14. STATISTICS FOR CENTRAL (19.9.83 TO 16.10.83) AND INTERACTIVE COMPUTERS (PERIODS 8304 TO 8310)

AVAILABILITY

Percentage of 672 hours available

	MVT	CMS	ELECTRIC
This Period	95.5	97.7	88.9
Last Period	97.2	99.0	92.4
Previous Period	97.0	99.6	90.8

Breaks (Mean time between failures and no. of breaks)

	MVT		CMS	
	MTBF	Breaks	MTBF	Breaks
This Period	13.11	51	96.0	7
Last Period	.....	..	.....	..
Previous Period	.....	..	.....	..

MVT THROUGHPUT

	Average Backlog/week	Average CPU hours/week
This Period	2.17	148
Last Period	0.18	160
Previous Period	54.14	299

TERMINAL SYSTEM USERS

	CMS	Electric
Registered	1308	831
Active	641	185

MVT BATCH TURNROUND

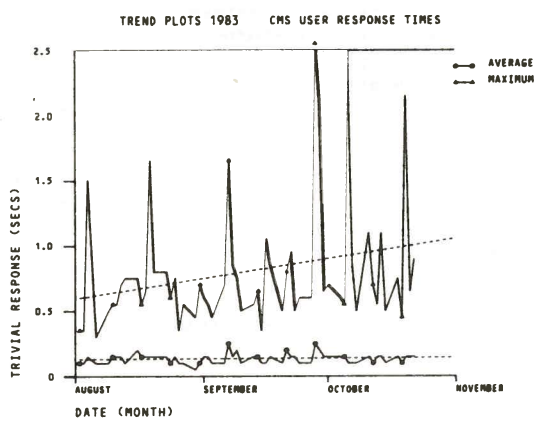
Figures show percentage of prime shift short jobs not turned round inside guidelines.
Figures greater than 10% indicate a guideline failure.

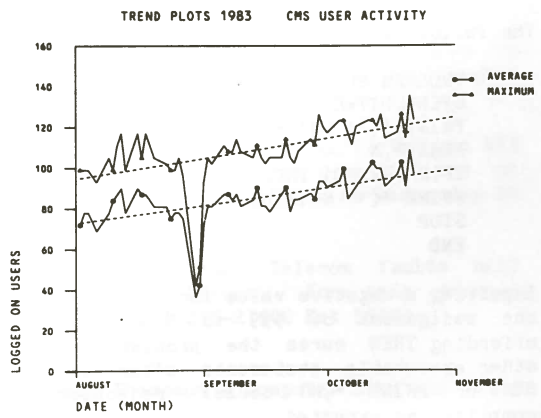
	Setup Jobs			Non-setup Jobs		
PRIORITY	12	10	8	12	10	8
<210K	-	17.4	11.8	9.9	3.8	4.1
212 - 560K	-	9.7	11.7	34.5	6.0	5.6
562 - 1500K	-	21.8	6.7	-	2.5	2.1

USAGE

Central Systems - Cumulative totals are for current financial year, 28 weeks to date.

Board	MVT CPUhrs	ELECTRIC AUS	CMS AUS	PRIME AUS	GEC AUS	DEC-10 AUS
ASR	207	110	722	113	59	33
Engineering	615	105	599	7131	2766	6113
Nuclear Physics	3955	347	3517	82	30	0
Science	511	150	1040	240	556	220
Secretary's Dept.	20	37	4086	3883	966	1064
Other Councils	45	11	267	0	0	0
External	47	17	178	192	146	0
Overheads	40	75	3159	3545	265	1269
TOTAL	5440	852	13568	15186	4788	8699





Rutherford Appleton Laboratory

FORUM

COMPUTER NEWSLETTER

No 40

November 1983

CONTENTS

1. EDITORIAL

Usage in this period has been at a similar level to the previous period on all systems. Certainly we have had no problems in meeting user demands on any facility. Performance on the GEC systems is still affected by the well known PCC problem. GEC claim to have a hardware fix which we hope to have installed on all systems with PCC's very soon. PRIME performance has been good with no serious problems to report. There is a strange problem with the IBM MVT system which results in output being wrongly routed and far more IPL's than normal. Every effort is going into sorting this out. If you lose output please let the PAO know.

The exchange of the IBM 3081D with another, new IBM 3081D went extremely well. This was mainly due to the fact that a fire at the ESSO RESEARCH CENTRE at Milton made a lot of IBM Engineers suddenly available. This once again proves that "it's an ill wind.....etc.,etc."

This issue contains an article on the University of Manchester Computer Graphics Unit and in particular points out that the facilities offered are available for SERC Grant Applicants to request. GEC Multi User Mini users will be interested in the article on GVIEW which allows graphics output to be viewed before outputting it to a graphics output device.

There is also an important message for SERC Grant Applicants which will help avoid unnecessary delays in processing their applications. This unfortunately will not solve all problems with applications taking a long time to be dealt with but will prevent some of the current difficulties.

Mike Jane - Head of User Support Group

2. FACILITIES AT THE UNIVERSITY OF MANCHESTER COMPUTER GRAPHICS UNIT

Readers of FORUM may not be aware that they may be eligible to use the facilities of the University's Computer Graphics Unit. Under the terms of a three year rolling agreement between SERC and the University of Manchester, SERC pays 20% of the costs of running the VAX 11/780. The Unit, established in 1974, provides an integrated hardware and software system for advanced, interactive computer graphics, together with expert advice and assistance to help users to get the best out of the system.

A large amount of basic and application software has been developed for a broad range of graphics devices. For example, the facilities support: high-performance interactive work on a 3-D Vector General display with real-time transformation hardware; generation of coloured, shaded pictures, with hidden surface removal, on a Genisco colour raster-scan display; plotting of high-quality diagrams on a Benson 5342 A0 drafting system; and creation of 16mm cine film and 35mm slides and microfiche on film recorders. Graphical data can be digitised on a large Summagraphics tablet and Tektronix 4014. These devices are supported in a device-independent manner on a VAX-11/750, running under VAX/VMS. The VAX is connected to SERCnet via X.25 and FTP.

Software is based on the Unit's GINO-M package, which can be accessed from FORTRAN or Pascal programs. GINO-M is an enhanced version of GINO-F containing extensions to support features such as hardware transformations, area fill, pixel arrays and HSV and RGB colour models. With this diverse hardware, great importance is attached to making the facilities easy to use, and there are many utility routines and programs designed to achieve this. For example, device-independent menu and message software allows a user to build a menu-driven program in a few minutes. Utilities include programs for designing colour palettes, interactive curve fitting, general surface display and a drawing program to prepare diagrams for documents or slides.

Many different projects have been conducted successfully using this system and the software has evolved to take account of their requirements. One effect of the multi-disciplinary environment is the extent to which ideas and programs are shared between users from different departments. Often, existing application programs can be adapted for new uses. Figure 1 to 3 show examples of output from different programs and devices. The ease with which pictures can be transferred from one device to another is an important feature of the software.

Figure 1 shows the Vector General being used to modify a molecular structure (a water molecule in this case). The whole structure and individual parts of it can be manipulated in real-time and energy minimisation routines can be invoked to check the configuration. The results can be plotted on the Benson, displayed using colour and shading on the Genisco, or printed as a grey-scale plot on a Toshiba matrix printer.

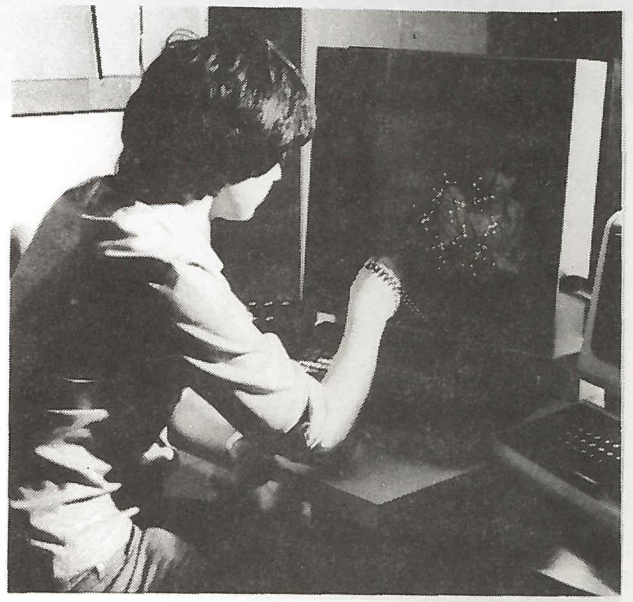


Figure 1

Figure 2 shows a Genisco picture of a pill travelling through a subject's intestine. The original is in colour; perhaps it's just as well that FORUM is not! The position of the pill at one minute intervals is represented by a series of spheres, and its path is shown as a set of cylinders along a cubic curve. Figure 3 shows a Toshiba grey-scale plot of the same picture.

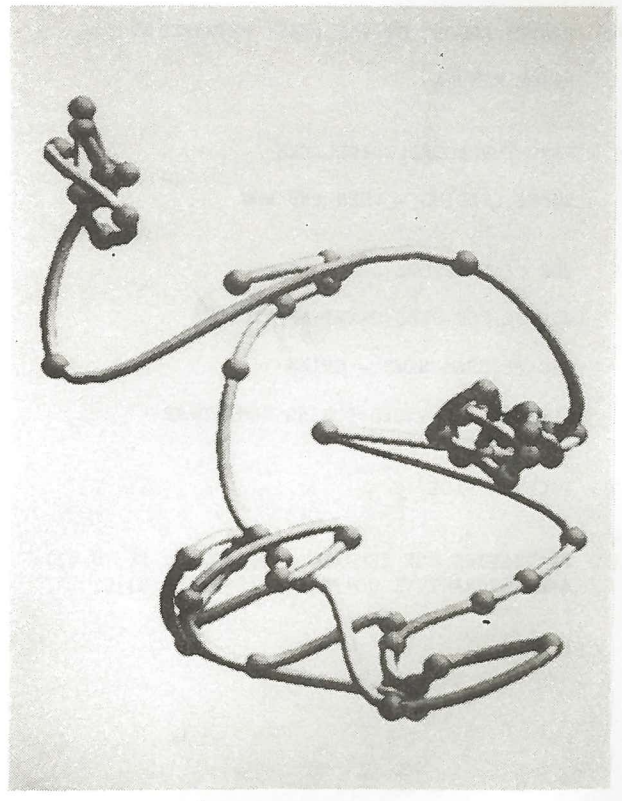


Figure 2

Figure 3

The Unit's facilities, which are normally only available to members of the University of Manchester, can be used by SERC-approved users from other institutions. If you have an application which you would like to try using these facilities, or if you simply want more information, you should contact the Director, Dr Roger Hubbold, on 061-273 7121 Ext. 5341. Special pump-priming arrangements can be made to get new SERC users underway with minimum delay.

Roger Hubbold - UMCGU

3. REV19 INSTALLATION UPDATE

Revision 19 of Primos has now been installed on all sixteen SERC Primes and the last three installations went very smoothly. The previously documented problems have now either been solved, or have a solution shortly expected.

The batch job problem, whereby batch jobs were not allowed to exceed a disk quota under any circumstances, has been cured by allowing batch jobs unlimited freedom to exceed disk quotas. This is only a temporary solution pending Prime's solution to the fundamental problem of a batch job having no Initial Attach Point.

The Prime F77 compiler problem at revisions 18.4 and 19.1 will be cured with the 19.2 F77 compiler release, expected shortly. Also, a new version of IRSTATUS is expected to solve the problems experienced with that package.

The settling in period which followed the introduction of revision 19 software seems to be over, and the initial spate of (mainly minor) problems has died down. Please report any further problems you do come across to User Support Group.

Finally, you will probably be pleased to hear we have no news at all about revision 20 release dates!

Phil Newton - Computer Services Group

4. CENTRAL COMPUTING COMMITTEE MEETING 17.10.83

The meeting was dominated by issues concerned with the worsening financial situation. Both RAL and DL had prepared Estimates bids based on revised guidelines which had a substantial reduction already in the original capital provision. The Science Board indicated a desire to make a further reduction of #250K in their contribution and there was much discussion as to whether this was allowable at this late stage in the procedure. With further cuts on Boards' finance likely, the capital available next year to continue the main replacement programme now looks as though it will be very small.

A separate but related topic on the Agenda was a paper giving different possibilities of how the cost of running central computing is attributed to Boards. Dr Manning proposed a revised procedure which separated out the cost of infrastructure activities from those specifically attributed to a particular service. This aim would be for all Boards to contribute equally to the infrastructure costs or for Council to fund this activity directly. The principle was accepted, but further discussion is needed to define an appropriate formula.

The ATLAS-10's performance over the last two months has exceeded our expectations in the early phase of its introduction. As a result, we shall generate more batch hours than originally anticipated this year. Consequently, the original Board bids for computing time have been agreed with the ability for Boards to exceed their allocation with no prejudice to either future allocations or the attribution of cost.

The joint SERC/Computer Board Working Party set up to review their funding and management of computing (see Forum 37) has begun. It is now due to report at the end of February 1984.

There was a large agenda and I have listed only the major topics.

Prof F R A Hopgood - Head of Computing Division

5. STATUS REPORT ON VAX (VMS) NETWORKING

The HEP VAXes

The networking of HEP VAX sites is increasing in UK universities as well as at CERN (Geneva) and DESY (Hamburg). The UWIST "Blue Book" FTP is currently running on some VAXes in at least 2 or 3 countries outside UK.

Within SERC, work is progressing on replacing by the end of 1983 the GEC 2050 workstations at some HEP sites by networked VAXes.

The Starlink VAXes

While the physicists are getting rid of their GEC 2050s, the astronomers are also updating themselves from their dedicated DECnet (point to point connection between VAXes over a leased line with DMC hardware at both ends) to running X25-DECnet over SERCnet. The advantages are the flexibility and line-cost sharing effects of an X25 open network.

The current status is that 6 (out of a total of 8) Starlink sites are now running X25-DECnet. They are Durham, ROE, UCL, Cambridge, RGO and RAL. The other Starlink sites will all be changed over to X25-DECnet by November 1983.

The change over to X25-DECnet requires the DEC software PSI 2.0, which also cures some of the problems of system crashes / hangs caused by PSI 1.2. (However the support of new X25 hardware, the DMF32, is still awaiting the release of PSI 2.1.)

RAL Computing Division VAX(VMS) support.

The work of central support for VAXes in SERCnet by RAL Computing Division has been started. Any new ideas and suggestions will be welcome (please send them by JNT MAIL to username SWLY at RLVS). The following are areas of work being done:

- Assisting new SERCnet VAX sites in installing the network software (DEC PSI and UWIST FTP) and answering queries afterwards.

- Co-ordination work towards DEC and UWIST (including field testing of their software).

- Keeping VAX site managers up-to-date with news and changes in SERCnet VAX networking, and sharing experiences from sites.

A project called GIFT (General Internetwork File Transfer) is likely to be participated in by RAL Computing Division. The success of this project will allow file transfers among the following networks: CERNet, SERCnet, INFNet (the Italian network based on DECnet) and UNINET/SUNET (the X25 based network in Norway and Sweden).

UWIST software

FTP 3.0 will be available to sites in early November. The major enhancements are:

- /AFTER=time and /AFTER=name now work.

- /CODE=FAST has been introduced for file transfers between VAXes, allowing transfers of any special types of VAX files. This means the problem of transferring indexed BACKUP files or files with a huge record size has been overcome.

- Multiple concurrent transfers are now supported (i.e. more than 1 incoming and 1 outgoing transfer at the same time).

- Syntax change from /USER="user pass" to /USER="user","pass" so that special characters in usernames and passwords are allowed. This is particularly useful in cases like: /USER="FEM/VNET/GEN" for job submission to CERN .

- You can now send JNT MAIL (POST) to multiple usernames, but they have to be all at one site.

- A command qualifier /FORMAT=LINE is required for batch job submission to the RAL IBM.
(e.g. $ TRANSFER /SUBMIT /FORMAT=LINE A.JCL RLIB::TEST)

PAD 2.3 will be distributed with FTP 3.0, the major user-visible enhancements in PAD 2.3 are:

- An improvement in terminal display and the "out of step" problem when users are typing ahead while using PAD.

- Abbreviations of DTEs for X29 are now allowed. (i.e. PAD> CALL 33 can be used instead of PAD> CALL 000000000033).

NOTE

Information revealed above is the author's own understanding and does not invoke any responsibility on DEC, UWIST or any other organisation mentioned.

Stephen Yip - Computer Services Group

6. PRIME MANUAL

We have had a number of the recently issued Prime Reference Manuals returned, with pages missing from chapter 5. They were not the same pages each time, but always (so far) from that chapter. Could you please check your manuals, and in particular chapter 5; if there are only a few manuals affected, we will send you the missing pages, if it is a widespread problem we will go back to the printers.

Send information of any missing pages from this manual to M. Herbert @ RAL (or phone on extension 5272).

Muriel Herbert - User Support Group

7. FR80 TURNROUND GUIDELINES

HARDCOPY

Work despooled at 0600 hrs will be processed that afternoon. It should be available for collection after 1600 hrs. Some of it may catch the afternoon courier for R1. It will catch the Oxford courier and the post the following day.

Work despooled at 1200 hrs will normally be processed in the afternoon to catch the afternoon post.

Work despooled during the evening will normally be processed the next morning and catch the lunchtime courier and the afternoon post. When the workload justifies it, the camera may be mounted the same night, in which case the work will be available for distribution the following morning.

MICROFICHE

Work despooled at 0600 hrs will normally be processed in the morning and be available for collection from R27 by midday. It will catch the lunchtime courier for R1, the afternoon courier for Oxford and the afternoon post.

Work despooled at 1200 hrs will normally be processed during the evening and be available for collection by the next morning.

BW35 and PR16 cameras

These cameras are normally mounted during the evening only. Therefore a job should be submitted with sufficient priority to ensure catching the evening despool (typically around 1930 hrs). In particular, jobs submitted at priority 6 or below are likely to lose a night in the camera queue.

BW16 camera

This camera is only mounted on Tuesday and Thursday evenings. The critical times are therefore the Tuesday evening and Thursday evening despool, but note that the central computer MVT batch is usually unavailable between 1730 hrs and 1930 hrs on Thursday evening. Note that PR16 is available more often than BW16, which should only be used for debugging work eventually requiring colour 16mm.

COLOUR

This camera is mounted once per week during Wednesday evening. The critical time is Wednesday midday despool. Colour processing is contracted out, requiring 7 - 10 days. Hence it is important to debug colour films using black and white film before involving the lengthy expensive colour processing.

Paul Thompson - Computer Services Group

8. SHIFT LEADING - THEN AND NOW

"Adrian Webber has to go into hospital for a re-build", they said. "How would you like to run his shift for a few months?", they asked. "OK" I replied, thinking back to my days as a Shift Leader.

That was my first mistake. After all, it was ten years ago and all we had then was one 360/195, a DDP224 (which only went wrong when lightning struck) and an HPD machine, all located in R1. There were also the remote workstations of course - all twelve of them and all directly connected.

Problem determination was relatively simple in those days, if the machine fell over you IPL'd it and if that didn't work it was probably a hardware fault and you called in IBM (OEM had not got their foot in the door then!). Communications problems were usually fixed by a quick test of the remote user's modem, if that failed you called "the GPO". Of course the problems of most users could be solved by actually talking to them FACE TO FACE.

Today, with virtual and real machines popping up (and down) seemingly all over the place, equipment from many different manufacturers and networks that would give a fisherman nightmares, things are more than a little different. Problem determination is anything but straight forward and things are not always what they appear to be. At 2-o-clock in the morning, when you have established where a user with a problem is located and which system he is attempting to use, it is still very difficult to figure out the tortuous path of, say, someone in the Outer Hebrides to the MVT system. Luckily, my shift usually knew more than I did so I took the manager's role and delegated! However, I think I can claim more success in diagnosing which bit of local software or hardware was knocking over the rest.

Some of the problems can be hair-raising and you pray for a quiet night; but whereas years ago Operators would drive the machines, now the machines drive the Operators, and this makes life boring when you DON'T have problems. A Catch 22 situation.

Thankfully, after two months, Adrian arrived back, fully functioning and fighting fit. Should they ask me the same question again, my reply is unlikely to be "OK".

Ann Cox - Computer Services Group

9. USE OF VM SPOOL

VM spool is a shared area of disk which is convenient for use by virtual machines as a temporary store of data and for transferring files between virtual machines. However users should note that it is not backed up overnight and there are limits both on the total number of spool files within the system and on the total amount of data. Thus the spool must not be relied upon for data storage.

During normal running periods, providing the spool does not get too full, files will remain in the spool until they are 3 months old, then they may be purged without warning. If, for operational reasons it is necessary to reduce either the amount of data or number of files in the spool by deleting files before they are 3 months old, then these files will be dumped to tape and the owners warned. Such files can be restored but this is a long and complicated process and may be subject to several days delay as it will also depend on space being available in the spool.

Tim Pett - Computer Service Group

10. ADVICE FOR SERC GRANT APPLICANTS

This article is intended to advise SERC Grant Applicants on the best way to go about applying for SERC Computing Resources. All Grant Applications require completion of an RG2 form and if Computing Resources are required, an AL54 form is also needed. The AL54 is always sent to the appropriate Computing Division (Daresbury or Rutherford Appleton) for comment prior to consideration by the relevant Committee. In future any late or incomplete AL54s will result in automatic deferral to the next Grant Round. Hopefully this article will minimise this, provided the advice is followed.

Computing requirements must be discussed with the appropriate people before the AL54 is completed. These people are, in order of priority:-

1. Your local Director of Computing.
2. Your local SERC representive (i.e. Multi User Mini Manager), if relevant.
3. The Resource Management Section at Daresbury or Rutherford Appleton.

Note that we will be including a list of Multi User Mini Managers in the next issue of FORUM.

Such discussions will ensure that you really need to apply for SERC Computing Resources and that you request the correct facilities (e.g. machine, quantity of resource, terminals, applications software etc.). The present staff shortages in SERC prevent any discussions with applicants between the Grant Round closure dates and the Committee meetings.

We are anxious to help all Applicants to get forms completed correctly and submitted in time. Please help us to help you.

Mike Jane - Head of User Support Group

11. GEC PROGRAM NEWS - GVIEW

Are YOU fed up waiting for your paper plot to appear? Fret no more, the answer has arrived. You need GVIEW. With a graphics terminal to hand (Tektronix, Sigma, Args or Sension) you can display your plot before your very eyes. Just think of the time saved - no more need to write two versions of every programme (AND process the data twice) then hang around while it scribbles over six metres of paper!

Simple to use single letter commands put the plot onto the screen. For the tricky, hard to spot, errors it's easy to zoom in on a tiny portion of the plot and blow it up to full-screen detail.

Glorious technicolour is preserved for colour displays, and you can swap the colours around until you find your favourite combination (green text and blue lines?). For the perfectionist, GVIEW will tell you exactly how big the file will plot - you can even re-scale it and plot that instead.

If you're in the overhead projector foil making game, then GVIEW is really for you! It drives the Calcomp and Hewlett-Packard flat bed plotters from your Benson input code, so A4 foils of your favourite graphs are no problem.

Ready for more? - then read the GVIEW manual, or try the online real-time 'Introduction to GVIEW' tutorial.

Leslie French - Systems Development Group

12. COMPUTER SERVICES DURING CHRISTMAS

The Mainframe computers, ICL 2904 and FR80 will be closed down from 1600 hrs on Friday 23 December until 0800 hrs on Wednesday 28 December.

PR1MEs RLGB and RLGM, PDP 11/70, VAX 11/750 and VAX 11/780 will be running unattended from 1600 hrs on Friday 23 December until 0830 hrs on Wednesday 28 December.

During the same period urgent Telecom faults will be attended to on call-out. For this service please ring Security (0235-21900 Ext 5545).

Paul Thompson - Computer Services Group

13. PROBLEM PAGE

QUESTION - CMS

How does one use the CMS NOTE command to send a message to someone at another site/computer?

ANSWER

To send a NOTE across the SERC network, one needs to know the following:

a) The username/identifier of the person to whom one wishes to send a NOTE.

b) The mnemonic/address of the site/computer where the NOTE is to be sent. For example, NOTE US @ RLIB (use one or more spaces either side of the '@' sign) where US is the username and RLIB is the mnemonic address for CMS.

The Hitch Hikers Guide to SERCnet contains a full list of mnemonics for those sites/computers connected to the SERC network. This document can be obtained from any one of our Support Offices GEC, PRIME or IBM.

All NOTEs are directed through the SERC network. The success of a NOTE depends entirely upon the accuracy of the username and mnemonic, the availability of the network, and finally the remote Host using a compatable JNT protocol.

QUESTION - GEC (and of general interest)

I have a problem with one of my Fortran 77 programs; it is not giving the expected results.

ANSWER

Your program contains a line of code of the form:

```
IF(<expression>) THEN <assignment-statement>
```

The glaring error is that in Fortran 77, the Block-IF statement should have nothing immediately after the THEN, and there should be a balancing ENDIF somewhere in the program. It was quite surprising that the compiler should have accepted such a source line, though it was obvious that it was not generating the intended object code.

The following program tests this construct:

```
      PROGRAM BUG
      OPEN(UNIT=6,FILE='*')
      PRINT '('' ENTER NO > '')'
      READ *,N
      IF(N .LT. 0) THEN N = 999
      PRINT '('' N VALUE = '',I3)', N
      STOP
      END
```

Inputting a negative value for N does not generate the assignment of 999 to N. Removal of the offending THEN cures the problem. Substituting other executable statements after the THEN (e.g. STOP or PRINT *,N) causes rejection by the compiler, as expected.

Does this problem represent a compiler bug?

The compiler allows the
IF (<expression>) THEN <assignment>
construct to slip through, simply because it strips out any blank spaces between the THEN and the variable name, effectively reducing the Block-IF to a Logical-IF statement. Hence, there is no syntax error generated by the missing ENDIF, and

```
IF(N .LT. 0) THEN N = 999
```

is compiled as:

```
IF(N .LT. 0) THENN = 999
```

QUESTION - PR1ME

How does PR1ME hardware affect Fortran programs?

ANSWER

a) Word
The PR1ME word is 32 bits. All integer arithmetic is performed using 1 word, and all real arithmetic is performed using 2 words. These are either truncated or rounded as required, at assignment time. For example, an INTEGER is truncated to 16 bits. This truncation is normally invisible to the Fortran program. However, it can cause problems when programs are optimized.

b) Page
A page is 1024 words. The PR1ME uses pages in its virtual memory management system, by swapping pages out of main memory onto disk on a least recent used basis. This can cause problems for array access.

For example, the following program took over 24 hours to run on a single user PRIME 550:

```
      REAL A(1124,1024)
      DO 10 I = 1,1124
      DO 20 J = 1,1024
      A(I,J) = 0.0
 20   CONTINUE
 10   CONTINUE
```

It ran in 3 seconds after recoding line 4 to:

```
A(J,I) = 0.0
```

c) Segment
A segment consists of 64 pages. Arrays have the potential to span more than one segment. Such arrays require special treatment: either the required arrays can be included in COMMON, or PR1ME Fortran compilers recognise the option -BIG, which generates segment spanning code for such arrays when they occur in SUBROUTINE and FUNCTION calls.

Note that CHARACTER arrays larger than a segment can only be handled if the CHARACTER elements of the array have a length which is a power of 2 (for example, 2, 4, 128).

Penny Windebank - User Support Group