C.S.I.R.O.

DIVISION OF COMPUTING RESEARCH

NEWSLETTER NO. 35 - 1st JUNE, 1968.

I. GENERAL

Publications Issued this Month

NL - Newsletter No. 35

LM - Library Accession List No. 24 - May,1968

Other Publications Available

C5 CSIR NEWTON Solution of Simultaneous Non-linear Equations by the Newton - Raphson Method.
Authors : D. P. McKee and K. Serkowska, D.C.R., Canberra.

BEER - A Display Library Program. This Program enables a keyboard display user to inspect, edit or prepare short drum documents.
Author: G. Shearing, D.C.R., Canberra.

Basic Fortran Courses

Brisbane - June 3rd, 1968

Canberra - June 3rd, 1968 and June 24th, 1968.

Melbourne - July 8th, 1968.

Vista Demonstration

As the demonstration accompanying the Vista lecture by G. Shearing on May 10th was not able to be seen by most people attending the lecture, the demonstration will be repeated at 4.00 p.m. Wednesday, 12th June.

Card Trays

A large number of card trays is missing from the cabinets in the data preparation room in Canberra. Users holding these trays are requested to return them as soon as possible.

Perth Branch

Equipment for the Perth Branch of the Division has now arrived and is being installed at the Floreat Park laboratories of C.S.I.R.O. The installation will use a Digital Equipment Corporation PDP-8/S linked by telephone lines to the PDP-6 at the University of W.A. to enable full use to be made from Floreat Park of the University computer. This remote station will be equipped with a Potter 800 lines

per minute printer, a DEC 200 cards per minute card reader, a DEC paper tape reader/punch and a teletype unit.

Staff News

Dr. W. T. Williams is transferring to the Division of Tropical Pastures in Brisbane. He will be located at the Cunningham Laboratory where he will continue his research in numerical taxonomy.

Mr. E. H. Kinney who was with the Adelaide Branch of the Division between 1964 and 1966 will be rejoining the Division in Canberra. Since returning to the U.S.A. he has been a Systems Analyst with Control Data in Los Angeles where he specialised in 6000 series machines.

Mr. H. McKenzie has joined the Canberra headquarters of the Division as a programming consultant. Since 1966 he has worked with the Commonwealth Department of Health on the processing of pharmaceutical benefits and on management systems.

Mr. C. E. Wallington is at present in Poland as a member of the team representing Australia in the International Gliding Championships.

II. 3600

DRLIST

A new control statement has been added to the DAD system:

*DRLIST, chargecode

Its effect is to tabulate on OUT (Logical unit 61) the names of all existing drum documents of the given charge code. If the charge code is omitted, the user's charge code is assumed. A heading:

CC IDENT ED DATE LENGTH (DR SECTORS)

is produced followed by a single line for each document. The date given is the last activity date, and the length is in drum sectors of 256 words.

New Format for Display Log-in Message

A new format has been introduced for the display log-in message. The change has been made to facilitate the integration of teletypes into the display system, but incorporates other features as well.

The requests "BREAKIN", "LOCATE", "EXECUTE", "DELETE", "PRINT", "PUNCH" and "PLOT" behave as before. "LOGIN" replaces the display program request form. It has fields as follows:-

charge code, display program, extra ident.

Note that no time field is required.

Changes Introduced:

(1) A display program is terminated abnormally with a "TIMESUP" diagnostic if more than 10 minutes elapse between successive interrupts. A user may thus operate with a display program indefinitely (not 2 hours maximum as previously), but must not become dormant for more than 10 minutes.

(2) The charge code field may be left blank after the user has once explicitly stated his charge code in any request. A non-blank charge code field replaces the previously used code even if it or the request in which it appears is invalid.

(3) The user should employ the above property of the system to destroy his charge code on leaving the display; otherwise the following user may unwittingly use it and may destroy a document.

(4) Responses all appear on the second line of the screen, with the explicit form of the request on the first line.

(5) Alternative forms of request, intended for teletype use, may appear on the first line. Display users may also employ these.

Display Program MAPATT

B. G. Cook of the Division of Land Research, Canberra has made available a display program for producing a character map on the screen of the keyboard display consoles showing which sites of a rectangular array belong to an attribute class. The user supplies a document defining the values of attributes and specifies an attribute class by entering a logical expression on the display screen. Any number of different maps may be produced on the screen and all are also printed. The program description is available from the Division of Land Research as Technical Memorandum No. 68/3.

Unlabelled Tapes

As unlabelled tapes have a dampening effect on the 3600 system, requiring operator intervention for their assignment, users are requested to use standard labels wherever possible.

III. 3200

There is no 3200 news this month.

IV. PUZZLE CORNER

The puzzle last month was to prove that $2^{1092} - 1$ is divisible by 1093^2. The solution given by W. M. Harper, who submitted the puzzle, uses modulo arithmetic. With the symbol $\equiv$ representing equality, modulo p^2 where $p = 1093$ and starting with

$$2^{14} = 15p - 11 \quad (1)$$
$$3^7 = 2p + 1 \quad (2)$$
$$3^2 \cdot 11^2 = p - 4 \quad (3)$$

it can be shown that

$$3^2\, 2^{26} \equiv -469p - 1$$
and $$3^{14}\, 2^{182} \equiv -4p - 1$$
so that $$2^{182} \equiv -1$$
and $$2^{1092} \equiv 1$$

Hence 2^{1092} when divided by 1093^2 has a remainder of 1, that is, $2^{1092} - 1$ is divisible by 1093^2. A full proof of this can be found in Hardy and Wright [Theory of Numbers p 72].

For those who prefer to let the computer do the hard work, the following short program will also prove the results by using the fact that $2^{1092} = (2^{13})^{84}$ and calculating the remainder when this is divided by 1093 * 1093. The result is proved if the remainder is 1.

```
      PROGRAM PUZZLE
      IREMAIND = 1 $ IFACTOR = 2**13 $ IDIVISOR = 1093*1093
      DO 1 L   = 1, 84 $ IREMAIND = IREMAIND*IFACTOR
    1 IREMAIND = IREMAIND-IREMAIND/IDIVISOR*IDIVISOR
      IF (IREMAIND.EQ.1)2,3
    2 WRITE(61,100)
    3 STOP
  100 FORMAT(1X,9HDIVISIBLE)
      END
```

The puzzle for this month is to write a Fortran program that will calculate the cube root of a number without using the cube root function, logarithmic or exponential functions, or the +, - or / signs. Only one * may be used and no additional subroutines or function subprograms are to be written.