



COMPUTER  
CENTRE  
**BULLETIN**

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Editor:  
Mrs Sarah Barry



## CHANGE OF POLICY ON BULLETIN MAILING LIST

In past years the Bulletin has been distributed according to two mailing lists; one for organizations and departments, which is permanent, and the other for individuals, which is maintained on an annual basis.

Unfortunately, however, many organizations and departments have omitted to inform us when they no longer require the Bulletin. Consequently the Centre is continuing to supply the journal at considerable expense, to users who may not necessarily be interested in receiving it.

To overcome this problem, future distribution of the Bulletin will be on an annual basis for all users. Accordingly, existing mailing lists will be cancelled at the end of this year, and organizations, departments, and individuals wishing to receive volume 5 are requested to complete and return the enclosed form on page 187.

## CHRISTMAS SHUT DOWN

The Computer Centre will shut down on Christmas Eve and remain closed during the intervening days between Christmas and New Year. No further work will be processed after 11.30 p.m. on Thursday 23 December. However, the Centre will remain open until 1 p.m. on Friday 24 December to allow staff to finalize end-of-year accounting and users to collect any work or card punching. The Centre will re-open at 9 a.m. on Tuesday 4 January 1972.

## COMPUTER CENTRE COURSES AND SEMINARS

During February 1972, the Computer Centre will conduct a number of courses and seminars. A schedule of these, together with a brief outline of each, is set out below. A complete schedule of Computer Centre courses for 1972 will be published at a later date when lecture room availability and allocation for the year becomes known.

### 1. DIFFERENCES BETWEEN COURSES AND SEMINARS

#### (a) Courses

A course comprises two or more half-day sessions and is intended to instruct students in a given topic at a fairly detailed level. The presentation of the topic is relatively formal and most courses contain practical work. Details of available courses will be published well in advance, and enrolments must be made on the form 'Nomination for Computer Course'. These forms can be obtained from the Computer Centre Secretary. A fee is payable for all courses, and includes machine time used on practical work.

(b) Seminars

Seminars, on the other hand, are fairly short (one or two hours) and deal with a specific topic of general interest, or give details of new services and facilities. While as much advance notice as possible will be given, there will be no attempt to publish a complete schedule of seminars for a year. No charge is made for seminars, and formal enrolment is not required.

2. COURSES IN FEBRUARY 1972

(a) Introductory FORTRAN Programming

FORTRAN (Formula Translation) is a programming language which allows the computer user to express his calculations in a mathematical type of notation. The Introductory FORTRAN Programming course assumes that the student has no prior knowledge of either computers or programming. This course covers some computer concepts, basic FORTRAN programming, and includes several exercises which are run on the PDP-10 computer.

Course duration: five half days

Course fee : University personnel \$20; Others \$40

Prerequisites : None

(b) Introduction to Dynamic Debugging Technique

DDT (Dynamic Debugging Technique), available to remote terminal users of the PDP-10, is a powerful facility which greatly assists in the testing and debugging of programs. This short course introduces DDT and its uses to the FORTRAN programmer, and provides some practical experience.

Course duration: two half days

Course fee : University personnel \$8; Others \$16

Prerequisites : Experience in FORTRAN and use of remote terminals.

3. SEMINARS IN FEBRUARY 1972

(a) Computer Centre Facilities and Services

A general description of the facilities and services provided by the Computer Centre.

(b) Use of Remote Terminals

An introduction to the use of remote terminals on the PDP-10 and the facilities available to the remote terminal user.

(c) The Digital Plotter

This seminar describes the digital plotter on the PDP-10 and discusses its operation, uses and the range of available plotter software.

(d) The Student Accounting System

The student accounting system allows large numbers of small programs (such as those written by undergraduate practical or laboratory classes) to be grouped together and processed quickly and cheaply as one job on a single project number. The class tutor or supervisor can set a cost limit for each student job in the group. The output for each student is identified by name, and the system provides the class supervisor with accounting details for each student.

(e) Absolute Overlays

The absolute overlay facility available on the PDP-10 allows a large program (exceeding the available memory space) to be segmented and run in a small memory space. This seminar describes the use of absolute overlays.

The schedule of courses and seminars is shown on page 172.

COMPUTER CENTRE MANUALS

This year, Computer Centre manuals, coding sheets, flow charts, templates, etc. have been sold through the University Bookshop. However, in view of the growing number of manuals and the difficulties in maintaining the revision status of these publications, it has been decided that this material will be sold directly in the Computer Centre from 4 January 1972.

A revised list of manuals and supplies including prices for 1972 follows:

MANUALS

MNT-5	FORTTRAN	\$1-50
MNT-6	EDITOR	\$0-80
MNT-8	SYSTEM USER'S GUIDE	\$3-60
MNT-9	BASIC	\$2-40
MNT-10	AID	\$3-00
MNT-12	§1,2 OVERLAYS AND PLOTTER	\$0-90
	§3 DDT-10	\$1-30

SUPPLIES

CODING SHEETS	\$0-50
FLOWCHART TEMPLATES	\$1-00
H.S.P. BINDERS	\$1-10

SCHEDULE FOR FEBRUARY 1972

Date	Commence Time	Title	Type	Location	Course Duration	Course fee		Nomination Closing Date
						Univ.	Other	
1.2.72	10 a.m.	Computer Centre Facilities and Services	Seminar	B18 Engin.				
3.2.72	10 a.m.	Use of Remote Terminals	Seminar	B18 Engin.				
7.2.72	9 a.m.	Introductory FORTRAN Programming	Course	B18 Engin.	9 a.m. - 1 p.m. 7.2.72 - 11.2.72	\$20	\$40	31.1.72
21.2.72	10 a.m.	Use of Remote Terminals	Seminar	B18 Engin.				
22.2.72	10 a.m.	The Digital Plotter	Seminar	B18 Engin.				
23.2.72	10 a.m.	The Student Accounting System	Seminar	B18 Engin.				
24.2.72	10 a.m.	Absolute Overlays	Seminar	B18 Engin.				
24.2.72	2 p.m.	Introduction to Dynamic Debugging Technique	Course	B18 Engin.	2 p.m. - 5 p.m. 24.2.72 - 25.2.72	\$8	\$16	17.2.72

In order to ensure that adequate stocks of all manuals are available for the beginning of first term next year, the Centre requests that all University staff members giving courses with some computing content advise the Centre, as soon as possible, of the course, anticipated number of students next year, and the manuals which will be required in that course. For your convenience the form on page 185 should be completed and returned to Mrs Sarah Barry at the Computer Centre.

### PDP-10 RANDOM AND SEQUENTIAL FILE ACCESS

[WN-62]

Users should not attempt to mix random and sequential modes of access for the same file in a FORTRAN program. The following rules for reading and writing FORTRAN files should be observed.

- (a) A logical unit may not be used for sequential and then random input/output in the same program unless an intervening CALL to RELEASE is issued. For example, if sequential input/output is done to unit 10, then random input/output to unit 10 is illegal and will fail.
- (b) Before random input/output is performed through a READ or WRITE statement, the file must be properly defined through a DEFINE FILE.
- (c) CALLs to IFILE or OFILE open files for sequential input/output. They must not be issued for logical units to be used for random input/output. If it is desired to open a file for sequential input/output on a unit that has been used for random input/output, a CALL to RELEASE must be issued before a CALL to IFILE or OFILE.

### ENCODE/DECODE SYNTAX RESTRICTIONS

[WN-62]

The number of characters specified in ENCODE or DECODE statements may be an integer variable or an integer constant but not an expression. For example;

```
ENCODE(20,10,A) I,J,K
```

```
DECODE(N,40,A) X,Y
```

are acceptable provided statement numbers 10 and 40 are legal format statements.

The following statement produces a compilation error:

```
*****          ENCODE(K*J,10,A) I,JK
*****          ↑
*****          S-1 SYNTAX
```

Note also that a similar restriction applies to logical device numbers in READ and WRITE statements.

## PDP-10 FORTRAN ERROR

[WN-65]

An error has been detected in the routine used to print asterisks when an output field width is too small. Instead of incrementing the count of errors it adds one to a location which is usually a user program instruction. The effects are unpredictable and usually not noticed. Until this is fixed any program which gives the 'OUTPUT FIELD WIDTH OVERFLOW' message must be suspect. The use of G type format specification is recommended to avoid this situation.

## COGO

[WN-64]

A new version of COGO (Coordinate Geometry program) has been implemented on the PDP-10. The Main Roads Department has developed this package for the PDP-10 and has made it available to the University for general use. Complete documentation on this program can be obtained from the Computer Branch, Main Roads Department.

## LINE PRINTER SYMBIONT

[WN-65]

A new version of the line printer symbiont program has been implemented. Most of the changes are not apparent to the user except for the implementation of the argument ALL. A user can now specify ALL as either the name, processor program name or both, in order to list a group of files with the one command.

example:

LIST ALL/F4, PROGR/ALL

## LIBRARY ACCESSIONS

BRIGHTMAN, Richard W.	<i>Information systems for modern management</i> 1971 (HF5548.2.B758 Main)
ADAMS, J. Mack	<i>An introduction to computer science</i> 1970 (651.8 ADA Engin.)
-	<i>All about minicomputers</i> 1970 (QtoQA76.A5 Main)
WATSON, Richard W.	<i>Timesharing system design concepts</i> 1970 (651.8 WAT Engin.)
CONFERENCE ON COMPUTATIONAL PHYSICS, 2nd LONDON 1970	<i>Computational physics</i> 1970 (QC20.2.C6 Phys.)



SHULMAN, Arnold Roy

*Optical data processing* 1970 (535.02462 SHU Elect.)

GREENBERG, Harold

*Integer programming* 1971 (519.9 GRE Maths)

McMILLAN, Claude

*Mathematical programming* 1970 (T57.7.M35 Main)

### PLOTTING AND REGRESSION PROGRAMS

Mr Whiten, from the Department of Mining and Metallurgical Engineerin, has kindly offered the use of the following programs should any Computer Centre users be interested.

- (a) A FORTRAN subroutine for plotting on the line printer.
- (b) A multiple spline regression program as described in 'The Use of Multi-Dimensional Cubic Spline Function for Regression and Smoothing' Australian Computer Journal, May 1972.

A brief description of these programs follows.

#### GRAPH PLOTTING ON THE LINE PRINTER

This subroutine is in the file 94.LPPLOT/REL and its calling sequence is:

```
CALL PLOTG(N,X,Y,LX,LY)
```

where the arguments are

N number of data points

X an array containing x coordinates of the points to be plotted

Y an array containing the corresponding y coordinates of the points to be plotted

LX length of the x scale in inches (10 is normal)

LY length of the y scale in inches (8 is normal).

The graph is printed starting on a new page. A title if required may be printed under the graph. Overlapping prints are printed as a count until 10 and then a \$ is printed. The cost per graph is about 25 cents.

#### THE MULTIPLE SPLINE REGRESSION PROGRAM

The multiple spline regression program consists of three separate passes each with its own data. Scratch files are used to pass the data values between these passes. Each pass can be run separately if desired.

## PASS I

This is the input pass. A listing of the data and the distribution of each variable is printed. An option exists for transforming the data using the subroutine TRANS.

The input data is as follows:

- (a) A problem heading - 75 characters  
FORMAT (15A5)
- (b) The number of raw variables and the number of transformed variables in fields of 5 characters (right justified). Neither value can be greater than 10.  
FORMAT (2I5)
- (c) The 5 character alphabetic names for the transformed variables. The names start in the following columns 6, 13, 20, 27, 34, 41, 48, 55, 62 and 69.  
FORMAT (5X, 10(A5,2X))
- (d) The data point name (columns 1 to 5) and the data values for each data point in fields 7 characters wide starting from column 6. One card is used for each data point and the end of the input marks the last data point. The data values are best scaled to be in the approximate range 1 to 1000.  
FORMAT (A5, 10F7.0/(F12.0, 9F7.0))

Sample data

	SAMPLE DATA				19/3/71
	4	4			
	X VAL	Y VAL	Z VAL	WT	
T1	1.2	1.62	25.	1.0	
T2	1.1	1.84	29.	1.5	
T3	2.4	1.59	31.	2.0	
T4	2.1	1.85	37.	1.0	

## PASS II

This pass applies spline transformations to single variables as specified in the input cards. The data is read from a scratch file and the transformed data is written onto a second scratch file.

The input data is as follows:

- (a) The names of variables to go onto the output scratch file without change. The names start in columns 6, 13, 20, 27, 34, 41, 48, 55, 62 and 69. A blank field marks the end of these names.  
FORMAT (5X, 10(A5, 2X))
- (b) (i) The name of the variable (column 1) to undergo spline transformation, the number of knots (right justified columns 6 - 10), and the word PERIODIC from column 13 if a periodic spline function is required.  
FORMAT (A5, I5, 2X, A5)

- (ii) The x values of the spline knots in fields of 7 characters starting in column 6.

FORMAT (5X, 10F7.0)

The data in (b) can be repeated as required until 50 values have been specified for the output scratch file.

Sample data

```
      Z VAL  WT
X VAL   3
      1.0   1.75  2.5
Y VAL   3 PERIODIC
      1.6   .17  1.8
```

### PASS III

This pass converts the one dimensional transformations of pass II to multidimensional functions, performs the regression, and prints the results.

The input data is as follows:

- (a) The name of the dependent variable (column 6) and the name of the weighting variable if any (column 13)  
FORMAT (5X, A5, 2X, A5)
- (b) The independent variables. First a type code - 5 blank spaces for the sum of variables and/or one dimensional spline functions, or PRODb for the product of spline functions. Then the names of the variables starting in columns 6, 13, 20, 27, 34, 41, 48, 55, 62 and 69. This card type may be repeated as required to obtain a sum of product functions. Up to 64 function values can be calculated.  
FORMAT (A5, 10(A5, 2X))
- (c) END starting in column 1. MATRIX starting in column 6 if the Cholesky reduced regression matrix is required.  
FORMAT (A5, A5)

The complete regression description ((a) to (c) above) may be repeated as often as required.

Sample data

```
      Z VAL  WT
      X VAL  Y VAL
END  MATRIX
      Z VAL
PROD X VAL  Y VAL
END
```

The first half of the data specifies a regression equation to predict Z VAL as a sum of spline fraction X VAL and Y VAL using WT as a weighting function. In the second half Z VAL is predicted using a two dimensional (product) function of X VAL and Y VAL.

The deck setup for the PDP-10 computer is:

```
.JOB - - -  
.RUN 94.MSRI, 94.TRANS  
    } Pass I data  
file separator card  
.RUN 94.MSRII  
    } Pass II data  
file separator card  
.RUN 94.MSRIII  
    } Pass III data  
file separator card  
.EOJ
```

The file 94.TRANS contains a no transformation subroutine. To make transformations other than spline a transformation subroutine must be written and loaded instead of 94.TRANS. In this case the transformations are made card by card using a subroutine starting as follows:

```
SUBROUTINE TRANS(NRV,NV,CODE,D)  
REAL D(10)
```

The arguments are:

NRV        number of raw variables  
NV        number of transformed variables  
CODE      the 5 character data set code  
D         a ten element array containing the data values.

#### INDEX OF COMPUTER CENTRE BULLETIN VOLUME 4

<u>Volume Numbers</u>	<u>Pages</u>
1	1 - 11
2	13 - 27
3	29 - 34
4	35 - 51
5	53 - 71

6	73 - 86
7	87 - 106
8 & 9	107 - 135
10	137 - 146
11	147 - 167
12	169 - 187

	page reference
<b>A</b>	
Access to files within other projects	58-59
Applications Analyst, appointment of	32
Articles	
A Dynamic Storage Management Procedure	80-85
Introduction to Decision Tables	43-51
Plotting and Regression Programs	175-178
Programming with Decision Tables	64-71
Smis	132-135
Australian Computer Society	
Fifth Computer Conference	11
Overseas Visitors Programme	
Professor Galler	89
Professor Wilkes	86
Professional Development Seminar	23-27
Articles presented, see under Articles	
Australian National University Seminar on Optimization	165-167
<b>B</b>	
Basic	
Randomize command	36-38
Errors	96, 144
Batch	
Command cards	127
Errors in new Batch	138
New system released 9 Sep 71	123-125
Use of COPY command	149
Use of question marks	77
Biomedical Computer Programs	158
BMD01D Simple Data Description	159-160
BMD02D Correlation with Transgeneration	160
BMD08D Cross-Tabulation with Variable Stacking	161
BMD01M Principal Component Analysis	161
BMD04M Discriminant Analysis for Two Groups	162
BMD07M Stepwise Discriminant Analysis	162-163
BMD02R Stepwise Regression	163
BMD01V Analysis of Variance for One-way Design	163-164
BMD04V Analysis of Covariance with Multiple Covariates	164

Building changes to Centre	73
Bulletin Mailing List	169
BYTE, Function subprogram to manipulate bytes	144-146
C	
CHES	77-80
COBOL	
command	59-61
errors	95
options	125-126
COGO	174
Command format extended	59-61
Command language specifications	150
Commands, new and extended	59-61, 73-75
COMPARE command	60
Computer Centre	
Developmental work	
Hardware	148
Software	40-41
Services	
File listing	36, 90-91
Punched card output	107
Computer charges, revised for 1971	3
Computer Courses	4, 38, 87-88, 169-172
Computer Operations	15-16
Computer System Status Service	30, 35
Computer, Use of	13-14
Conditions of Use and Liability Statement	8-10
Consulting times, extension of	147
COPY command through Batch	149
CSIRO Workshop on 'Pictorial Organization and Shape'	137
D	
Data files	
General description of PDP-10 file system	16-23
Use by FORTRAN programs	103-106
Decision Tables	
Introduction to ~	43-51
Programming with ~	64-71
E	
Editor, new version	137
Eigen subroutine	131-132
ENCODE/DECODE	111-113, 173

F

FORTRAN-IV on the GE-225	
errors	38-39, 64
FORTRAN-IV on the PDP-10	
Warnings and errors	
Common subscript expressions	5
Digits in continuation field	94
Execution error	63, 121
Error in complex arithmetic	39
Error in FORTRAN Library	8
Error in FORTRAN Manual	92
Error in use of scratch files	64
False diagnosis caused by Implicit statement	31
Format specifiers	139
Free field input	140-141
Implied Do Loops	141-142
Implied Long precision operation	93
Incorrect error messages	94, 100
Incorrect filenames	93
Jumps outside of Do Loops	93
Large arguments for sine and cosine	94
Mixed mode arithmetic	94, 119
Recognition of tabs	93
Repeats of slashes	141
Representation of characters on coding sheets	40
Restoration of variables in a calling sequence	31, 77
Significant digits for Real constants	5
Skipping records in non-formatted files	151
Subprogram names	139
Unit numbers in READ or WRITE	92
Unnecessarily complicated statements	151
Use of quote character in a Hollerith string	40, 120, 143
BYTE, function subprogram to manipulate bytes	144-146
Core storage allocation	138-139
Corrected errors	121-122
Data files, IFILE, OFILE, CALL RELEASE	18-22, 173
Direct Access I/O, DEFINE FILE	108-111, 173
ENCODE/DECODE	111-113, 173
END and ERROR	111
Error messages	117-118
ERRSET	116
Execution summary	119
FORTRAN compiler released 14 Dec 70	6-8
FORTRAN system released 2 Aug 71	107-123
IFIX, INTIER, and ENTIER	122
Improvements of I/O reporting	151-154
JOBAL	116
Multiple returns from subroutines	113-115
New Operating system released 27 Sep 71	151-156
Output field exceeds Format	115-116, 174

Printer Control characters	154-155
Random Number Generating Subprograms	128-129
REWIND	122
Use of Data files by FORTRAN programs	103-106
Use of REWIND, ENDFILE and CALL RELEASE	150-151
G	
Games	
CHESS	77-80
MOO	97
I	
Index of Volumes 1 and 2	vol. 2 pp. 167-169
Index of Volume 3	vol. 3 pp. 105-107
L	
Library Accessions	see U.Q. Library Accessions, also 32-34, 42-43, 63, 98-101, 126-127, 156-157, 174-175
LIMIT command	73-75
Line Printer Symbiont	90-91, 174
LIST command	90-91
Logout changes	129-130
M	
MACRO	
command	60
error	144
Manuals	3, 30, 92, 127-128, 138, 171, 173
Matrices	
Eigen and Zeigen	131-132
Matinv error	131
Matrix Inversion and Solution of Simultaneous Equations	102-103
MRLP-SLIP	157
MOO	97
O	
Overlays	92, 150



P

Paper Tape		
Incorrect use of	31	31
Supported use of		57-58
Plotter		
Available to Batch		75-76
Changes to plotting routines		155
PLOT command		59
PLOTI subroutine modification		123
Out of bounds error		130-131, 144
Release of plotter		53-55
Use of plotter with overlays		92
Plotting program for the line printer		175
Printer control characters		154-155
Punched card output		107

R

Random and Sequential File Access		173
Random Number Generating Subprograms		128-129
Regression Program, Multiple Spline		175-178
Remote Terminals		
Availability of		1-3
Release of new Batch		125
Review of Initial release		15
Use of FORTRAN I/O		23
REWIND, ENDFILE, and CALL RELEASE		150-151

S

Seminars		169-172
Sequential (and Random) File Access		173
SMIS		132-135
Software classification		42, 62
Software releases		
Editor 25 Aug 71		137
FORTRAN compiler released 14 Dec 70		6-8
FORTRAN compiler, execution package, and library routines		
2 Aug 71		107-123
New Batch system 9 Sep 71		123-125
New Decoder 27 Apr 71		53-62
New FORTRAN Operating System 27 Sep 71		151-156
New Login, Logout, Decode 9 Sep 71		148-149
New Monitor 23 Sep 71		149
New System implemented 7 Dec 70		5
Systems programs, availability of		61

T

Teletype supplies	96
Timesharing	
Further extension of hours	35
Increased file storage, and extension of hours	29-30
Initial release	1-3

W

WISP, new version of	157
----------------------	-----

Z

Zeigen subroutine	131-132
-------------------	---------

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