COMPUTING CENTRE NEWSLETTER
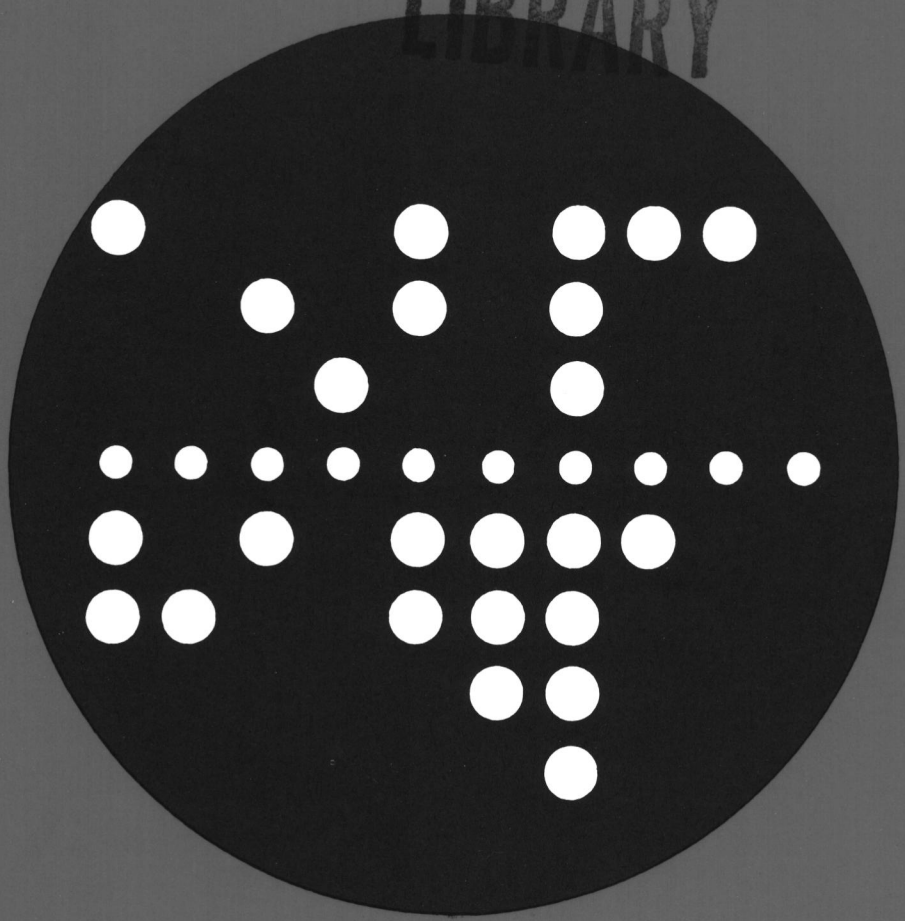
April 1981 - N. **50**

Commission of the European Communities

JOINT
RESEARCH
CENTRE

Ispra Establishment

CONTENTS

EDITORIAL NOTE

The Computing Centre Newsletter is published monthly except for August and December.

It describes developments, modifications and specific topics in relation to the use of the computing installations of the Joint Research Centre, Ispra Establishment.

The aim of the Newsletter is to provide information of importance to the users of the computing installations, in a form which is both interesting and readable.

The Newsletter also includes articles which are of intellectual and educational value in order to keep the users informed of new advances in computer science topics.

The Editorial Board is composed as follows:

J. Pire.   Responsible Editor.

M. Dowell.   Technical Editor.

Administration and contact address:

        Ms. A. Cambon (tel. 730)
        Support to Computing
        Building 36
        J.R.C. Ispra Establishment
21020-ISPRA (Varese)

LEGAL NOTICE:

Neither the Commission of the European Communities nor any person acting on behalf of the Commission is responsible for the use which might be made of the information in this Newsletter.

NEW MAGNETIC TAPE UNITS

M. Dowell

Within a short time new magnetic tape units will be brought into service and will progressively replace the present units.

In order to have a smooth and gradual passage to these new units, users are asked to read the following information carefully and to act on the information/instructions given.

The new magnetic tape units will only accept 9-track magnetic tapes recorded at 1600 b.p.i. and will not accept densities of 800 b.p.i. or less.
In order to continue using 9-track 800 b.p.i. magnetic tapes or 7-track magnetic tapes no changes will be necessary. For compatibility we will keep one 7-track magnetic tape unit and one 9-track unit which will accept 800 b.p.i. magnetic tapes. However, we strongly advise users to transfer any tapes of this type to 9-track 1600 b.p.i. tapes as soon as possible.

To make use of the new tape units the following changes must be made in the appropriate batch control cards:

1. DD Cards

    1.1 The **DCB** parameter   must   contain   the   keyword
         subparameter **DEN=3** if the magnetic tape is being
         written to in the job step. We strongly advised that
         this should be inserted in all cases.

    1.2 The **UNIT** parameter must be changed (in all cases)
         to **UNIT=ATAPE**

    Example: **//TAPE1 DD UNIT=ATAPE,...,DCB=(...,DEN=3),...**

2. $OC Job Execution Requirements Statements

    The parameter **TP9** must be changed to **ATAPE** to indicate to
    the operator that the new one magnetic tape units may also
    be used.

    Example: **$OC ATAPE=EU9999,SL,Y**

Point 1.1 is of particular importance. If a user does not make the change specified in 1.1 then this may result in serious consequences for the user (such as the inability to read or use the information stored on the magnetic tape).

Note. Users may change to the new system now and continue using their magnetic tapes leaving the choice of magnetic tape unit to the operators.

NAG LIBRARY MARK 8

M. Dowell

A new version of the N.A.G. numerical library of subroutines (Mark 8) is now available. In this new mark there are 95 new routine; 24 routines have been withdrawn and there are now in total 466 user-callable routines.

The new libraries will be available (using the existing data sets) from Monday 1st June 1981.
People who are currently using routines in the Mark 7 library which are deleted from the Mark 8 library (see list in follow-ing section) should either modify their programs to use the suggested replacement routine or take a personal copy of the existing subroutine before the 1st June 1981.
A copy of the new updated manual will be available in the Computing Support Library.
Anyone requiring advice regarding these points should contact Mr. Martyn Dowell (ext. 701, room 1886, building A36).

Details of Mark 8 Changes

Deleted routines,

Withdrawn routine	Replacement routine(s)	Comments
C05PAF	see EO4GAF	(C05PAF simply calls EO4GAF with $M=N$.)
D01AAF	D01AGF	There is insufficient justific-ation for continuing to support so many different routines for the same quadrature problem.
D01ABF	D01AGF	
D01ADF		
D01AEF	D01BAF, D01BBF	The new routines for Gaussian quadrature offer greater range and flexibility.
D01AFF		

Withdrawn routine	Replacement routine(s)	Comments
D02AAF	D02YAF	All these withdrawn routines are concerned with solving initial
D02ABF	D02BAF, -BBF or -PAF	value problems in O.D.E's. They are replaced by an appropriate choice from the new routines
D02AHF	D02CAF, -CBF or QAF	introduced at Mark 7, which include both easy-to-use and comprehensive routines and offer a
D02AJF	D02EAF	wider range of facilities together with algorithmic improvements.
E04CFF	E04CGF or -JBF	These are routines for unconstrained minimization; the replace-
E04DDF	E04DEF, -DFF, -KBF or -KDF	ment routines (introduced at Mark 6) include both easy-to-use routines and comprehensive
E04EAF	E04EBF or -LBF	routines (the latter require simple bounds on the variables).
E04FAF	E04FCF or -FDF	These are routines for minimizing a sum of squares: the replacement
E04GAF	E04GBF, -GCF -GDF or -GEF	routines include both easy-to-use and comprehensive routines.
F01BFF	F01BQF	A minor revision involving a change in the specification.
F01CJF	F01CRF	A more efficient algorithm.
F02AHF	F02BCF	A minor revision to make the routines conform to standard
F02ALF	F02BDF	FORTRAN; this required an additional parameter to be introduced.
F02AUF	F02BLF	
F03AJF	F01BRF	Routines for solving sparse system of linear equations. The new
F03AKF	F01BSF	routines are considerably more efficient and have a better user
F04APF	F04AXF	interface.

Summary of New Routines

- A new set of adaptive routnes for one-dimensional quadrature,
  derived from the QUADPACK package (see NAG Newsletter 2/80 in
  Computing Support Library for further details).

- A new set of routines for solving boundary-value prblems for
  systems of ordinary differential equations: there are three
  groups of routines based, respectively, on a shooting and
  matching technique, on Pereyra's finite difference deferred
  correction method, and on least-squares collocation. Each
  group contains a "specialist" routine with a wide range of
  facilities, and two easy-to-use driver routines for simpler
  problems.

- A set of routines for systems of parabolic partial differ-
  ential equations in one space variable, using the method of
  lines. Here again there is a specialist routine and two
  easy-to-use drivers.

- A new set of routines for fast Fourier transforms which are
  more efficient than the exisitng routines (C06AAF and C06ABF)
  and also allow a much wider range of values of N (the length
  of the sequence). There is a choice of time-saving and space-
  -saving versions. The routines are based on software origin-
  ally written by G. Sandé.

- A new set of routine for singular value decomposition of real
  rectangular matrices. These are more efficient and more flex-
  ible than the existing routine (F01BHF). Additional routines
  apply the singular value decomposition to the solution of
  linear least squares problems. These improved SVD routines
  have also been exploited to improve the efficiency and decr-
  ease the workspace requirements of the routines for minimiz-
  ing a sum of squares.

- The initiation of a new chapter G08 on Nonparametric
  Statistics. Routines for nine nonparametric tests are includ-
  ed at this Mark.

- Routines for incomplete (and complete) elliptic integrals,
  based on algorithms developed by B.C. Carlson. These compute
  symmetrized variants of the usual definitions of elliptic
  integrals, but the usual forms can easily be derived from
  them.

New routines have also been included in the following areas:

- roots of a single non-linear equation;

- multi-dimensional quadrature;

- eigenfunctions of Sturm-Liouville problems;

- Stone's storngly implicit procedure for equations of 7-point molecule form;

- interpolation in one variable (using either a polynomial or a cubic spline);

- constrained curve-fitting by polynomials;

- manipulating polynomials in Chebyshev-series representation;

- ℓ_∞ - solution of an over-determined system of linear equations;

- solution of Ax=b where A is symmetric, positive-definite and of variable bandwidth;

- generalized eigenvalue problems;

- line-printer scatterplots;

- calculation of Normal scores;

- analysis of variance for some simple experimental designs;

- pseudo-random generation of a time-series according to an ARMA model;

- linear programming;

- log Gamma functions.

JOB EXECUTION REQUIREMENTS (New Feature)

M. Dowell

A new feature has been added to the set of job execution
requirements commands $0C (see Newsletter N. 34, September
1979 for full details of the Job Execution Requirements
system.)
This new facility enables the user to send a message to the
central operator regarding the execution requirements of the
job. The job will be set into hold status.

The new command is an extension of the already existing message
facility and has the form:

    $0C M=...any text of up to 66 characters(cols 7 to 72)

i.e. the parameter following "M" is "..." (three full stops)
followed by the text of up to 66 characters.

Note. A maximum of 10 such statements are allowed in any one
job.

Examples of valid use

    $0C M=...JOB TO BE EXECUTED WHEN ADABAS ACTIVE   .

    $0C M=...CUT 3 METRES FROM START OF MTXYZ BEFORE LOADING

Example of a Job Using this Command

    //.........JOB....(your job card).....
    $ CLASS 1
    $0C TP9=EU9999,NL,Y
    $0C M=...CUT 3 METRES FROM START OF EU9999 BEFORE LOADING
    $0C M=...JOB TO BE EXECUTED WHEN ADABAS ACTIVE
    .
    .
    .   (job control cards)
    .
    .

PROGRAMMING FOR SOFTWARE SHARING

M. Dowell

Introduction

A course entitled "Programming for Software Sharing" organized in the framework of the Education and Training Programme of the Joint Research Centre ("Ispra Courses") will take place at the J.R.C. Ispra from Monday 31st August 1981 to Friday 11 September 1981. This is an updated version of the course with the same name which was first held in September 1979. The new version of the course will contain updated lecture material and will emphasize the use of practical exercise sessions. A set of international speakers and JRC staff all involved in software sharing research and development work will present the lecture material (see list in following section). Also, a group of JRC computer users (see list in following section) will describe their experiences in software sharing both as developers and users of shared software.

This course will be of considerable interest and will present extremely useful material for members of the JRC staff involved either in the development of software packages which will be "exported" to other installations or in the use of software packages from other installations.

Further detials of the course may be otained from the Ispra Courses Secretariat at the JRC-Ispra.

Details of a more technical nature may be obtained from Mr. Martyn Dowell or Mr. Aurelio Pollicini (tel. 701, room 1886, Building A36 - JRC Ispra).

In the following section an overview of the course aim, the programme, and the lecturing staff details are given.

General Overview of Programming for Software Sharing Course

Software represents an ever-increasing proportion of the cost of computing and these costs tend to nullify all the economic advantages flowing from the wider availability of cheap hardware. It was hoped that the widespread use of high-level programming languages would help in alleviating the problems of software production, by increasing productivity and by making it simpler for users with similar problems to be able to use the same programs, possibly on different types of machines. It is common experience that in practice this simple optimism has proved to be unfounded.

The aim of this course is to examine the problems involved in the sharing and transfer of software, as well as suggesting ways of overcoming them. It will cover the difficulties faced by software developers, implementors and users. There will be considerable emphasis on the role played by strict adherence to agreed standards and the use of appropriate methodology.

The course will stress tools and techniques which have been
shown to be useful in practice. It is expected that
participants will gain understanding and insight which will
enable:

- users to employ shared programs more expeditiously
- developers to create programs which are more easily shareable
- implementors to transfer programs more easily
- all computer users to increase the utility and lifetime of
  their programs.

Practical exercises concerning a design/implementation problem
and the use of software tools will be an integral and important
part of the course.

The course is addressed to people involved with software
development, implementation and use, typically but not
necessarily in a scientific environment, who are interested in
a systematic approach to the problem of designing and
implementing programs for a wide and heterogeneous user
community.
It will be assumed that participants have at least 2 years
programming experience. A background of science or engineering
may be found helpful.
The course is not recommended for people having solely a
commercial data processing background.
The course will be given in English.

COURSE PROGRAMME

A: Software Development

   Programming methodology, specification/design, program
   structure, validation, programming languages and
   style,managing software development, tools for software
   development.

B: Flexibility

   Flexibility, language standards and portability, programming
   standards for portability, software tools, portable user
   documentation, numerical aspects, operating system
   interfaces.

C: Transfer/Sharing

   Multi-machine software development, FORTRAN dialect
   conversions, networks, data shareability, user interface and
   network utilization.

D: General Topics

   Legal aspects, users view of software sharing, ADA.

LECTURING STAFF

Guest Lecturers:

B. Ford   Numerical Algorithms Group, Oxford, U.K.
G. Goos   University of Karlsruhe, F.R. Germany
D. Muxworthy   University of Edinburgh, Edinburgh, U.K.
P. Poole   University of Melbourne, Parkville, Australia
F. Schreiber   Polytechnic of Milan, Milan, Italy
W. Waite   University of Colorado, Boulder, U.S.A.

Lecturers from the Commission of the European Communities

M.D. Dowell   Informatics Division, JRC Ispra
A.   Endrizzi   Informatics Division, JRC Ispra
B.   Harris   DG III, C.E.C., Brussels, Belgium
H.J. Helms   Informatics, Mathematics and Systems Analysis
                Department, JRC Ispra
A.A. Pollicini Informatics Division, JRC Ispra

JRC Ispra User's Experience Group

J.S. Duffiel'd, A.V. Jones, W.E. Kolar, R. Nijsing, J. Reynen,
G.R. de Vries

Course Director

H.J. Helms

Assistant Course Co-ordinators

M.D. Dowell, A.A. Pollicini

STATISTICS OF COMPUTING INSTALLATION UTILIZATION
REPORT OF. COMPUTING INSTALLATION EXPLOITATION
FOR THE MONTH OF   MARCH 1981.

	YEAR 1980	YEAR 1981
General		
Number of working days	21 d	22 d
Work hours from 8.00 to 24.00 for	16.00h	16.00h
Duration of scheduled maintenance	22.34h	27.00h
Duration of unexpected maintenance	24.17h	3.84h**
Total maintenance time	46.51h	35.84h
Total exploitation time	334.49h+	319.16h++
CPU time in problem mode	203.80h	336.08h*
Batch Processing		
Number of jobs	7921	8762
Number of cards input	1225000	584070
Number of lines printed	25072000	29500000
Number of cards punched	151000	58800
CPU time	179.27h	269.69h*
Number of I/O (Disk)	24340000	32435000
Number of I/O (Magnetic tape)	4207000	5455000
T.S.O		
Number of LOGON's	3703	5412
Number of messages sent by terminals	253000	401200
Number of messages received by terminals	1437000	2549760
CPU time	21.60h	54.94h*
Number of I/O (Disk)	3224000	4997500
Connect time	2661.18h	3794.24h
ADABAS		
Total time service is available	-	173.09h
CPU time	-	9.30h*
Number of I/O (Disk)	-	2019000
IMS		
Total time service is available	111.69h	133.74h
CPU time	2.93h	2.16h*
Number of I/O (Disk)	576000	420000

* Real CPU has been multiplied by a factor of 2 to indicate the increased throughput of the AMDAHL.

** Covering all the configuration.

\+ Including 45.00hrs overtime.

++ Including 3.00hrs overtime.

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UTILIZATION OF COMPUTING CENTRE BY OBJECTIVES & APPROPRIATION ACCOUNTS FOR THE MONTH OF MARCH 1981.

		AMDAHL 470/V7A equivalent time in hours
33001	Reactor Safety	365.58
33002	Plutonium Fuel and Actinide Research	-
33003	Safety of Nuclear Materials	4.38
33004	Fissile Materials Control and Management	17.27
33005	Super-SARA Test Programme SSTP	27.53
33011	Solar Energy	7.45
33012	Hydrogen Production, Energy Storage and Transport	0.13
33013	Thermonuclear Fusion Technology	48.27
33014	High Temperature Materials	3.20
33021	Protection of the Environment	22.20
33022	Remote Sensing from Space	2.81
33041	Informatics	59.88
33043	Support to the Community Bureau of References	2.46
33044	Training and Education	-
33046	Provision of Scientific and Technical Services	11.92
1.20.1 1.20.2	General Administration - JRC General Services - Administration - Ispra	96.78
1.20.3	General Services - Technical - Ispra	1.09
1.30.3	Central Workshop Ispra	1.72
1.40.2	ESSOR	1.80
	TOTAL	674.47
1.94.0	Services to External Users	4.09
	TOTAL	678.56

BATCH PROCESSING DISTRIBUTED BY REQUESTED CORE MEMORY SIZE

	100 k	200 k	300 k	400 k	600 k	800 k	1000 k	1200 k	1400 k	>1400 k
No. of jobs	2430	1962	1529	1401	659	115	189	53	2	15
Elapsed time	84	168	244	259	262	54	123	36	1	8
CPU time	3.3	23.5	41.4	41.4	97.3	16.8	32.1	9.2	0.5	3.9
"Equiv" time	30	53	97	102	120	24	43	14	1	5
"Turn" time	0.5	1.1	2.2	3.1	4.2	3.4	4.0	3.0	7.3	7.4
I/O (disk)	2540	3973	7777	8075	3112	940	1539	617	22	157
I/O (tape)	3035	598	215	1222	230	19	103	2	-	-

NOTE.
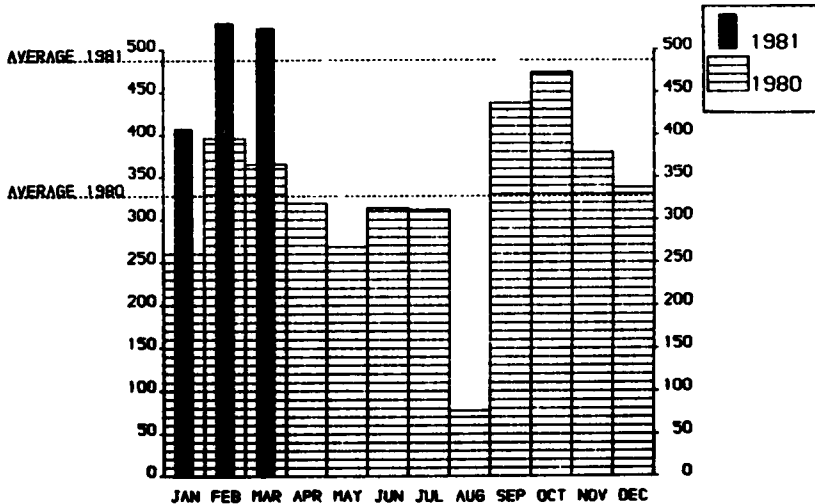All times are in hours.
"Equiv" means equivalent.
"Turn" means turn around.
All I/O transfers are measured in 1000's.

PERCENTAGE OF JOBS FINISHED IN LESS THAN:

TIME	15mn	30mn	1hr	2hrs	4hrs	8hrs	1day	2day	3day	6day
%year 1980	26	39	51	64	79	92	99.3	100	100	100
%year 1981	32	45	57	69	82	93	100	100	100	100

HISTOGRAM OF TOTAL EQUIVALENT TIME(HRS)

Projected total for 1981 = 5848 hours(using average)

Total for 1980 was = 3936 hours

REFERENCES TO THE PERSONNEL/FUNCTIONS OF THE COMPUTING CENTRE

		Room	Tel.
Manager of the Computing Centre	J. Pire		
Responsible for User Registration	Ms. G. Rambs		

Operations Sector
Responsible for the Computer Room   A. Binda-Rossetti
Substituted in case of absence by:

Responsible for Peripherals   G. Nocera

Systems Software Sector
Responsible for the sector   D. König
Substituted in case of abscence by: P.A. Moinil

Responsible for TSO Registration   C. Daolio

			Room	Tel.
Informatics Support Sector				
Responsible for the Sector	(f.f.)	H. de Wolde	1883	787
Secretary		Ms. G. Hudry	1873	787
Responsible for User Support		M. Dowell	1886	701
General Inf./Support Library		Ms. A. Cambon	1871	730

		Room	Tel.
Advisory Service /List of Consultants(See Note 1)		1870	730

A. Inzaghi   H. I. de Wolde
             A. A. Pollicini
R. Meelhuysen   M. Dowell

Note 1. The advisory service is available in the same room as the Computing Support Library (room 1870). Exact details of the advisory service times for a specific week can be found at the head of any output listing (for that week).
Any informatics problem may be raised. However, the service is not designed to help users with problems which are their sole responsability. For example, debugging of the logic of programs and requests for information which can easily be retrieved from available documentation.
If necessary, other competent personnel from the informatics division may be contacted by the consultant but not directly by the users.
The users should only contact the person who is the consultant for that specific day and only during the specific hours.
Outside the specific hours general information may be requested from Ms. A. Cambon in the Computing Support Library.

HOW TO OBTAIN COMPUTING CENTRE DOCUMENTATION

Person interested in receiving copies of the Computing Centre
"green books" or in receiving regularly the "Computing Centre
Newsletter" are requested to complete the appropriate par of
the following form and send it to:

Ms. A. Cambon

Support to Computing

Building 36

Tel. 730.

Indicate with a (✓) which option are required.

Please add my name to Newsletter mailing list   ( )

Please send me copies of the following "green books":

JRC-TSO Primer   ( )

JRC Computer Graphics (new version)   ( )

Towards a New Programming Style   ( )

LIBRARIAN   ( )

NAME ....

ADDRESS ....

....

....

TELEPHONE ....