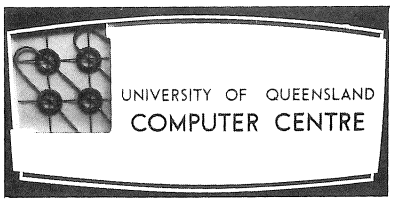

COMPUTER CENTRE BULLETIN

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Editor:
Sarah Barry

ADDITIONAL CORE MEMORY FOR THE PDP-10

In its submission to the Australian Universities Commission for capital funds for computing, the University nominated additional core storage as the item of highest priority.

In anticipation of support from the AUC, and to ensure the earliest possible installation should funds become available early in 1973, the Centre has placed a Letter of Intent for the purchase of 64K words of 650 nsec core memory. Although confirmation or otherwise of this intention will be known by 30 September, we are advising clients of this intention now as the likely installation of significantly more core may affect clients' forward planning.

One outcome would be improved terminal response and batch turn around times. At the moment the PDP-10 is running at its limit of 24 active jobs for the greater part of its time. The main advantage of more core will be that more jobs will reside in core, thereby reducing swapping overheads.

It will also be possible to increase the user's core limit, but if this were increased substantially, the number of core resident jobs would decrease and swapping overheads would again increase. For this reason, should the memory be installed, the maximum likely increase in the user's core limit will only be to 32K.

DATA PREPARATION WORK

With the recent reorganization of the Computer Centre's Secretary's office, many users are confused as to where data preparation work is to be handed in or collected. All data preparation work should be collected from, or handed into, the Receipt/Dispatch window in the foyer of the Centre, not at the Enquiries window. Data preparation forms are available in the Clients' room.

PDP-10 FORTRAN

[WN-95]

1 DEFINITION OF ARITHMETIC STATEMENT FUNCTIONS

The Computer Centre FORTRAN manual MNT-5 does not state that the definition of arithmetic statement functions should precede the first executable statement in the program. This omission will be corrected with the next revision of the manual.

[WN-96]

2 DO LOOPS

The present version of the compiler does not create proper code when a function is used as one of a DO loop's indices.

example:

```
      DO 2830 J=1,MIN0(6,NN)
      -
      -
      -
```

No diagnostic message is produced during compilation but an improper relocatable binary file is produced, and during loading the message

```
?ILL.  FORMAT BLOCK TYPE NNN PROG.name1 FILE name2/REL
```

will be produced. This error has been remedied in a later version of the compiler but until this version is adopted, this construction should be avoided.

3 UNARY MINUSES

Use of the unary minuses in logical expressions or mixed logical and arithmetic expressions do not always produce the correct results, for example,

```
J=(J1.AND."777).OR.((-(N+1)).AND."777000)
J=(J1.AND."777)+((-(N+1)).AND."777000)
```

This has been corrected in a later version of the compiler which will be implemented in due course. Until it is available, it is suggested that this construction should not be used and that the expression be split into two as;

```
JJ=-(N+1)
J=(J1.AND."777).OR.(JJ.AND."777000)
```

PDPUN

[WN-99]

PDPUN may not correctly punch the identification code of other than the first of a series of Fortran files with supplied identification.

This problem will be corrected in the near future.

ALGOL V2

[WN-94]

Version 2 of the Algol system does not allow the use of external FORTRAN subprograms. This feature is discussed in various manuals, and information from Digital indicates that this facility will be available with version 3.

COBOL V3 ERROR

[WN-94]

In use of the sort features of Cobol, it appears that under some circumstances wrong code is created by a Return statement of the form

RETURN filename INTO identifier . . .

This can be overcome by omitting the INTO option, but achieving the same effect by moving the data to the required destination after the Return.

OUTSTANDING PROBLEMS IN COBOL V3

[WN-96]

The following note, prepared on 3 July 1972, gives a summary of known problem areas with Cobol. The large majority of these are corrected by patches issued by Digital and these will be

incorporated as effort becomes available.

THE COBOL COMPILER

(a) This version does not allow qualification of condition names (to be corrected with version 3A).

(b) "RETURN name1 INTO name2" as part of a sort does not work (patch exists).

(c) Comparison for equality of 6-character display-6 fields may not give correct results (patch exists).

(d) Some external references from non-resident segments are not set up properly. The reported situations were
SORT verb in resident code
RETURN and/or RELEASE in non-resident
TALLY in examine generator
TODAY in the USING generator
Size error and display of a COMP-1 variable
(patches exist).

(e) "MULTIPLY name1 BY fraction GIVING name2" where fraction is less than 1.0, e.g. 0.0125; will return the value zero to name2 in some circumstances, depending on the typing of name1 and name2 (patch exists).

(f) A numeric literal in a "VALUE OF DATE WRITTEN" clause fails (patch exists).

(g) The compiler allows a quoted literal for a PROGRAM-ID, but if the literal is less than 6 characters, the remainder of the name is random (patch exists).

(h) The compiler does not successfully restart after a catastrophe dump if it was using a command file.

(i) The compiler will not accept lower case for the first character of a reserved word, although lower case characters are satisfactory in all other positions (a patch to allow the first character to be lower case exists).

(j) Under some circumstances, a spurious warning message "REDEFINITON NOT THE SAME SIZE AS REDEFINED ITEM" may be given. This can occur when the two fields occupy an integral number of words (patch exists).

(k) Under some circumstances, Cobol compiler tables are not expanded correctly. This error may manifest itself as compilation or execution error for which no simple

explanation may be found. A patch exists for one situation such as this, but at least one other may exist.

(l) "PARITY IS EVEN" does not compile properly (patch exists).

(m) Improper line numbers are given for the procedure division map (patch exists).

(n) Compilation using the /P switch will produce a catastrophe dump if "TRACE ON/OFF" is used (patch exists).

(o) It appears as if the construction "OCCURS n1 TO n2 TIMES DEPENDING ON name1" will not create an output record of the size specified by name1 but rather the maximum size n2.

2 THE COBOL EXECUTION PACKAGE - LIBOL

(a) When a random file is opened for output only, any attempt to write to it will terminate the run with an error message "IT IS ILLEGAL TO CHANGE THE RECORD SIZE WHEN THE ACCESS MODE IS RANDOM" (patch exists).

(b) When a Cobol program attempts to open two files which share the same buffer area, the resultant error message is garbled (patch exists).

(c) When an IO file encounters an EOF, a data location is not reset, with the result that the next sequential file input will fail (patch exists).

(d) Multi-file magnetic tapes are not positioned properly (patch exists).

(e) Some advisory messages do not conform to the specifications for Digital's 5 series monitors (patch exists).

(f) IO access to an indexed sixbit file will fail at the first read (patch exists).

(g) Code created for "USE AFTER ERROR" procedure is incorrect (patch exists).

(h) File record areas are improperly cleared under some circumstances when adjacent files are opened.

(i) Some improper checks are made when error situations arise, for example, when a file is not found (some patches exist).

(j) Under some circumstances the wrong quantity is used to calculate record size when a blocking factor is specified.

This will cause an undeserved error message at execution (patch exists).

(k) Open immediately after close on magnetic tape fails (patch exists).

(l) Sort of an indexed file may fail (patch exists).

(m) Some problems exist with indexed files, e.g. the size of an ASCII key is incorrectly computed and under some circumstances the channel used for the index file is not closed (patch exists).

(n) Under some circumstances, there may be an interaction between sort and the use of indexed files which will cause the program to fail (patch exists).

(o) "NEXT GROUP NEXT PAGE" may cause the output of a blank page (patch exists).

(p) An EOF is found when attempting to read an indexed file sequentially (patch exists).

(q) A sort which reads a file created by the same program may get an error (patch exists).

(r) When a null record is found in a random file, subsequent inputs or outputs may fail (patch exists).

3 THE SORT PACKAGE

(a) Under some circumstances, a command file is not accepted (patch exists).

4 RERUN

Rerun has several problems, some of which are related to the version of the operating system currently being used and it is doubtful if satisfactory results will be achieved. A number of patches exist and when these have been incorporated consideration will be given to further testing.

5 ISAM

The Isam utility has some problems in handling ASCII input files and in conversion from ASCII to sixbit files (patches exist).

6 GENERAL

6.1 Supplement to Digital's Cobol Manual

Attention is drawn to a note in Volume XII no 5 of the DECSYSTEM10 Bulletin which states that a supplement to the Cobol manual is now available. This supplement describes ISAM, COBDDT, and COBOL table handling and is available on request from Digital.

6.2 Factors Affecting the Size of a Compilation

In response to a query regarding the size of the largest program that can be compiled within the present core limits, the following suggestions were offered by Digital.

(a) Identifiers longer than 6 characters in length require additional storage.

(b) Condition names (level 88) should be avoided

(c) Keep paragraph names (number and size) to a minimum

(d) Do not use values as data items

(e) Keep literals as short as possible

(f) Avoid ALTERs

(g) Do not use the report writer

It is not likely that great advantage can be taken of these suggestions, but it is worth noting that version 3 of Cobol has proved to be able to compile substantially longer source programs than any of its predecessors.

6.3 Recompilation of Existing Programs

A note in the DECSYSTEM10 Bulleting on April 1 1972 indicates the next release of Cobol will retain the existing version of the execution time package for those programs that presently use it. Programs compiled with later versions of Cobol will compile a version of Libol identified by its version number. In this way, existing compiled programs will continue to run without recompilation. It is, however, recommended that programs previously compiled with versions earlier than version 3 be recompiled.

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26Aug72

NEW COMMAND DECODER

[WN-95]

A new version of the command decoder (version 2E(36)-3) was implemented on the PDP-10 on Wednesday 12 July. A number of important changes were made with this decoder. The changes documented in section 1 and 2 below, foreshadow the implementation of a general program library and extended command capability.

1 Directories

Library directories on the PDP-10 were renamed and in some cases there was some reorganization of the actual files contained on these areas.

Library directories are referenced by name, e.g. PLOT, STATS, MATRIX. The names are not preceded by a dollar sign; a dollar sign is used to indicate a device or pseudo device, e.g. $DSK, $ASR.

User directories are referenced by the project number of the area belonging to that user, e.g. 279, 531.

Files from any directory can be obtained by referencing the directory name and the filename

For example:

(i) RUN MYPROG PLOT.CALCMP(LIB)
runs the file MYPROG (understood to be on the user's own directory) with the library file CALCMP from the PLOT directory.

(ii) STATS.BMD02R
executes the program BMD02R on the STATS directory.

(iii) COPY TUTOR.MYPROG/F4 TO=374.MYPROG/F4
copies the FORTRAN program MYPROG from the TUTOR directory onto project area 374.

On the 12 July, the old library directories ($BMD, $MATH, $MATRIX, $LEARN, $PLOT, $STATS) were removed and reorganized and the new directories are as follows:

Directory	Files	Contents
GAMES	CHESS/SAV	
	DOTS/SAV	

	ELIZA/SAV	
	LUNAR/BAS	
	MOO/SAV	
	NIM/SAV	
	QED/SAV	
		These were all removed from the system directory to GAMES.
HELP	HELP/HLP	explains how to use help
	MANUAL/HLP	gives details of current status of computer centre manuals
	NEWS/HLP	current weekly newsletter
MATH	SSP/REL	a library file containing all the mathematical routines from the scientific subroutine package
MATRIX	MATINV/REL	matrix inversion
	SSP/REL	a library file of matrix subroutines from the scientific subroutine package
	SMIS/SAV	Symbolic Matrix Interpretive System
PLOT	DEC/REL	old Digital plotter routines
	CALCMP/REL	basic CalComp software routines
	DRIVR/SAV	program to read cards for CRVPT
	FLOCT/SAV	Flowchart Generation Utility Program
	FORGN/SAV	Forms Generation Program
STATS	BMD01D/SAV	Simple Data Description
	BMD02D/SAV	Correlation with Transgeneration
	BMD08D/SAV	Cross Tabulation with Variable Stacking
	BMD01M/SAV	Principal Component Analysis
	BMD04M/SAV	Discriminant Analysis for Two Groups
	BMD07M/SAV	Stepwise Discriminant Analysis
	BMD02R/SAV	Stepwise Regression
	BMD01V/SAV	Analysis of Variance for one way Design
	BMD04V/SAV	Analysis of covariance with Multiple Coordinates
		[Note that these programs are now referenced by their complete names]
	SSP/REL	statistical routines from the scientific subroutines package
TUTOR	MYPROG/F4	a program and subroutine used in teaching DDT to users
	MYSUBR/F4	

Initial documentation on the library routines will be available in the clients' room, for reference only.

2 Numeric Filenames

Filenames can consist of 6 alphanumeric characters. The restriction that the first character had to be alphabetic has been removed. The first character of the processor program name may also be numeric. The editor will presently not recognize all numeric filenames or all numeric processor program names.

3 The DIRECTORY Command

A DIRECTORY command in which no argument is specified assumes a default argument of ALL/ALL. That is

```
DIR
and  DIR ALL/ALL
```

both list the user's complete directory.

With the implementation of the changes detailed in section 1 and 2 above, the default of ALL/ALL for filename where none is specified, continues to be assumed with the following results.

(i)	DIR PLOT	lists the directory entry for the file PLOT on the user's area
(ii)	DIR PLOT.CALCMP	lists the directory entry for the file CALCMP on the PLOT library
(iii)	DIR PLOT.	assumes ALL/ALL for the filename and lists the complete directory of the PLOT library
(iv)	DIR 379	lists the directory entry of the file 379 on the user's area
(v)	DIR 379.TEST/F4	lists the directory entry of the file TEST/F4 on project 379
(vi)	DIR 379.	assumes the default option for filename and lists the directory of project 379

4 IDENT Command

The decoder will now recognize the correct spelling of 'exercise' for the argument EXERCISE= exercise-number. EX is an allowable abbreviation for the assignment.

5 ALGOL Command

An ALGOL command, similar to the FORTRAN, COBOL and MACRO commands, has been implemented. The only options available are LIST and NOLIST, BIN and NOBIN.

```
ALGOL(LIST   , BIN   ) {IN={filename-1 {BIN={filename-2
      NOLIST  NOBIN   {LST={filename-3
```

6 OVERLAY

An OVERLAY(Ø) command will now clear any files on the loadlist and commence a new list for the overlay command and those that follow.

7 Error Messages

Decode now gives the correct error messages in all situations.

SCIENTIFIC SUBROUTINE PACKAGE

[WN-98]

The Scientific Subroutine Package comprises a set of over 25Ø Fortran subroutines covering many areas of mathematics and statistics. The following pages list the name and a very brief description of each of the routines. As indicated, these routines are now available in a number of library files on the PDP-1Ø system in the following directories.

(a) STATS directory

The library file SSP/REL contains all the statistical routines from the SSP package. Any of these can be loaded with a user's program by a command of the form

```
RUN prog-name STATS.SSP(LIB)
```

(b) MATRIX directory

Again, the library file SSP/REL on the MATRIX directory contains all the matrix routines of the SSP package. Any of these can be loaded with a user's program by a command of the form

RUN prog-name MATRIX.SSP(LIB)

(c) MATH directory

There are three library files of SSP routines on the MATH directory.

(i) SSPP/REL contains polynomial routines

(ii) SSPF/REL contains other mathematical functions

(iii) SSPM/REL contains miscellaneous routines.

The listing of the routines gives the particular library file in which any given routine is to be found.

The user can load a routine from any library with an appropriate RUN command. For example, if a program called routines from both the library files SSPP/REL and SSPM/REL the command would be

RUN prog-name MATH.SSPP(LIB) MATH.SSPM(LIB)

The scientific subroutine package is classified as type 4 software and is therefore made available on an 'as is' basis.

Interim documentation is now available in the clients' room at the Centre for reference only.

CATEGORIAL GUIDE TO SUBROUTINES AND SAMPLE PROGRAMS

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