C.S.I.R.O. COMPUTING RESEARCH SECTION

NEWSLETTER NO. 18 - 1.11.66

I.   GENERAL

Publications Issued this Month

NL - Newsletter No. 18

TM - Technical Note No. 19 - A Basic Package of
Subroutines for using the VISTA visual display
unit.

Seminars - Canberra

The Seminar timetable published in the last Newsletter
has been amended. The complete timetable is given below. The
new starting time should be noted.

November 10	A proposal for an On-line Facility for Picture Processing and Graphical Communication	Dr. J.P. Penny
November 24	A Simple Compiler-Compiler	Dr. P.J. Claringbold
December 8	The Role of Analogue and Hybrid Machines in Scientific Computation Today	M.J. Cumming
December 22	Recent Advances in Numerical Classification	Dr. W.T. Williams

The meetings will be held at 2.00 p.m. in the Lecture Room,
Computer Building, Clunies Ross Street, Black Mountain, A.C.T.

C.R.S. Library

Computer users who wish to borrow textbooks or periodicals
from the Section library are asked to make their requests
through their own library. This does not apply to Canberra-
based C.S.I.R.O. staff from the Division of Land Research,
Plant Industry, or Entomology who may borrow personally.

Basic Fortran Course

Hobart, November 28 – December 2. This will be the first course given in Tasmania by the Section. Arrangements for the course are being made by the Chief Commissioner, Forestry Commission and applications to attend should be made to him at 12 Murray Street, Hobart.

VISTA

A set of subroutines to enable the Fortran programmer to use the visual display device, VISTA has been prepared. These Vista Basic Subroutines (VBS) are described in Technical Note 19 and have been the subject of a seminar.

It is expected that VISTA will prove a powerful tool for graphic display and for work involving interaction between the user and the running program.

Since some new concepts are involved in programming for VISTA, it is planned to issue additional notes on its use, including a number of sample programs. Further demonstrations and possibly, another one day course on its use will also be organized. Anyone wishing to use the VBS package can obtain it from Dr. C. Abraham, C.R.S., Canberra. Those who are interested in learning to write programs which use VISTA are asked to contact J.S. Drabble, C.R.S. Canberra.

A Review

The September, 1966 issue of Scientific American is devoted entirely to the use of computers for information processing. This review should interest many readers and may stimulate thought on new applications. There are twelve articles ranging from "Computer Logic" and "The Use of Computers in Science" to "Artificial Intelligence". Several illustrations of the use of graphical displays similar to VISTA are particularly interesting.

Puzzle Corner

From time to time we plan to include a brain-teaser in the Newsletter. Suggestions for this department from readers are invited – inexplicable programming bugs excepted!

The author of this Newsletter, having failed to solve the puzzle below, set the computer to the task. The solutions thus obtained made the answer obvious. The problem is taken from a competition for Russian school children; it is:

For what integral values of n is

$$20^n + 16^n - 3^n - 1$$

divisible by 323?

Solutions from readers are welcomed.

Staff News

Mr. D.C. Knight has left Adelaide to further his studies in the United Kingdom.

Mr. D. Ross is now acting Officer-in-Charge of the Adelaide installation.

Miss V. Wainman has been promoted to a Coder and replaces Mrs. A. Simpson at Adelaide.

Mr. P. Milne will take up duty as a Coder in Canberra toward the end of November.

II. 3600

Equipment Change

A hardware modification (ECO 80) has been made to the 3600. This modification provides better protection of the monitor by increasing the number of illegal instructions able to be detected when the Interrupt System is active. This change makes the central processor a type 3604B as described in Appendix VIII of the 3600 Computer System Reference Manual, Publ. No. 60021300 (Revision G), 1965.

This change will not affect the Fortran programmer. Programmers using Compass will not be able to deactivate the Interrupt System (INF), stop the computer (SLS), or alter certain registers, such as the time limit register, which they have no cause to alter.

Another hardware change which could affect programmers making their own status checks on magnetic tape is that the bit which formerly indicated 'horizontal parity' now indicates 'end of operation'. This implies that parity errors are indicated only by bit 2XXX. (Reference 3600 SCOPE Manual, Publ. No. 60053300, page 3-9).

Tape Labels

SCOPE 6, which is the back up system to DAD, has a different tape label format from SCOPE 5. DAD now writes tape labels in the SCOPE 6 format but will accept input tapes with either SCOPE 5 or SCOPE 6 labels. At a later date (to be notified) only SCOPE 6 labels will be accepted by DAD.

Fortran PAUSE and STOP Statements

The effect of the Fortran PAUSE and STOP statements has been changed. PAUSE becomes a do-nothing statement and STOP causes an immediate exit to the monitor, which terminates the job. No message is provided on execution of either statement. These changes have been made in the routine Q8QPAUSE.

Fortran 5

Version 5 of 3600 FORTRAN will be incorporated under DAD on December 1st. As a result core storage space available to the user's programs will be reduced by about 488 (decimal) words. This is largely due to an increase in the size of the input/output routines needed by Fortran programs which contain FORMAT statements. A user's own program may also increase slightly in length, but should run somewhat faster than previously.

An advantage of this new version is that diagnostics are printed out as text rather than merely as an identifying code number.

A correction to the operation of the IF statement means that minus zero (-0) is no longer distinguishable from plus zero (+0). Users who have been testing for -0, e.g. blank characters read by an I format conversion, are cautioned to amend their programs.

The statement:

IF (K.EQ.-0) 2, 3

should be replaced by the statements:

```
    IF (K.EQ.0) 1, 3
  1 J = K.AND.1
    IF (J.EQ.1) 2, 3
```

New DAD Control Statement

Card images may be printed by the control statement:

*LIST

When *LIST is encountered a page skip is performed on logical unit 61 and subsequent card images are transferred to this unit. An end-of-file on input causes a page skip. The job is terminated when the end-of-document (*EØD) is reached. If the input medium is paper tape, a maximum of 16 words per record is written on unit 61.

Linear Programming Systems

Two generalized linear programming systems, CDM4 and ILP1 are now available under DAD. Information on these is contained in:

CDM4   Reference Manual, Publ. No. 60132300.

ILP1   Technical Applications Bulletin, Publ. No. 60084900a

A Reminder

Since the 3600 operates under the DAD system, users need to consult Memorandum 5 - The DAD system for the FORTRAN user. Anyone to whom a copy is not available may obtain one from The Librarian, Computing Research Section, Canberra.

SORT II

All SORT jobs are now run under SCOPE 6 for which it is designed and some of the difficulties experienced under SCOPE 5 no longer exist. SORT will later be implemented under DAD. To aid the operators and to save time SORT jobs should be arranged as follows:

1. Where possible EQUIP statements should be omitted.
    SORT will locate input tapes by LABEL calls using
    information in the FILE statement. SORT will also
    locate available scratch tapes and label the output
    tape.

2. Whenever possible file names in FILE statements
    should be declared as standard (S) and should
    correspond to the tape labels. SORT will use the
    name in the input FILE statement to locate the input
    tape and the name in the output FILE statement to
    label the output tape. The file name should be of
    14 characters or less.

    Many users at present declare their tapes as
    labelled in an EQUIP statement and unlabelled in the
    FILE statement. This procedure was necessary under
    SCOPE 5 but is incorrect under SCOPE 6 and may cause
    the input tape label to be treated as data.

    Tapes should be declared as unlabelled (X) or
    non-standard (N) only if they are so.

3. Scratch units should be declared as logical unit
    numbers in an S/statement. Under SCOPE 6 there are
    6 tape units available to the programmer. If there
    is only one input tape and one output tape this
    leaves 4 units for SORT to use as scratch units.

III. 3200

3200 System Changes

The JOB card now requires the parameter DP if a recovery
dump is to be taken. Either the absence of DP, or the presence
of ND will indicate that no dump is to be taken.

The processing of arithmetic faults has been changed. When
a divide fault occurs, both the divide fault and the exponent
overflow fault indicators will be set and the result of the
division will be $\pm$ 0 according to the sign of the divisor. An
exponent overflow or underflow sets the exponent overflow
indicator and returns −0.

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 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.