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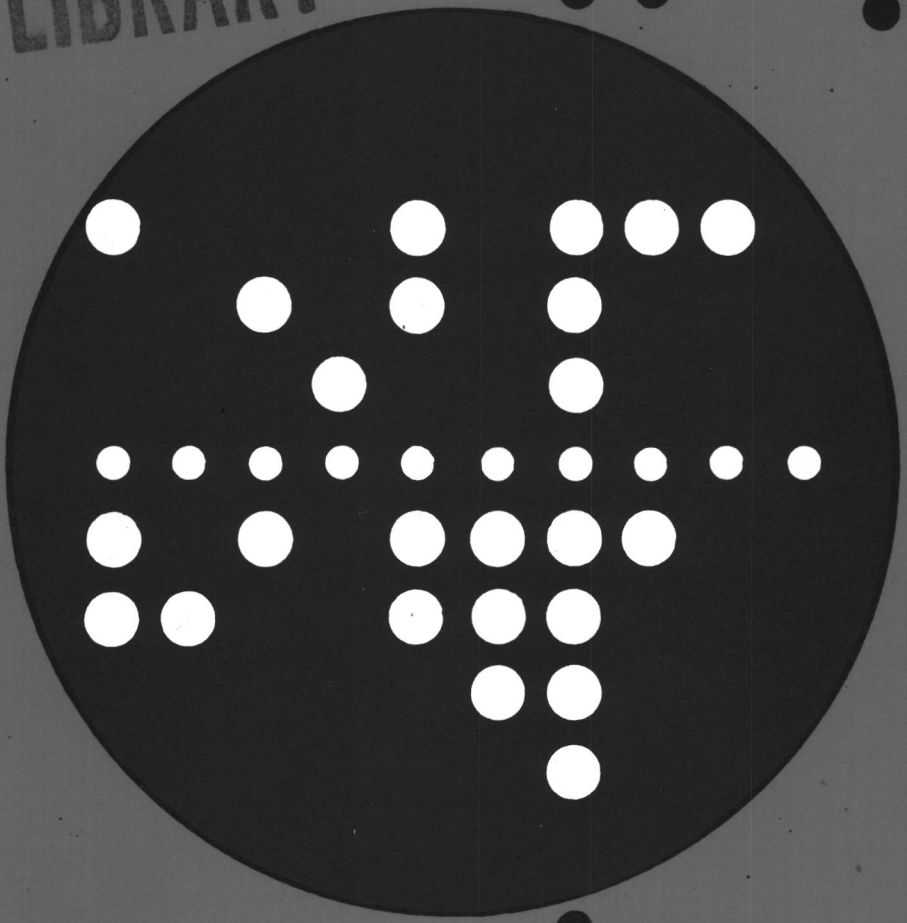
Joint Research Centre - Ispra

Computing Centre Newsletter



January 1977 ● No 7

Contents

Note of the Editor

The present Newsletter will be published monthly except for August and December.

The Newsletter will include:

- Developments, changes, uses of installations
- Announcements, news and abstracts on initiatives and accomplishments.

The Editor thanks in advance those who will want to contribute to the Newsletter by sending articles in English or French to one of the following persons of the Editorial Board.

Note de la Rédaction

Le présent Bulletin sera publié mensuellement excepté durant les mois d'août et décembre.

Le Bulletin traitera des:

- Développements, changements et emploi des installations
- Avis, nouvelles et résumés concernant les initiatives et les réalisations.

La Rédaction remercie d'avance ceux qui voudront bien contribuer au Bulletin en envoyant des articles en anglais ou français à l'un des membres du Comité de Rédaction.

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Acknowledgement should be given for their technical support to Mr. E. Eiselt, Mrs. M.G. Giaretta, Mrs. M. Van Andel, Mr. G. Clivio and Mr. G. Zurlo.

Evolution du Centre de Calcul au cours de la période 1973 - 1976

J. Pire

L'année 1976 marque la fin du programme pluriannuel. C'est pour nous l'occasion de faire un rapide examen de ce qu'a été l'évolution du Centre de Calcul au cours de cette période.

Rappelons qu'en 1972, une unité centrale IBM 370/165 a été installée en remplacement de l'unité IBM 360/65 qui était pratiquement saturée et ce en prévision d'une utilisation intense de l'ordinateur du Centre de Calcul pour la réalisation des programmes.

D'autres modifications telle que l'augmentation notable de la mémoire centrale et de la mémoire périphérique étaient prévues. Par suite de contraintes extérieures auxquelles l'inflation monétaire n'est pas étrangère, ces modifications ont dû être retardées et n'ont pû être réalisées qu'au cours de 1976. De sérieuses économies ont dû être réalisées pour faire face à l'augmentation du coût du matériel qui a été de 45% entre janvier 1974 et décembre 1976 pour le matériel en location et a atteint plus de 200% sur certains articles de consommation.

Les économies ont été réalisées par:

- la suppression de matériel peu utilisé ou rendu inutile par d'autres transformations
  - terminal graphique IBM 2250
  - emulator 7090
  - extension du cache rapide
  - selector channels.
- le remplacement de matériel trop cher pour ses performances par du matériel plus adapté avec, éventuellement, recours à de nouveaux fournisseurs
  - remplacement de l'unité à disque à têtes fixes IBM 2301, modèle 1 par un modèle 2
  - remplacement des unités à disques IBM 2319 par des unités ITEL 7330-1
  - remplacement de l'unité de contrôle de télécommunication IBM par une unité MEMOREX 1380.

Notons que le remplacement des unités à disques a non seulement permis de réduire le coût, mais aussi d'augmenter notablement les capacités disponibles (augmentation de 800 megabytes).

L'investissement a consisté en l'achat de 2 blocs de mémoire TELEX en remplacement du bloc de mémoire IBM et de bandes magnétiques TELEX en remplacement des unités IBM. Le premier bloc est entré en fonction le 1er mars 1975 portant à 2 megabytes la capacité de la mémoire centrale.

Cet investissement nous a permis, du point de vue logiciel, l'installation de nouvelles facilités:

- passage de l'O.S. MFT à l'O.S. M.V.T.
- installation expérimentale de I.M.S., STAIRS, A.P.L.

Ainsi que nous pourrons le voir au cours de l'analyse des prestations du Centre de Calcul, l'augmentation du banc de mémoire supplémentaire a permis de réduire de moitié le "turn around time" et d'améliorer notablement le service rendu aux utilisateurs qui exploitent des programmes de grande dimension.

Enfin, fait non négligeable, l'introduction d'une nouvelles règlementation du travail par tour a permis une exploitation beaucoup plus rationnelle des moyens de calcul.

Statistiques 1973 - 1976

Nous avons regroupé en quelques tables les informations statistiques relatives à l'activité du Centre de Calcul au cours du plan quadriennal.

La tendance générale est à la hausse, mais l'année 1976 est exceptionnelle sous beaucoup de rapports.

La table I fournit des valeurs statistiques globales; la table II donne les rapports entre les valeurs annuelles et celles de 1973 et les rapports entre 1976 et 1975.

Les faits les plus saillants sont:

- une explosion, au cours de 1976, de l'utilisation de programmes de grande dimension
- une augmentation spectaculaire de l'utilisation de l'unité centrale.

TABLE I

	1973	1974	1975	1975	
Nombre de jobs (total)	79	92	92	105	x 1.000
Cartes lues	28	32	30	32	x 1.000.000
Lignes imprimées	199	267	268	296	x 1.000.000
Cartes perforées	5	6	6	7	x 1.000.000
I/O bandes	32	37	43	50	x 1.000.000
I/O disques	164	212	211	235	x 1.000.000
Temps CPU	616	740	901	1.306	en heures
Temps équivalent	1.855	2.339	2.506	3.098	en heures
Jobs occupant plus de 300 K en nombre	3	3	5	17	x 1.000
CPU utilisé	67	93	176	458	en heures

TABLE II — Rapport entre les valeurs annuelles

	1973	73/74	75/73	76/73	76/75
Nombre de travaux (total)	1	1.167	1.167	1.325	1.136
Cartes lues	1	1.147	1.071	1.177	1.092
Lignes imprimées	1	1.339	1.343	1.485	1.106
Cartes perforées	1	1.206	1.183	1.307	1.105
I/O bandes	1	1.171	1.367	1.588	1.162
I/O disques	1	1.299	1.290	1.435	1.113
Temps CPU	1	1.201	1.463	2.120	1.450
Temps équivalent	1	1.261	1.351	1.670	1.236
Travaux occupant plus de 300 K nombre	1	1.237	1.919	6.306	3.286
CPU utilisé	1	1.389	2.627	6.836	2.602

La table III est relative au "turn around time". Chaque colonne fournit le pourcentage de la charge totale exécutée en déant un délai inférieur à celui indiqué en tête. Les délais étant donnés suivant une loi exponentielle, il est facile de voir que le turn around time est diminué de moitié en 1976 par rapport à 1975.

Les tables suivantes concernent le temps facturé et sa répartition entre objectifs, administration, externes. Les tendances sont positives car nous constatons que

1. après un développement explosif de l'utilisation du Centre de Calcul de la part de l'administration, les valeurs ont atteint un plafond
2. l'utilisation de la part des objectifs a été en très nette augmentation et a presque doublé au cours de la période
3. les prestations externes sont restées à peu près stables, mais leur importance relative est presque diminuée de moitié.

TABLE III — Pourcentage de travaux ayant un Turn-around time inférieur à t minutes

	15	30	60	120	240	480	>480
1973	32	49	66	81	90	93	7
1974	38	56	72	84	92	95	5
1975	25	42	60	75	84	89	11
1976	44	62	77	88	96	99	1

La table IV donne le nombre d'heures facturées, la table V les rapports entre les valeurs des diverses années et l'année 1973 ainsi que le rapport des valeurs 1976 comparées à 1975. La table VI indique pour chaque année les pourcentages de travail dédiés à chaque type d'utilisateur.

La table VII enfin fournit les coûts approximatifs de l'heure facturée au cours de la période 1973-1975. Cette diminution est évidemment due à une plus large utilisation de l'installation mais aussi à la politique de réduction des dépenses qui a permis d'annuler pratiquement l'inflation.

TABLE IV — Temps facturés (heures)

	1973	1974	1975	1976
Objectifs	968	1.150	1.277	1.895
Administration	455	712	777	795
Externes	247	289	266	262
Total	1.670	2.151	2.320	2.952

TABLE V — Temps facturés: rapport entre les valeurs annuelles

	73	74/73	75/73	76/73	76/75
Objectif	1	1.187	1.319	1.957	1.484
Administration	1	1.567	1.710	1.749	1.022
Externes	1	1.168	1.076	1.061	0.986

TABLE VI — Pourcentages du facturé par classe d'utilisateurs

	1973	1974	1975	1976
Objectifs	58.0	53.4	55.0	64.2
Administration	27.2	33.1	33.5	26.9
Externes	14.8	13.4	11.5	8.9

TABLE VII — Coût approximatif de l'heure équivalente en unités de compte

1973	1974	1975	1976
1370	1080	920	770

Projets pour le prochain programme pluriannuel

L'installation centrale actuelle est suffisante pour la durée quasi complète du plan quadriennal. Les ressources exploitables en temps de calcul sont encore très larges, cependant certains points faibles subsistent, notamment en ce qui concerne:

- le support aux applications graphiques dont les besoins semblent avoir largement augmenté
- les facilités d'accès conversationnel.

Les développements prévus tendent à combler ces lacunes. La première recevra une solution au cours du premier semestre 1977 et les efforts concernant l'amélioration des facilités offertes seront poursuivis.
Les améliorations prévues consistent en:

- adjonction d'une seconde unité semblable à l'unité Calcomp actuelle,
- installation d'une unité moins précise – mais beaucoup plus rapide en libre service,
- installation d'une unité à microfiches et microfilms (16 mm).

Le logiciel actuel sera modifié de telle façon que les données servant à décrire un graphique seront indépendantes de l'unité et pourront être exploitées pour produire une bande magnétique spécifique à un "device" déterminé sans devoir réexécuter les programmes de calcul.

De plus, de nouvelles libraries de routines seront introduites.

Le problème de l'accès conversationnel à l'ordinateur est beaucoup plus complexe. Il est déjà à l'étude mais la réalisation du réseau interne n'est pas réalistiquement prévisible avant la moitié de 1978.
De plus amples informations seront diffusées sur ces deux sujets.

Le Centre de Calcul souhaite cependant que les utilisateurs se groupent en un "Users'Group" pour lui faire part d'autres lacunes possibles et pour résoudre éventuellement des problèmes que le manque de personnel ou de ressources rendent actuellement insolubles.

Il espère également que les moyens mis à disposition seront de mieux en mieux utilisés et spécialement les terminaux déjà existants pour l'introduction des travaux et les espaces disques maintenant largement disponibles afin de réduire au minimum l'usage des cartes et même des bandes magnétiques.

I M S — Rules for Application

A. Borella

The previous Newsletter No. 6, contained an article on the Introduction to Data Base Management Systems and described shortly the IMS system as has been installed at the Ispra Computing Centre.

The rules for access to this system are explained in the present text.

All the defining names for the Data Base Description (DBD), Program Specification Block (PSB), programs, segments and fields, have to be established in consultation with the DBA administrator for reasons of protection and security.*

The Generation of the Data Base Description (DBD)

The generation of the DBD is a preparatory function required before the execution in the Data Base System processing environment. A DBD must be provided for each data base to be used by an application program.

DBD generation is the execution of a set of IMS-supplied macro-instructions to create a description of the characteristics of a data base. The data base description includes a definition of data base organization, access method, segment formats, iter-segment relationships, and field formats within the segments. It may also include a description of relationships between segments in two- or more data bases.

The user creates control card statements which are presented to the DBD generation in a normal O.S. problem program job. The result of a DBD generation execution is the placement of the compiled DBD into the DBDLIB as a member of the partitioned data set.

The members of DBDLIB library are used during the Data Base System execution. See the IBM Manual SH20-0915-0, chapter 2.

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*) *Actually the Data Base Administration (DBA) Function is covered by Mr. A. Borella, building 36, tel. 757, under the supervision of Mr. G. Buccari, building 36, tel. 752.*

DBD generation:

```
$ class 3
$ Tapes
// EXEC DBDGEN, MBR = dbdname
//CMP.DBD DD *
                dbd card deck
/*
//DDIC.SYSIN DD *
DBDIN (P,P, dbdname, 0) [MODE = 2]
ADDTO DBD (P,Pdbdname,0) DESC = (1, 'dbd description    ')
/*
```

The procedure requires a reply 'U' at the console for the introduction of the member in the library.
'dbdname' is the previously concordated name of DBD.

MODE = 2 is used for overlay existing entry.
The dbd description is a free format description of maximal 40 characters.

Program Specification Block (PSB) Generation

The second preparatory function which is necessary prior to execution in the Data Base System processing environment is the generation of the Program Specification Block (PSB).

A PSB control block is associated with any processing application program. The PSB control block defines the data bases which are used by the application program. In addition, it defines the manner in which the data bases are used (retrieval only, retrieval and updating, or data base create) and the segment within each data base to which the application program is sensitive.

PSB generation is the execution of a set of IMS - supplied macro instructions to define an application program's use of one- or more data bases. The user creates control card statements that are presented to PSB generation in a normal O.S. problem program job.

The result of PSB generation execution is the placement of the compiled PSB into the PSBLIB as a member of the partitioned data set. The members of PSBLIB data set are used during the Data Base.System processing execution.
See the IBM Manual SH20-0915-0, chapter 3.

PSB generation:

```
$ Class 3
$ Tapes
//PSBGEB EXEC PSBGEN, MBR = psbname, PFC = n
//CMP.PSB DD *
        psb card deck
/*
//DDIC.SYSIN D *
PSBIN (P,P,psbname,0) LINKPGM
ADDTO PSB (P,P,psbname,0) DESC = (1, ' psb description ')
/*
```

Require two replies 'U' at the console for the introduction of the members in the library.

psbname is the previously concordated name of the PSB

n = 5 if you want to utilize the COBOL-IMS (COBIMS) precompiler.

n = 0 if COBIMS' utilization is not requested.

The psb description is a free format description of maximal 40 characters.

Application program

The function which must be performed prior to Data Base System execution is the creation of application programs.

Application programs are required to create and maintain all user-defined data bases.

These programs may be written in Assembler language, Cobol, or PL1 and must be placed in the PGMLIB data set after compilation and link edit.

See the IBM-Manual SH20-0912.

Batch execution for test:

```
//STEP1 EXEC IMSC
// CMP.SYSIN D *
        Source deck
/*
//STEP2 EXEC IMSLG, MBR = objname, PSB = psbname
```

Batch compile, link-edit:

```
// EXEC IMSCL, SURLIB=surlib, NAME=surname,
// LINKLB=objlib, PGR=objname
//CMASYSIN DD *
      source deck
/*
```

Batch execution program

```
// EXEC IMS, MBR = objname, PSB = psbname )name
```

objlib	the name of the library where the object library resides
objname	the name of the object program
surlib	the name of the library where the source program resides
surnam	the name of the source program
psbname	the name of the related PSB.

Application Control Block (ACB) Generation

This is a preparatory function required during data communication program execution. It includes a dynamic relationship between DBD – PSB – PGM blocks for execution of a transaction created by the user.

The Application Control Block is only requested for programs in DC. These blocks will be created by the data base administration for reasons of precaution.

Note from the Program Library

G. Gaggero

Due to a planned reorganization of the available software packages, some of the standard procedures will require a modification in the near future. The concerned packages are CTE system, the ICES, GENESYS, DYNAMO, MPSX, SIMPL1, CARONTE, LIBRARIAN, CSMP-3, SIMULA.

As it is difficult to estimate the exact moment of conversion we ask the users of these packages to contact Mr. Pollicini in case of failure of the related procedures.

The new procedures and starters will be kept in stock for quick distribution.

EQUIVALENT TIME TABLE FOR ALL JOBS OF THE ADMINISTRATION – MONTHLY AND CUMULATIVE STATISTICS

	January	February	March	April	May	June	July	August	September	October	November	December
Year 1975	64	55	62	73	62	61	94	52	51	59	74	70
accumulation	64	119	181	254	316	377	471	523	574	633	707	777
Year 1976	84	82	101	77	57	64	73	54	61	59	36	46
accumulation	84	166	267	344	401	465	538	592	653	712	748	794

EQUIVALENT TIME TABLE FOR THE JOBS OF ALL THE OBJECTIVES – MONTHLY AND CUMULATIVE STATISTICS

	January	February	March	April	May	June	July	August	September	October	November	December
Year 1975	178	171	168	166	142	166	228	137	152	170	190	176
accumulation	178	349	517	683	825	991	1219	1356	1508	1678	1868	2044
Year 1976	206	237	270	241	229	248	249	223	233	244	159	150
accumulation	206	443	713	954	1183	1431	1680	1903	2136	2380	2539	2689

EQUIVALENT TIME TABLE FOR THE JOBS OF THE EXTERNAL USERS – MONTHLY AND CUMULATIVE STATISTICS

	January	February	March	April	May	June	July	August	September	October	November	December
Year 1975	16	28	24	28	32	31	26	15	18	19	12	18
accumulation	16	44	68	96	128	159	185	200	218	237	249	267
Year 1976	18	19	28	16	25	32	14	11	27	31	29	12
accumulation	18	37	65	81	106	138	152	163	190	221	25 0	262

EQUIVALENT TIME TABLE FOR ALL JOBS OF ALL USERS – MONTHLY AND CUMULATIVE STATISTICS

	January	February	March	April	May	June	July	August	September	October	November	December
Year 1975	214	216	208	215	190	222	266	166	181	202	219	208
accumulation	214	430	638	853	1043	1265	1531	1697	1878	2080	2299	2507
Year 1976	233	271	313	280	277	281	260	245	273	287	206	172
accumulation	233	504	817	1097	1374	1655	1915	2160	2433	2720	2926	3098

Statistics of computing installation utilization

Report of computing installation exploitation for the month of November 1976

	YEAR 1976	YEAR 1975
Number of working days	20	19
Work hours from 8.00 to 24.00for	16.00 h	14.00 h
Duration of scheduled maintenance	26.58 h	18.42 h
Duration of unexpected maintenance	14.59 h	8.50 h
Total maintenance time	41.17 h	26.92 h
Total exploitation time	278.83 h	239.08 h
CPU time in problem mode	103.52 h	75.50 h
Teleprocessing:		
CPU time	2.09 h	1.01 h
I/O number	328000	581000
Equivalent time	4.30 h	4.64 h
Elapsed time	117.00 h	84.40 h
Batch processing:		
Number of jobs	8.555	8.057
Number of cards read	2672.000	2659.000
Number of cards punched	152.000	228.000
Number of lines printed	23445.000	22857.000
Number of pages printed	528.000	526.000

BATCH PROCESSING DISTRIBUTION BY CLASS

	A/1	2	3	4	D	5	6/7	TOTAL
Number of jobs	2430	3084	1777	433	280	156	166	8326
Elapsed time (hrs)	53	188	173	60	50	60	49	633
CPU time (hrs)	3	23	26	16	5.7	10	16	99.7
Equivalent time (hrs)	15.4	27.0	55.4	22.1	19.1	14.3	23.3	176.6
Turn around time (hrs)	0.5	0.9	1.5	1.8	5.0	2.0	2.5	1.2

PERCENTAGE OF JOBS FINISHED IN LESS THAN

TIME	15'	30'	1h	2h	4h	8h	1D	2D	3D	6D
% year 1975	25.9	43.6	59.0	72.8	86.5	96.3	99.5	99.5	100	—
% year 1976	37.9	54.9	71.8	86.1	95.5	98.5	99.4	99.5	99.5	100

Utilization of the computer center by the objectives and appropriation accounts for the month of November 1976

IBM 370/165
equivalent time in hours

120	General Infrastructure	36,1348
130	Scientific and Technical Support	1,5034
143	ESSOR Reactor	3,4475
145	Medium Activity Laboratory	0,1428
146	Central Bureau for Nuclear Measurements (CBNM)	—
191	Technical Support to Commission Activities	1,1643
193	Technical Support to Power Stations	2,9804
211	Waste Disposal	2,3174
213	Materials Science and Basic Research on Materials	6,2702
214	Hydrogen	0,3959
221	Reactor Safety	47,0995
222	Applied Informatics	20,8816
223	Information Analysis Services	23,5430
230	European Informatics Network	0,8043
251	Standards and Reference Materials	0,9738
252	Protection of the Environment	6,9039
253	Remote Sensing of Earth's Resources	4,7040
254	New Technologies	—
412	Fissile Materials Control	0,2158
	TOTAL	159,4826
190	Services to external Users	28,7737
	TOTAL	**188,2563**

Statistics of computing installation utilization

Report of computing installation exploitation for the month of December 1976

	YEAR 1976		YEAR 1975	
Number of working days	16d		16 d	
Work hours from 8.00 to 24.0 for	16.00	h	14.00	h
Duration of scheduled maintenance	15.33	h	22.00	h
Duration of unexpected maintenance	2.84	h	2.17	h
Total maintenance time	18.17	h	24.17	h
Total exploitation time	237.83	h	199.83	h
CPU time in problem mode	82.71	h	69.88	h
Teleprocessing:				
CPU time	1.80	h	0.77	h
I/O number	226.000		446.000	
Equivalent time	3.40	h	3.90	h
Elapsed time	107.00	h	72.00	h
Batch processing:				
Number of jobs	6577		6633	
Number of cards read	2233441		2199000	
Number of cards punched	111710		203000	
Number of lines printed	18842700		19249000	
Number of pages printed	404285		417000	

BATCH PROCESSING DISTRIBUTION BY CLASS

	A/1	2	3	4	D	5	6/7	TOTAL
Number of jobs	1620	2483	1498	311	311	318	107	6438
Elapsed time (hrs)	38	173	118	49	46	50	25	499
CPU time (hrs)	2.3	23.5	19.1	17.9	6,8	4.5	6.1	80.2
Equivalent time (hrs)	13.1	45.4	44.9	21.0	24.9	6.5	10.2	166.0
Turn around time (hrs)	0.37	0.57	0.9	0.9	1.8	1.4	1.8	0.72

PERCENTAGE OF JOBS FINISHED IN LESS THAN

TIME	15'	30'	1^h	2^h	4^h	8^h	1^D	2^D	3^D	6^D
% year 1975	23.7	38.8	54.6	68.3	82.6	94.9	99.2	99.7	99.8	100
% year 1976	45.5	66.6	82.2	93.2	98.3	99.4	99.6	99.6	100	–

Utilization of the computer center by the objectives and appropriation accounts for the month of December 1976

IBM 370/165
equivalent time in hours

120	General Infrastructure	46,0003
130	Scientific and Technical Support	1,0964
143	ESSOR Reactor	2,7852
145	Medium Activity Laboratory	0,0309
146	Central Bureau for Nuclear Measurements (CBNM)	---
191	Technical Support to Commission Activities	1,0683
193	Technical Support to Power Stations	2,3809
211	Waste Disposal	0,7480
213	Materials Science and Basic Research on Materials	3,0005
214	Hydrogen	0,1644
221	Reactor Safety	37,7139
222	Applied Informatics	21,4445
223	Information Analysis Services	18,7480
230	European Informatics Network	0,5798
251	Standards and Reference Materials	1,6153
252	Protection of the Environment	9,0747
253	Remote Sensing of Earth's Resources	3,1713
254	New Technologies	---
412	Fissile Materials Control	0,2989
	TOTAL	149,9213
190	Services to external Users	11,9041
	TOTAL	161,8254

Reflections and Predictions

Herman I. de Wolde

After six editions of this Newsletter, and at the start of a new year, we feel the need for a look at both past and future. The birth of this Newsletter, eight months ago, was attended by doubts of its becoming a successful publication. However, the actual response we received has indicated very clearly the usefulness of this Newsletter and stimulated the editors to proceed.

It is a pity that most reactions were in verbal form !

Once again we invite our readers to express their constructive opinions in written form. Requests for dealing with certain topics are especially welcomed by the editors. Of course, it is not our intention to publish detailed manuals concerning all the aspects of Informatics. We try to describe developments, trends and applications in this field, exposing the user to the available solutions to general problems. The reader may not apply the proposed solutions without further knowledge; we kindly invite him to consult the basic documents, manuals, installation notes, etc. Sometimes we have noticed people punching controlcards directly from a Newsletter article. This might be a method for an urgent job, but it is not completely consistent with our goals. The intention of this Newsletter is mainly preventative support to users; solutions are provided, but please read the basic information also.

For the coming months we have planned some general trends for publication. First of all, ample space will be given to the background of the **portability of programs.**

Knowing that a programmer costs about $ 30.000 per year and that the average annual production is roughly 3000 final statements, we may deduce that one statement costs $ 10. It is clear that this precious product must be available for many users to justify its expense, and so the software products have to be applicable on many computer installations.

The given figures also make clear the need to improve the number of valid statements. A promising tool towards this goal is **structured programming,** on which some articles have been published already.

Furthermore it is expected that the **graphics facilities** will be extended during 1977. New powerful hardware and software will become available and we hope to offer users easy and flexible access to these facilities. Here also the documentation will be at two levels; global descriptions in the Newsletter and detailed manuals through the Installation Notes.

To complete this survey of activities we have composed a summary of items and keywords on which information has been published in numbers 1 to 6.

But, once again, if some readers want certain subjects to be treated in the Newsletter, please do write a memorandum to one of the editors.

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An Example of the Use of the COREA System

G. Gaggero, A.A. Pollicini

This example shows the use of the COREA system to access the library program TRUSS.

TRUSS is a program for the analysis of plane pinned structures, by the method of joints. The input consists of the following sets of data:

a) Number of bars and joints:
   NB, NJ — one card with format (2I5)

b) Joint coordinates:
   J, X(J), Y(J) — NJ cards with format (I5,2F10.5)

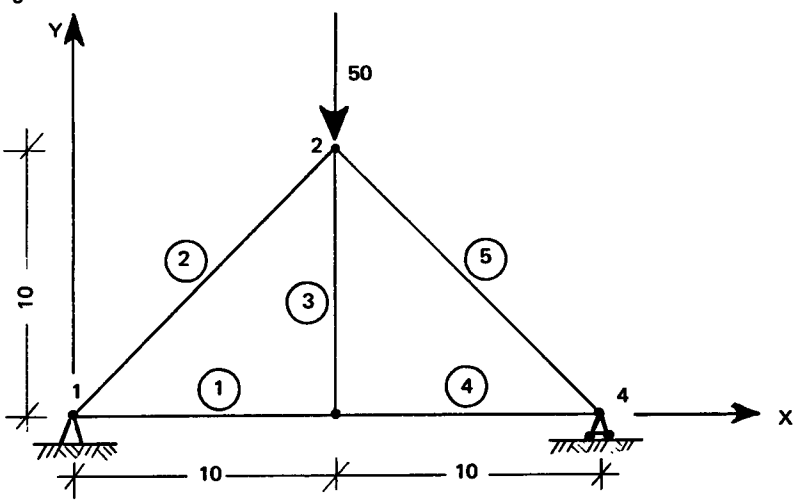
c) Bar orientations:
   I,J1,J2 — NB cards with format (3I5)

d) Support specifications:
   JR,IX,IY — two cards with format (3I5)

e) Non-zero loads:
   J,FX,FY — one or more cards with format (I5,2F10.5)
   (J = 0 means end of loads)

f) Continuation or stop card:
   PROB — one card with format (A4)

The problem dealt with in the example is illustrated in the following figure:



The example consists of three work sessions which illustrate some applications of the COREA system.

Work Session 1

In the first session, after some introductory operations, the user defines and Input-task and fills it with input data, using the format facility. The generated task is then listed.
Finally the user defines an Output-task and submits a job to execute the program TRUSS.

```
.l corea
OK                                  } → select COREA from the library of TELEUR system
.e

 336 14.02.14 ST.023 PROBLEM MODE ENTERED.

  EUROCOPI REMOTE APPLICATION SYSTEM IS RUNNING.
PLEASE BEGIN WORKING IF YOU ARE FAMILIAR WITH THE SYSTEM,
OTHERWISE TYPE     $HELP     TO BE INFORMED ABOUT SYSTEM USE.

$name 3,travet                  → declare user identification

$task sample,i,g                → generate the Input-task SAMPLE

$format (2i5)                   → specify format for input  a)

5,4                             → supply values for NB and NJ
                                  (data are formatted and stored in the Work file)

$format (i5,2f10.5)

1,0.0,0.0

2,10.0,10.0                     → supply input  b)

3,10.0,0.0

4,20.0,0.0
```

```
$format (3i5)
1,1,3
2,1,2
3,2,3
4,3,4
5,2,4
$insert
1,1,1
4,0,1
$format (i5,2f10.5)
2,0.0,-50.0
0
$format (a4)
stop
$insert
```

→ supply input c)

→ move data from Work file to SAMPLE

→ supply input d)

→ supply input e)

→ supply input f)

→ append data in Work file to SAMPLE

```
$list                                   → list the content of SAMPLE
   1      5     4
   2      1          0.0          0.0
   3      2         10.0         10.0
   4      3         10.0          0.0
   5      4         20.0          0.0
   6      1     1      3
   7      2     1      2
   8      3     2      3
   9      4     3      4
  10      5     2      4
  11      1     1      1
  12      4     0      1
  13      2          0.0        -50.0
  14      0
  15 STOP
```

The continuation of the session shows the submission by terminal of a job to be executed in batch mode.

Concerning the procedure CORLIB, called from the Library Procedure file, it must be noticed that:

1) CORLIB is a general purpose procedure, in which the name of the required library program is specified as value of the parameter PROG,
2) the user is allowed to supply any procedure parameter by means of unformatted text-lines. If there is more than one parameter, a comma must separate them.

```
$task result,o,g                → generate the Output-task RESULT

$program corlib                 → call the procedure CORLIB

prog=truss                      → specify the name of the program

$execute ti=1,li=2,cl=1 → specify time, lines, class and submit the job
***JOB  RESULT  HAS BEEN INTRODUCED IN INPUT JOB STREAM

$stop                           → close the session

  COREA COMMUNICATION SESSION NORMALLY CLOSED


 336 14.27.21 ST.023 SYSTEM MODE ENTERED.
```

Work Session 2

At this point the user can periodically ask the TELEUR system about the situation of the job RESULT, until the execution is finished.

The user can then start the second session to examine the Output-task RESULT in which the output of the program TRUSS has been stored.

He examines the computed reactions and bar forces. Then he decides to check how these forces change, when a different load is applied.

```
$n 3,travet,l                → require information about user tasks
          INPUT  -  CODE          NAME              NUMBER OF CARDS
                      77          SAMPLE                 15
          OUTPUT -                NAME              NUMBER OF LINES
                                  RESULT                 66
$t result,o                  → activate the Output-task RESULT

$o 4,'react',b               → print 4 lines after string "REACT" is found
THE SEARCHED LINE HAS THE SEQUENTIAL LOCATION      41


  JOINT   REACT-X    REACT-Y

      1       0.0       25.00
      4       0.0       25.00
$o 1,'bar forces',c          → print the next line containing the given string
THE SEARCHED LINE HAS THE SEQUENTIAL LOCATION      47

   BAR FORCES
$o 8,s                       → print the following 8 lines
  BAR      FORCE

     1      25.00
     2     -35.36
     3      -0.00
     4      25.00
     5     -35.36
```

Now the user performs the desired load modification, updating line 13 of his Input-task SAMPLE (see the list in session 1).

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Mrs R. Porta Program's Library Bldg. 36 - Tel. 760	Mme R. Porta Bibliothèque des Programmes Bât. 36 - Tel. 760

```
$t sample,i                    → activate SAMPLE to update it

$f (i5,2f10.5)                 → specify format

$l 13                          → list line 13
  13      2        0.0         -50.0

2,30.0,-40.0                   → supply the new load (data are formatted and stored in the Work file)

$r 13                          → replace line 13 with the content of the Work file

$l 13                          → list again line 13 for control
  13      2        30.0        -40.0

$t result,o,r                  → activate RESULT to be reused


$p corlib                      } → submit job RESULT for batch execution
prog=truss                     }

$e ti=1,cl=1
***JOB  RESULT  HAS BEEN INTRODUCED IN INPUT JOB STREAM

$s                             → close the session

  COREA COMMUNICATION SESSION NORMALLY CLOSED
```

Work Session 3

When the new job has been executed, the user can open the third session. Since he will look at the same results as in session 2 he can require the output from line 41 (see the system message after the search for string "REACT").

```
$n 3,travet

$t result,o

$o 41,l                        → print lines from 41 to the end
  JOINT   REACT-X    REACT-Y

      1    -30.00       5.00
      4      0.0       35.00
```

```
 BAR FORCES
BAR      FORCE

   1      35.00
   2      -7.07
   3      -0.00
   4      35.00
   5     -49.50


 JOINT RESIDUALS
JOINT   FORCE X    FORCE Y

    1     -0.00       0.00
    2      0.00       0.0
    3      0.0       -0.00
    4      0.0        0.00


TIME =        0.95
```

```
$w                                  → submit a job to produce the listing of the whole output
***JOB   RESULT   HAS BEEN INTRODUCED IN INPUT JOB STREAM

$s                                  → close the session

  COREA COMMUNICATION SESSION NORMALLY CLOSED
```

ERRATA CORRIGE

Newsletter No. 6 — November 1976

page 20 : The headers of the two diagrams must be interchanged as follows:

IF - THEN - ELSE -CIF

SELECT - CASE -OTHER - CSELECT

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