

# acs academic computing services Newsletter

Volume 24, Number 12

University of Minnesota, Twin Cities

December, 1990

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**A New  
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## **The VAX 6000: A New, More Powerful VAX VX**

**I**n recent months University VMS users have found our VAX VX system quite slow because of the increasing use of this machine.

Relief is at hand: We will upgrade the VX system on December 16 from the present VAX 8650 to a new VAX 6000 Model 510.

See the article elsewhere in this issue for more about the new VAX, and watch on-line announcements on our VMS machines for further information about this important change.

## **VMS Cluster to be Upgraded to Version 5.4**

*Marisa Riviere*  
MARISA@UMNACVX

When we install the VAX 6000-510, we'll need to upgrade the operating system on the VMS cluster from VMS Version 5.3 to Version 5.4.

Some changes in Version 5.4 may affect users. We'll soon make on-line information available about these.

# Help Page

## ACS HELP-Lines

### Central Systems (UX,VX,VZ,CA):

Software (including Graphics, Databases, and Statistics Packages), Hardware, Networking

626-5592 8 am to 5 pm, weekdays

### Artificial Intelligence:

625-8332 3 to 4 pm, Monday,  
Wednesday, Friday

### Liberal Arts, Text Analysis:

625-8332 3 to 4 pm, Monday,  
Wednesday, Friday

### LUMINA (communications questions):

626-2272 8 am to 5 pm, weekdays

### Lauderdale Tape Library:

626-1838 9 am to 3 pm, weekdays

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### Microcomputer and Workstation Networks Center Micro HelpLine

626-4276 9 am to 4 pm, weekdays

## Consulting

### Walk-In Consulting

#### ACS, East Bank:

1 Nicholson Hall 10 am to 4 pm,  
Monday through Friday

#### Microcomputer and Workstation Networks Center:

125 Shepherd Lab 9 am to 4 pm,  
Monday through Friday

### Electronic Mail Consulting

Consulting is now available via the mail facility on all ACS systems (the UX, VX, VZ, and CA). Send mail to user name CONSULT for questions after hours and for low-priority questions that are not critical to your immediate computing work. Replies will be sent to your account through the mail facility on your system.

### Instructional Computing Consultant

Department instructors may call 626-0200 for assistance in choosing ACS systems (ENCORE/UNIX, VAX/VMS, CYBER/NOS), software, and for answers to any other inquiries on using computers for instructional computing.

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## Computing Information Center

1 Nicholson Hall, 625-7397, MAD@UMNACVX, MAD@VX.ACS.UMN.EDU  
8 am to noon and 1:00 to 4:30 pm, Monday through Friday

**Computing account and grant applications** available for ENCORE, VAX, and CYBER computers.

**Short course enrollment.** Short course schedules and class descriptions available. Call 626-0032.

**Assistance in ordering vendor documentation.** Vendor documentation is not always available in the University bookstores and may be ordered directly from the company.

**Complete documentation collection.** Reference copies of vendor and all other documentation for ACS software.

**Free ACS documentation.** General information and central system information available.

**Computing Newsletters.** Subscribe to the *ACS Newsletter*. Newsletters from other computing centers are also available for reference.

# acs

## Academic Computing Services

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[PMG@VX.ACS.UMN.EDU](mailto:PMG@VX.ACS.UMN.EDU).

For a free subscription call (612) 625-7397, or send your name and address to the Computing Information Center, 1 Nicholson Hall, University of Minnesota, 216 Pillsbury Drive SE, Minneapolis, MN 55455. [MAD@UMNACVX](mailto:MAD@UMNACVX)/  
[MAD@VX.ACS.UMN.EDU](mailto:MAD@VX.ACS.UMN.EDU). On-campus address changes *must* include your department name and address.

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The *ACS Newsletter* is produced on an Apple Macintosh IIfx running Microsoft Word and Aldus PageMaker software. Camera-ready copy is produced on an Apple LaserWriter Plus and then printed at the University Printing Dept.

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## The VAX 6000: A New, More Powerful VAX VX

Marisa Riviere  
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In the configuration diagram that we published in our October issue, we indicated that during fall quarter we would install a dual-processor VAX 6000-420 with a vector processor.

We have already changed our plans—for the better.

After ACS ordered the 420 model in September, the Digital Equipment Corporation (DEC) announced the 6000-510, a faster version of the 6000 series. Convinced that this new machine would serve our users even better, we changed our order, and DEC has shipped us a single scalar processor VAX 6000-510 with an attached vector processor.

In a test report entitled "A Stellar Performer" in the July 9, 1990, *digital review*, the new machine's vector processor performed at nearly twice the speed of the 6000-410 when running *digital review's* standard CPU 2 benchmark suite. With added directives and library calls the performance tripled. Further, the vector processor addition to the VAX provides a system with about half the speed of the CRAY-1, the University's first supercomputer. The similar design of the VAX and CRAY-1 will help in porting Fortran research problems requiring local debugging and initial phases on the VAX to the large final phase on the CRAY.

Although the 6000-510 will have been installed by the time you receive this issue, it is our policy not to change systems during a University quarter. Thus ACS will continue running the 8650 as the VX system until the end of fall quarter, and during that time the 8650 will continue running its present version of the VMS operating system, 5.3.

Meanwhile, we have installed the 6000-510 under the temporary mnemonic VT, and all our present VX users can use this system with their current user names and passwords. The VT will run VMS 5.4 (which is required on 6000-500 series machines) until the 6000-510 becomes

the VX. On December 16 we will upgrade the entire VAX cluster to Version 5.4 and the VT will become the VX. At that time we will remove the 8650 from our configuration.

The new and faster VAX will help us to meet the computational needs of the University community. The present VAX VX, a VAX 8650, has been so heavily used that it has become intolerably slow during many peak daytime hours in the past several months.

### Using the Greater Speed of the New VAX

Many Fortran users will benefit from the new machine immediately by using the qualifier `/VECTOR` on their VAX Fortran command lines. `/VECTOR` invokes the High Performance Option (HPO) of the Fortran compiler, which can vectorize many normal Fortran source language constructs. The source optimizations that make efficient vectorizing possible on the VAX will also benefit those programmers exploring uses that later require the more powerful systems available through the Minnesota Supercomputer Institute. The numerous VAX VMS workstations of the University will obtain a vector server at ACS that can run those time consuming large production jobs.

In the future we hope to install versions of SPSS and SAS that exploit the vector module to provide faster and more economical statistical computation.

### Charges

Until we have more time to verify the speed ratios between the old and new systems, ACS will charge 26 cents per SBU (12 cents times 2.17 the expected scalar speedup). Remember that an SBU is approximately nine-tenths of a CPU second, with the remaining portion being the charge of byte transfers from or to input/output devices. If you run programs that take advantage of the vector processor, you will see dramatic drops in actual SBU costs.

## Technical Notes

Compared to the 6000-420, in addition to faster write-back cached memory, the VAX 6000-510 has more powerful Ethernet and Computer Interconnect (CI) modules connected directly to the 100 million bytes per second XMI backplane instead of the 13 million bytes per second BI channels. The 510 has a scalar power approximately 2.17 times that of the 8650 system on one processor module, whereas the 6000-420 that we originally ordered needed two modules for the same power. The 6000-510's vector processor module is tightly coupled to the scalar processor to provide 2 to 10 times faster execution of vectorizable programs.

## For More Information

We will make more information about the new VAX in system notes and other on-line announcements and documents on our VAX cluster, and in articles in future issues of this *Newsletter*.

## ACS Hours for December and January

### Systems

Our systems will run in unattended mode from noon Monday, December 24, until midnight Tuesday, December 25.

Our systems will also run in unattended mode from 5 pm Monday, December 31, until midnight Tuesday, January 1.

It is unlikely that any tape requests or printing will be processed during these hours. Normal operations on all systems will resume at midnight Tuesday, December 25, and on Tuesday, January 1.

At all other times, our system hours will be the normal hours listed on the inside back cover of each issue of this *Newsletter*. Our systems will be running and staffed on Martin Luther King Day, January 21.

### Offices

Our Lauderdale offices (including Engineering Services), our consulting offices be closed on December 24, 25 and 31, and on January 1 and 21. Our facilities in 1 Nicholson Hall will be closed December 22-25, December 29-31, and January 1 and 21.

At all other times we will observe our normal office hours: the Lauderdale front desk and Engineering Services will be open from 8 to 4:30 Monday through Friday. Normal hours for our consulting offices and the Computing Information Center are listed in the inside front cover—the Help Page—in each issue of this *Newsletter*.

# GRG2 Nonlinear Optimization Library— New Version on VX

Michael J. Frisch

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**O**n December 17, we will install a new version of the GRG2 (Generalized Reduced Gradient) Fortran subroutine library on the VAX VX computer. GRG2 solves nonlinear optimization (nonlinear programming) problems: maximize or minimize a nonlinear function subject to linear or nonlinear constraints. The user supplies the function and its gradient, or else supplies just the function and GRG2 uses the function to compute the gradient by a finite difference approximation.

We obtained GRG2 from Professor Leon Lasdon of the University of Texas at Austin and our contract with him limits use of GRG2 to research activities of a non-commercial nature.

We believe that the new version is upward compatible with the old one. The main difference is that you can now use a subroutine call with many parameters, or else you can continue to use the original method of setting up a data file with those same parameters. The documentation has been changed to add the subroutine call description. Some new routines and COMMON blocks have been added.

We regard GRG2 as an easier-to-use package than the MIN5LIB (MINOS 5.0) library. However, we think that the documentation for MIN5LIB is somewhat better. Both programs produce a great deal of output, even for simple problems.

### Documentation

The 5-page local documentation for GRG2 has been updated. To read it, use the command:

```
$ LISTDOC GRG2
```

The 65-page *GRG2 User's Guide* is now available by the command:

```
$ LISTDOC GRG2DOC
```

and to obtain a printed copy, use the command:

```
$ LISTDOC /PRINT /NAME=xx.nnn GRG2DOC
```

where *xx* is the site code and *nnn* is the bin number where the output should be delivered. For example, EA.435 is a bin number in 1 Nicholson Hall.

The ACS Computing Information Center also has a copy of the *Guide* on reserve in 1 Nicholson, 625-7397.

### Using GRG2

GRG2 on the VAX VX is an all-double-precision /G\_FLOATING Fortran 77 version. You can access GRG2 as a user library on the VAX VX with the command:

```
$ LIBS GRG2
```

You normally only need to use the LIBS command once for each login. Note that you must declare all floating point variables to be used with GRG2 routines as DOUBLE PRECISION (or REAL\*8). Also, you must use the /G\_FLOATING parameter on the VMS FORTRAN command. (It can be abbreviated to /G.) As an example, here are the commands to use GRG2 to solve a problem from file SAM.FOR:

```
$ FORTRAN /G_FLOATING SAM
$ LIBS GRG2
$ LINK SAM
$ RUN SAM
```

Below is a sample problem from the *GRG2 User's Guide*.

This problem has five variables, bounded above and below, a quadratic objective function and three quadratic constraints with both upper and lower bounds. The functions and bounds are given below.

### GRG2 Sample Problem

Minimize  $5.3578547 X_3^2 + 0.8356891 X_1 X_5 + 7.293239 X_1 - 40792.141$

Subject to  $0 \leq 85.334407 + 0.0056858 X_2 X_5 + 0.0006262 X_1 X_4 - 0.0022053 X_3 X_5 \leq 92$

$90 \leq 80.51249 + 0.0071317 X_2 X_5 + 0.0029955 X_1 X_2 + 0.0021813 X_3^2 \leq 110$

$20 \leq 9.300961 + 0.0047026 X_3 X_5 + 0.0012547 X_1 X_3 + 0.0019085 X_3 X_4 \leq 25$

$78 \leq X_1 \leq 102$

$33 \leq X_2 \leq 45$

$27 \leq X_3 \leq 45$

$27 \leq X_4 \leq 45$

$27 \leq X_5 \leq 45$

This problem is to be solved starting from the feasible starting point:  $X = (78.62, 33.44, 31.07, 44.18, 35.22)$

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## Contents of SAM.FOR

```
DOUBLE PRECISION Z(5000)
INTEGER NCORE
DATA NCORE/5000/
OPEN (UNIT=5, FILE='GRG.IN', STATUS='OLD')
CALL GRG(Z, NCORE)
STOP
END
SUBROUTINE GCOMP(G,X)
C HIMMELBLAU PROB. 11, COLVILLE QUADRATIC
  IMPLICIT DOUBLE PRECISION (A-H,O-Z), INTEGER (I-N)
  DIMENSION G(4), X(5)
  G(1) = 85.334407 + 0.0056858*X(2)*X(5) + 0.0006262*X(1)*X(4)
  1      - 0.0022053*X(3)*X(5)
  G(2) = 80.51249 + 0.0071317*X(2)*X(5) + 0.0029955*X(1)*X(2)
  1      + 0.0021813*X(3)**2
  G(3) = 9.300961 + 0.0047026*X(3)*X(5) + 0.0012547*X(1)*X(3)
  1      + 0.0019085*X(3)*X(4)
  G(4) = 5.3578547*X(3)**2 + 0.8356891*X(1)*X(5) + 37.293239*X(1)
  1      - 40792.141
  RETURN
END
```

## Contents of file GRG.IN

```
      5      4
NAME COLVILLE QUADRATIC (HIMMELBLAU PROB 11)
ROWS
R  1      0.0                92.0
R  2      90.0               110.0
R  3      20.0                25.0
END
BOUNDS
R  1      78.0                102.0
R  2      33.0                45.0
R  3      5 27.0              45.0
END
INITIAL
TOGETHER
78.62      33.44      31.07      44.18      35.22
END
PRINT
IPR      0
END
GO
STOP
```



**GRG2 Output**

Only part of the output is shown here because it is rather long. See the documentation for the full output.

FINAL RESULTS  
COLVILLE QUADRATIC (HIMMELBLAU PROB 11)  
SECTION 1 - FUNCTIONS

NO.	NAME	INITIAL VALUE	FINAL VALUE	STATUS	DISTANCE	LAGRANGE MULTIPLIER
					FROM NEAREST BOUND	
1		9.17927E+01	9.20000E+01	UPPERBND	2.401E-05:U	-4.03314E+02
2		9.88929E+01	9.88405E+01	FREE	8.840E+00:L	
3		2.01316E+01	2.00000E+01	LOWERBND	-1.398E-05:L	8.09463E+02
4		-3.03739E+04	-3.06655E+04	OBJ		

SECTION 2 - VARIABLES

NO.	NAME	INITIAL VALUE	FINAL VALUE	STATUS	DISTANCE	REDUCED GRADIENT
					FROM NEAREST BOUND	
1		7.86200E+01	7.80000E+01	NONBASIC	LOWERBND	4.89270E+01
2		3.34400E+01	3.30000E+01	NONBASIC	LOWERBND	8.43326E+01
3		3.10700E+01	2.99953E+01	BASIC	2.995E+00:L	
4		4.41800E+01	4.50000E+01	NONBASIC	UPPERBND	-2.66392E+01
5		3.52200E+01	3.67756E+01	BASIC	8.224E+00:U	

## More NETLIB Public Domain Mathematical Software

Michael J. Frisch

MJFRISCH@VX.ACS.UMN.EDU

**T**he following items have recently been added to the list of libraries in the NETLIB electronic mail system for the distribution of the source code for public domain mathematical software.

**ParaGraph** Graphical display system for visualizing behavior of parallel algorithms on message-passing multi-processors.

**vfftpk** Vectorized Fortran sub-programs for fast Fourier transform of multiple real sequences.

**FORTRAN** Fortran single-double precision converter.

**TYPESETTING** troff and LaTeX macros; AMS-TeX macros.

**C++** Miscellaneous C++ codes

**OPT** Miscellaneous optimization software.

**BIB** Bibliographies: Golub and VanLoan, Matrix Computations, 2nd ed.

To find out more about accessing this library and other NETLIB libraries, use the following command on the VAX VX:

\$ **LISTDOC NETLIB**

## A New Short Course Schedule

In the following pages, we present our winter quarter short courses in a new format.

For your convenience, we've grouped all the short courses taught by ACS, St. Paul Computing Services, and Health Sciences Computing Services into a single list, arranged by topic. We hope that this new arrangement will make it easier for you to find the courses you want.

We've also established a *single phone number* through which you can register for any of these courses. You can also register by electronic mail at a single address or register in person at the Computing Information Center. See the next page for details.

Please let us know how you like this new short course format.

# Free Central System Computing Courses Winter 1991

Offered by St. Paul Computing Services (SPCS), Academic Computing Services (ACS),  
and Health Sciences Computing Services (HSCS)

**Registration begins December 17**

Our courses teach you the operating systems and software on **central system** computers, large systems used by many people at the same time. These courses do not cover microcomputer software unless otherwise indicated in the following descriptions.

To register call 626-0032, 8:00 am to noon and 1:00 to 4:30 pm, Monday through Friday.

Registration is located at the Computing Information Center, 1 Nicholson Hall. Mail registrations are accepted or you can also register by electronic mail—write to [classes@umnacvx](mailto:classes@umnacvx) or [classes@vx.acs.umn.edu](mailto:classes@vx.acs.umn.edu). Include a day-time phone number. Please call to cancel if you later decide not to attend, so we know how many to expect. Deadline for registering is 4:30 pm on the last working day before the class begins.

### General Courses

#### User Orientation (SPCS)

One section: Tuesday, January 29, 9:30-11:30 am  
Overview of SPCS's hardware, software, and services.

#### Introduction to Computing (ACS)

One section: Monday and Wednesday, January 7-14,  
2:30-4:30 pm

Basic terms and concepts in central system computing for the beginner. Uses VMS for demonstration and practice.

### Operating Systems

#### CMS Introduction (SPCS)

Two sections: Wednesday, January 30 and Friday,  
February 1, 9:30-11:30 am  
Wednesday, January 30 and Friday,  
February 1, 1:30-3:30 pm

Hands-on training in CMS, the operating system on the SPCS and Carlson School of Management machines.

#### CMS BATCH (SPCS)

One section: Wednesday, February 6, 9:30-11:30 am  
Why, when, and how to submit programs to BATCH. You must know the CMS operating system.

#### CMS Tapes (SPCS)

One section: Wednesday, February 20, 9:30-11:30 am  
Specifying, reading, and writing tapes. You must know the CMS operating system.

#### Introduction to VAX/VMS Operating System (ACS)

One section: Tuesday and Thursday, January 22-31,  
2:30-4:30 pm

An extensive introduction to the VMS operating system, including files, editing, mail, DCL commands, and procedures.

#### UNIX Overview (ACS)

Two sections: Wednesday, January 16, 2:30-5 pm  
Tuesday, February 5, 2:30-5 pm

A beginning look at the UNIX operating system: structure, commands, utilities, and editing.

## Short Courses

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### **vi: UNIX Editor (ACS)**

Two sections: Wednesday, January 23, 2:30-5 pm  
Thursday, February 7, 2:30-5 pm  
Editing files in UNIX in line mode (ex) or screen mode (vi): commands and setup. You must know the UNIX operating system.

### **Introduction to NOS/VE Part 1 (HSCS)**

Two sections: Thursday, January 10, 10:00 am-noon  
Wednesday, February 20, 2:00-4:00 pm  
Connecting to NOS/VE, entering commands, managing files, obtaining output, and on-line help.

### **Introduction to NOS/VE Part 2 (HSCS)**

Two sections: Thursday, January 17, 10:00 am-noon  
Wednesday, February 27, 2:00-4:00 pm  
Batch jobs, printing options, job/command control, special files, and file transfers.

### **NOS/VE Full Screen Editor (HSCS)**

Two sections: Tuesday, January 29, 10:00 am-noon  
Tuesday, March 19, 2:00-4:00 pm  
Creating and editing NOS/VE files, expanded on-line help for each function, and customized functions. You must know the NOS/VE operating system.

## **Communications**

### **CMS Electronic Mail (SPCS)**

Two sections: Thursday, January 31, 9:30-11:30 am  
Tuesday, March 5, 9:30-11:30 am  
Corresponding with other computer users locally and worldwide, via BITNET.

### **Internet Overview (SPCS)**

One section: Thursday, February 21, 10:30-11:30 am  
Using the CMS central system to log on to and transfer files to/from other computers on the Internet.

### **YTERM (SPCS)**

One section: Tuesday, February 12, 10:30-11:30 am  
Demonstration of the YTERM terminal emulation package, as used with the CMS operating system.

### **ProComm (SPCS)**

One section: Tuesday, February 19, 10:30-11:30 am  
Demonstration of the ProComm terminal emulation package, as used with the CMS operating system.

### **TinCan (SPCS)**

One section: Tuesday, February 26, 10:30-11:30 am  
Demonstration of the TinCan terminal emulation package, as used with the CMS operating system.

### **ProComm-Computing by Phone (ACS)**

One section: Tuesday, January 15, 2:30-4:30 pm  
Using ProComm microcomputer software to connect to LUMINA and other campus central system computers, and to upload and download files.

### **Electronic Mail & Networks (ACS)**

One section: Tuesday and Thursday, February 12-14, 2:30-4:30 pm  
Descriptions of the BITNET and Internet networks, and how to use them for electronic mail and transferring files, with emphasis on the VAX VMS system. You must know a central computing system.

### **Electronic Mail on NOS/VE (HSCS)**

Two sections: Wednesday, January 30, 2:00-4:00 pm  
Thursday, March 14, 10 am-noon.  
Using the E-mail system on NOS/VE to send and receive mail, transfer microcomputer files, and use bulletin boards and networks.

## **Statistics**

### **SAS/Base (SPCS and ACS)**

One section: Tuesday, February 5, 9:30-noon and Thursday, February 7, 9:30-11:30 am  
The essentials of the SAS statistical package for analysis, data storage and retrieval, report writing, graphics, and more. You must know either the CMS or VMS operating system.

## **SAS/Stat (SPCS and ACS)**

One section: Thursday, February 14, 9:30–11:30 am  
The statistical analysis features of SAS, such as correlation, regression, and analysis of variance. You must know either the CMS or VMS operating system.

## **Using SPSS (SPCS, ACS, and HSCS)**

One section: Monday, Wednesday, and Friday, January 28–February 1, 2:30–4:30 pm  
How to use the Statistical Package for the Social Sciences, available on several central computing systems. You must know a central computing system.

## **PC SAS Overview (SPCS)**

One section: Thursday, March 7, 9:30–11:30 am  
Discussion of features specific to the IBM-PC version of SAS.

## **Databases**

### **NOMAD2 (SPCS)**

One section: Friday, February 22, 9:30–11:30 am  
Demonstration of NOMAD2, a database management system on the CMS operating system.

### **INGRES (ACS)**

One section: Monday and Wednesday, February 11–20, 2:30–4:30 pm  
Creating databases and retrieving information from the INGRES database package. You must know the VMS operating system.

## **Graphics**

### **SAS/GRAPH (SPCS)**

One section: Thursday, February 28, 9:30–11:30 am  
Exploring SAS graphics for presentation of your data as plots, charts, maps, and contour plots. You must know the CMS operating system.

## **PicSure Interactive Graphics (HSCS)**

Two sections: Tuesday, January 15, 2:00–4:30 pm  
Tuesday, March 26, 2:00–4:30 pm  
Using PicSure to create bar charts, scattergrams, line charts, pie charts, and combinations. You must know the NOS/VE operating system.

## **MinnesotaMEDLINE**

(Call the Bio-Medical Library at 626-5808 for information on class times and registration procedures.)

### **Basics of MinnesotaMEDLINE Searching (HSCS)**

Basic commands and the use of Medical Subject Headings (MeSH) in on-line medical literature searching.

### **MinnesotaMEDLINE Workshop (HSCS)**

The more advanced and powerful searching capabilities of the MinnesotaMEDLINE system.

## **Other**

### **PROFS Calendars (SPCS)**

One section: Friday, February 15, 9:30–11:00 am  
Viewing, maintaining, and changing your electronic calendar on the CMS operating system.

### **C Programming (ACS)**

One section: Monday, Wednesday, and Friday, February 25–March 1, 2:30–4:30 pm  
Introduction to syntax, style, and structure of the C programming language. Requires some programming background. You must know the UNIX operating system.

# Conventions

Throughout this and other ACS publications, we have adopted these conventions:

- Messages and prompts from the ACS computers appear in plain type, like this.
- Words that the computer systems replace with a specific name, value, or other information appear in *italic type, like this*.
- Commands you type at your terminal keyboard appear in **bold face type, like this**.
- Words that must be replaced by a specific name, value, or command that you type in appear in ***bold italic type, like this***.
- Comments to interactive sessions and program files are enclosed in { curly braces, like this }.

Here's an example:

**SAVE, *filename***

is a command you type in. You type **SAVE** and replace *filename* with the name of your file. The system may respond with the message

*filename* ALREADY PERMANENT { An example of a system message. }

where *filename* will be replaced by the name of the file you attempted to save.

- The symbol <CR> refers to the carriage return (or RETURN) key on the terminal. The <CR> serves as a terminator for commands you type at your terminal. In most cases we do not show <CR>; we assume you know to type it after every command.

# Phones/Hours/Labs

## ACS PHONE NUMBERS

Administrative Office: 626-1600  
HELP-Line 626-5592

**Access:**

ACS systems (UX, VX, VZ, CA)  
3/12/2400 bps + 7/Even/1      **626-1630**  
12/2400 bps + 8/None/1      **626-1631**  
**LUMINA**      **626-2206**

**Accounts:**

ENCORE, VAX, CYBER	625-1511
Computer Hours (recorded message)	626-1819
Computing Information Center, 1 Nicholson Hall	625-7397
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LUMINA Consultant	626-2272
Math and Engineering Software	625-5830
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Permanent File Restoration	626-0595
Public Labs (with ACSnet)	
140 Blegen Hall	624-5278
B40 Central Library	624-3269
207/270 Diehl Hall	624-3128
4-204/4-250 EE/CSci	625-9081
121 Elliott Hall	624-0866
14 Folwell Hall	625-4896
1 Lind Hall	625-0801
308 Mechanical Engineering	625-7352
1 Nicholson Hall	625-5082
130 Physics	625-6820
9 Walter Library	626-1899
MWNC Lab Manager (14 Folwell Hall)	625-7850
Publications Information	626-1093
Short Course Registration	625-7397
Shuttle Bus Service	625-9525
System Status (recorded message)	626-1819
Tape Librarian/Operations Services	626-1838

## PUBLIC LABS TWIN CITIES CAMPUS

	Central System Printing	Interactive	Micro
<i>East Bank</i>			
ApH 117			X
Arch 148			X
CenH		X	
ComH		X	
DiehH 207/ 270	L	X	X
EddyH Annex 54			X
EE/CSci 4-204/250	I, L	X	X
EltH 121	I, L	X	X
FolH 14, 14a	L	X	X
FronH		X	
LindH 1	L	X	
LindH 26			X
LindH 306B			X
MasCanCtr M39		X	
MechE 308	L	X	
MoosT 8-425			X
Nich H 1	L	X	
Phys 130	L	X	X
PioH		X	
SanH		X	
TerrH		X	
VinH 203			X
WaLib 9	L	X	X
<i>West Bank</i>			
AndH 170	L		X
BlegH 140	I	X	
MdbH		X	
OMWL B2	L		X
<i>St. Paul</i>			
BaH		X	
CentLib B40	I, L	X	
CentLib B50			X
ClaOff 135	L		X
McNH 305			X
Vet 436			closed fall quarter for remodeling

I - Impact line printers.  
L - Laser printers.

## SYSTEM OPERATING HOURS

The ENCORE UX, VAX VX, VAX VZ, and CYBER CA systems run continuously from 6 pm Sunday until 6 am the following Sunday.

On the second and fourth Fridays of each month from 5 am to 7 am the CYBER CA and NV systems are unavailable. Low-rate hours on all systems are from 8 pm to 8 am Monday through Friday, and all operating hours on Saturday and Sunday.

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