous PLANT. If a new PLANT is required,
                         69 should be rewound before the new FTN card.)
        *RUN
             Data for COMFAC

             :    :    :

        *EOD
```

System Documents

It has been the practice to hold on the drums various system documents,
e.g. the Display Library, SIMSCRIP, OSERIES. Some of these documents are used
infrequently, and since drum space is at a premium it has been decided that
copies of these documents should be held on the disc, and brought onto the drum
only when required. Then, if the document is idle, it may be flushed from the
drum like any other user document.

A display user, who finds that the display program he requires is not on
the drum, should copy it onto the drum using DISCDOCS. Users of other system
documents should check, within their program, that the document is on the drum
and copy it from the disc if not, e.g. all Simscript users should commence their
jobs with

```
*JOB,cc,id,t
*DESC,DF
*DRLOCATE,52,CBC*****,SIMSCRIP
*DFCOPDR,52,CBC*****,SIMSCRIP
    (the above statement is skipped if the document is already on the
    drum)
*EQUIP,47=52
*LOADMAIN,47
*RUN,5,5000
. . . . . .
```

Use of Paper Tape in the DAD System

At present non-standard mode paper tape is physically input and output by
the system, frame by frame, and the PK facility is provided to pack input to six
frames per computer word. Output documents must be produced with one frame per
word. This method is wasteful of drum space for output, and for both input and
output is slow. In the case of input particularly, it results far too frequently
in hardware reading errors.

It is proposed to change the paper tape hardware on June 3rd, 1968 so that
packing and unpacking of paper tape frames four per computer word will be
automatic. Only users of PK and NC modes will be affected, and the differences will be:-

(a) Input should be more reliable.

(b) Delays of input should be reduced (the tape will be read at four times its
     previous speed).

(c) Output documents will be one quarter of their previous length, and the
     charge reduced similarly.

(d) Input documents will be one and a half times their previous length, and
     the charge increased accordingly. This is regretted, but unavoidable, and
     it is considered that the other advantages outweigh this disadvantage.

(e) Various software changes, both to the system and to some users' programs will be necessary.

Changes to users' programs are outlined below, if necessary, further assistance may be obtained from D.C.R. staff.

(a) Programs using PK mode input, and subroutine NEXTCHAR.
Eventually PK as a mode designator in a paper tape header will be illegal, and should be replaced by NC, however PK and NC will have identical meanings for at least a month after the change-over. No other changes by the user should be necessary, as the library subroutine NEXTCHAR will be changed appropriately.

(b) Programs currently using NC mode input or output.
The user will have to alter his program appropriately. For output the library subroutine OUTTAPE(L,I) is recommended (see below).

Subroutine NEXTCHAR

This library subroutine will be changed on June 3rd as outlined above to accommodate hardware changes. Two new entry points will be added:-

a)   Entry point INTAPE (L)

This will be added to provide compatibility with 3200 software. A call

$$I = INTAPE (L)$$

will input one paper tape frame on logical unit L into the lower 8 bits of integer variable I. It provides automatic unpacking and buffering as does NEXTCHAR.

b)   Entry point OUTTAPE(L,I)

This will be added to provide automatic buffering and packing of NC mode non-standard paper tape output. A call

$$CALL OUTTAPE(L,I)$$

will output one paper tape frame on logical unit L from the lower 8 bits of integer variable I. It will provide compatibility with 3200 software, although the dummy call necessary on the 3200 to complete the document will be unnecessary (but not illegal).

It should be appreciated that these routines do not use the Fortran input/output routines so that other Fortran calls to the same unit, e.g. Backspace, Endfile, Rewind, etc. are inadvisable. These remarks also apply to NEXTCHAR.

SCOPE 5 Magnetic Tape Labels

At present, the DAD system will accept tapes labelled in either SCOPE5 or SCOPE6 format. From June 3rd, tapes with labels in the SCOPE5 format will not be recognised as labelled. Holders of such tapes, which all date from before 1.11.66 have been notified of our intention to make this change. They should make arrangements to copy any SCOPE5 labelled tapes. Where a tape is intended purely as a backup, so that its anticipated use is very rare, it may be used as an unlabelled tape without copying. Otherwise, the tape must be copied and released.

Plotting in the DAD System

The declaration SP has been made legal in EQUIP statements referring to PL or PB. It implies that a special paper and/or pen is required. Users desiring to plot on special paper, or with a special pen, should use the declaration SP and describe their special requirements on the job request card. Where no SP declaration is made, or where no description of the special requirements is supplied by the user, the plot will be output on standard ruled paper with a normal ball point pen. This change will apply from June 3rd.

System Subroutines PLOT and TEXT

The 3600 library routines PLOT and TEXT have been re-written and will replace the current versions on June 3rd. 3600 user programs using the labelled common block RHHUDSON will have to be altered as this feature has been removed in the new versions. The new routines are otherwise compatible with the old.

The new 3600 routines will be an overset of their 3200 counterparts. However, to achieve this aim, the 3200 CALL PLOT(X,Y,I) with I = 5,6 or 7 (i.e., point plots) will no longer be allowed.

PLOT and TEXT are entry points in the new routine. Two additional entry points are provided; PLOTSET and PLOTCHOP. These entry points and other differences from the current routines are described below.

CALL PLOT(X,Y,I, L)

X, Y and I have their current definitions. L is an optional parameter indicating the logical unit containing the plot. Simultaneous plots are allowed on a maximum of 4 logical units. If L is absent logical unit 1 is assumed.

CALL TEXT(C,I,M,L)

C, I and M have their current definitions. L is optional and has the same meaning as defined for PLOT.

CALL PLOTSET(I,L)

This entry point provides a means of specifying (in 90° steps) the orientation of the plot axes with respect to the paper. The absence of the call or I = 1 implies the current nominal orientation. Otherwise the axes are rotated counter-clockwise from the nominal position by $(I-1)*90^o$ where I=1,2,3 or 4. As above, L is optional.

CALL PLOTCHOP(L)

As above, L is optional. This call initiates the following actions,

1. The partially filled buffer for logical unit L is written on to L.
2. Logical unit L is released.
3. L is re-assigned to the same hardware type.

CALL PLTDUMP

Since plots are written to the plotters in 20 word records some means of dumping a partially filled record at the end of a job is required. This was provided in the current version by the entry point PLTDUMP. It is a dummy entry point in the new version.

In the new plot routine the buffers will be dumped <u>automatically</u> at the end of the job or between overlays and segments.

Display Program FRED

An editing program FRED, written by R.H. Hudson of the Division, has been added to the 3600 display program library.

When FRED is called (using the Display Program Request Form) the first thing seen on the screen is a list of the commands which can be used in FRED. These commands may be used to copy documents on to the screen, view different parts of the documents, make insertions and deletions and make a new document on the drum from the edited copy. The commands are typed in either singly or in strings of commands at the top of the screen and the bottom twenty lines of the screen are used for displaying the document.

FRED is in some applications more convenient than CIDER but cannot, at present, be used for deleting whole lines or preparing original documents. Users should find it quite useful and to a large extent, complementary to CIDER.

The use of the "command" method of operation used by FRED was motivated by the remote teletypes currently being added to the system.

Library System for Binary Programs

Users who have accumulated a number of programs in regular use may be interested in a system developed by the Division of Animal Genetics for access to a library of programs stored on a magnetic tape in relocatable binary form. This system is designed only for 3600 use.

A program is loaded from such a tape with a minimum number of control cards which include a card containing the program reference name so that the user need not know the position of the program on the library tape. Programs are maintained in block form to minimise tape skipping time. The desired program is unblocked and, if necessary, control cards are inserted in the job document to load it. The library tape may be assigned to any convenient unit and may contain relocatable overlay programs.

A program to update the library tape has also been prepared to permit deletion, replacement and addition of programs and sorting into any desired order which will normally be determined by frequency of use. This program also performs the blocking operation and verifies all tape copying.

Further information may be obtained from B. McHugh of the Division of Animal Genetics, North Ryde, N.S.W.

III. 3200

Subroutine PLOT

The plotting routines for the 3200 and the 3600 have been changed to make them compatible. From June 3rd, CALL PLOT (X,Y,I) with I = 5,6 or 7 to produce point plots will no longer be allowed on the 3200. Facilities previously available on the 3200 have been added to the 3600 system and a description is given in the 3600 section of this Newsletter. The fourth parameter L described there is allowed on the 3200 but acts as a dummy.

IV. PUZZLE CORNER

Correct answers to the puzzle for last month were submitted by W.M. Harper and Mrs. G. Keig. The only solution with one digit for the integral part is $3\frac{69258}{714}$. W.M. Harper also included the nine possible solutions with two digits in the integral part and went on to suggest the puzzle for this month.

The problem is to find a simple proof that $2^{1092} -1$ is divisible by 1093^2.