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# SPCS NEWSLETTER

ST. PAUL COMPUTING SERVICES

JULY 1990

UNIVERSITY OF MINNESOTA

## CONTENTS

PSST...THERE'S MORE! .....1  
 SECURITY: PASSWORDS .....4  
 HOLIDAY HOURS .....4  
 MICROCOMPUTER INFO  
   FLYING PCs .....5  
   PC SAS 6.04 .....5  
 SERIOUS SAS  
   LINEAR MODELS .....6  
   ANOVA USING PROC GLM ....7  
 CONSULTING CORNER.....9  
 TROLL SYSTEM .....10  
 TIME GRANT USERS! .....10  
 SHORT COURSES  
   CALENDAR .....11  
   DESCRIPTIONS .....12  
   POLICIES .....13  
 RATES .....14  
 NEWSLETTER INDEX .....15  
 GENERAL INFORMATION .....16



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## PSST...

### There's more!

Our March 1990 Newsletter featured a new product: Public Software Samples & Tools (PSST). We're pleased to report that our PSST collection is expanding. To view the most complete and up-to-date list of what's available, please enter these CMS commands in the order given:

```
getprod psst
help psst
help psstlist
```

To show you some of the potential of what you'll find in PSST, here's a demonstration that uses three of the programs: PUTBSIDE, JUSTIFY, and OVRLYTXT.

Suppose we have two files. One file, EXAMPLE FILE1 A, is a list of seven Minnesota cities, in alphabetical order:

- Alexandria
- Duluth
- International Falls
- Minneapolis
- Rochester
- Saint Cloud
- Saint Paul

The other file, EXAMPLE FILE2 A, is a list of numbers that correspond to each of those cities:

- 1,774
- 3,907
- 870
- 10,436
- 1,852
- 934
- 9,446

Let's say each number represents the total pounds of pasta consumed in that city on February 29, 1990.

We'd like to put the list of numbers next to the names of the cities, in the same file. We can do this in one step with the XEDIT macro PUTBSIDE. While editing the first file, EXAMPLE FILE1 A, we enter this from the XEDIT Command line:

```
putbside = file2 = 25
```

This is the PUTBSIDE command. The "= file2 =" stands for the filename, filetype, and filemode of the file to be put beside the file being edited. In this case, the filename and filemode of the two files are the same, so we can use the equal signs (=). The "25" on the PUTBSIDE command indicates the column in which the file should begin.

This is the resulting file (pretend this is an XEDIT screen, with SCALE ON 3 and PREFIX ON RIGHT):

	...+...1...+...2...+...3...+...4....	
Alexandria	1,774	00001
Duluth	3,907	00002
International Falls	870	00003
Minneapolis	10,436	00004
Rochester	1,852	00005
Saint Cloud	934	00006
Saint Paul	9,446	00007

So, the numbers are there, starting in column 25, no sweat. But they look ragged. We'd like to have them right-justified. The XEDIT macro JUSTIFY will do that; just enter this from the Command line:

```
justify r 25 30
```

In this JUSTIFY command, the "r" specifies RIGHT justification, and the "25 30" specifies the columns we want justified. Now the file looks like this:

	...+...1...+...2...+...3...+...4....	
Alexandria	1,774	00001
Duluth	3,907	00002
International Falls	870	00003
Minneapolis	10,436	00004
Rochester	1,852	00005
Saint Cloud	934	00006
Saint Paul	9,446	00007

Hey, pretty slick! Now we want to identify what the numbers stand for. We want to put "lbs. of pasta" after the number, on each line. We can do this with the XEDIT macro OVRLYTXT (which stands for "overlay text"), but first we need to add a line at the beginning of the file that has "lbs. of pasta" in the position that we want it on all the other lines. After we add the line, our file looks like this:

	...+...1...+...2...+...3...+...4....	
	lbs. of pasta	00001
Alexandria	1,774	00002
Duluth	3,907	00003
International Falls	870	00004
Minneapolis	10,436	00005
Rochester	1,852	00006
Saint Cloud	934	00007
Saint Paul	9,446	00008

Now we're set to use the OVRLYTXT command. Enter this from the Command line:

```
ovrlytxt 1 2 8
```

This command says we want to overlay the text of line 1 of the file (indicated by the 00001 at the right edge of the screen) onto lines 2 through 8 of the file. (If we wanted to overlay line 1 onto ALL lines of the file, starting with line 2, we could enter "ovrltxt 1 2 \*"). This is the result:

...+....1....+....2....+....3....+....4....			
		lbs. of pasta	00001
Alexandria	1,774 lbs. of pasta		00002
Duluth	3,907 lbs. of pasta		00003
International Falls	870 lbs. of pasta		00004
Minneapolis	10,436 lbs. of pasta		00005
Rochester	1,852 lbs. of pasta		00006
Saint Cloud	934 lbs. of pasta		00007
Saint Paul	9,446 lbs. of pasta		00008

Voila! Lines 2 through 8 look just the way we want! We're almost done. Let's delete line 1 and give this list a title. Something like this:

...+....1....+....2....+....3....+....4....			
Specialized Food Consumption			00001
Feb. 29, 1990			00002
			00003
Alexandria	1,774 lbs. of pasta		00004
Duluth	3,907 lbs. of pasta		00005
International Falls	870 lbs. of pasta		00006
Minneapolis	10,436 lbs. of pasta		00007
Rochester	1,852 lbs. of pasta		00008
Saint Cloud	934 lbs. of pasta		00009
Saint Paul	9,446 lbs. of pasta		00010

We decide to center the title, but rather than eyeball it ourselves, we will use the JUSTIFY command again:

```
justify c 1 44 1 2
```

The "c" specifies CENTER justification, the "1 44" specifies the columns in which to center the text, and the "1 2" specifies that we want to center lines 1 through 2. The result is:

...+....1....+....2....+....3....+....4....			
Specialized Food Consumption			00001
Feb. 29, 1990			00002
			00003
Alexandria	1,774 lbs. of pasta		00004
Duluth	3,907 lbs. of pasta		00005
International Falls	870 lbs. of pasta		00006
Minneapolis	10,436 lbs. of pasta		00007
Rochester	1,852 lbs. of pasta		00008
Saint Cloud	934 lbs. of pasta		00009
Saint Paul	9,446 lbs. of pasta		00010

Now the file is just the way we want it.

Of course, if we were really faced with 2 files only 7 lines long, we might not have bothered to use the PUTBSIDE, JUSTIFY, or OVRLYTXT commands to get this end result. We might have typed "1,774 lbs. of pasta" on the first line, and "3,907 lbs. of pasta" on the second line, and so on. Typing fast, that could have taken the same amount of time as it took to do this example.

But suppose that, instead of cities and lbs. of pasta, our files are lists of lakes and lbs. of fish caught. That's more than 10,000 lines per file, one line for each lake! Even then, this example would take the same number of commands, while typing on each line would take most of a day. This is the kind of case for which these time-saving macros were written! ▲

## Passwords

At one time, SPCS *required* its users to change their passwords every 90 days (this was built into the system). This has been eliminated; however, SPCS users should still change their passwords regularly to protect their accounts from unauthorized users. We've assembled a checklist of do's and don'ts to help you choose a new, secure, legal password. To help us reinforce our mainframe security, please keep your password confidential and change it frequently. If you forget your password, come to our office and fill out a Change form (we'll assign you a new password within 24 hours).

### DO . . . . .

☺ use a password that is at least 6 characters long, and preferably 7 to 8 characters long (5 character minimum)

☺ use acronym passwords (use the first letter of each word in a phrase), common sayings or aphorisms, or self-coined phrases, such as:

a stitch in time saves nine (asitsn)  
a penny saved is a penny earned (apsiape)

☺ put two words together that do not logically go together, or make up pronounceable nonsense words, such as:

mailbell, cupcow, boochaz, weege

☺ choose a password that's easy to type (the faster you can type it, the harder it is for someone to steal it by watching you)

☺ include a digit (0 - 9) or punctuation mark:  
! @ \$ % / ? & . \* ; :

### DO NOT . . . . .

☹ use dictionary words, including words in other languages (they're easily guessed; also, electronic dictionaries are available and provide an easy way to break passwords);

☹ use proper nouns or anything that bears a strong association with you personally (your name, parents, family, friends, pet, street address, birthdate, etc.)

☹ include your password in any file, especially electronic mail messages

☹ write it down anywhere

☹ use ( , ) "

☹ let it be known to others.

## To Change Your Password

For your own protection, you will be prompted to change your logon password during your first logon session. Thereafter, to change your password, enter the following command from the command line:

```
change pw
```

You'll be prompted to enter your current logon password, and then to enter a new password. You will be required to enter the new password once more, for verification, and the new password will be in effect from that point on. For more information about changing passwords, refer to Documentation Note 2, Changing Passwords. ▲

## Holiday Hours

SPCS will offer Reduced Service\* during these holidays:

### Fourth of July

7/4/90 0:00 a.m. - 7/5/90 7:00 a.m.

### Labor Day

9/2/90 10:00.m. - 9/4/90 7:00 a.m.

\* Tapes will not be mounted, printed output will not be distributed, and the Coffey Hall user area will not be open.



# Microcomputer Info

## Flying PCs

reprinted from OASI News, January/February 1990

If you have users who travel on an airplane with a laptop PC, there are a few travel tips you might want to share with them:

- Always carry the PC on the plane with you. If you check it, it will be in a nonpressurized part of the plane, which could damage it.
- The x-ray machine will not hurt the PC.
- DO NOT carry the PC through the metal detector, because it can damage the hard drive. Ask for a hand inspection at the metal detector checkpoint station.

➤ The FAA limits you to carry one piece of luggage besides your briefcase or purse. It must fit in the overhead storage compartment or under the seat in front of you. ▲

## PC SAS 6.04

In late July, SPCS will be distributing the latest upgrade of PC SAS: version 6.04. This version adds support for many new graphics devices (including VGA displays) and dBASE IV files. In addition, two new procedures have been added: LOGIST for Logistic Regression and CALIS for Covariance Analysis of Linear Structural Equations (LISREL type models). Instructions and diskettes will be mailed directly to all PC SAS site licensees. ▲

## ST. PAUL MICROCOMPUTER LAB

The St. Paul Microcomputer Lab is open to all students, staff, and faculty members of the University of Minnesota who possess an ACS Microcomputer Access Card (available from the St. Paul Bursar's Office for \$30/quarter). A Microcomputer Access Card is only valid during the quarter in which it is purchased. High quality printing is available on the Apple LaserWriter Plus, an HP LaserJet Plus, and an HP ColorPro Plotter. To use one of these printers, you'll need a Laser Printer Access Card, available for \$1.00 from the Bursar's Office. Each Printer Access Card is good for ten pages of manuscript-quality print and can be used any time. The lab is operated on a first-come, first-served basis, and each user is limited to 2 hours per session.

### S O F T W A R E

<b>IBM</b>	<b>MACINTOSH</b>	<b>APPLE IIe</b>
dBaseIII	MacPaint	AppleWork
GLIM	MacPascal	MousePaint
Lotus 123	MacSpell+	MouseWrite
Minitab	MacTerminal	
PC Paintbrush	MacWrite	
Statistix	MS-Basic	<b>IBM PS/2</b>
Turbo Pascal	MS-Chart	Microsoft
WordPerfect	MS-Multiplan	Windows
WordStar	MS-Word	PC SAS
WordStar 2000		

### H A R D W A R E

- 11 IBM PCs with 640K memory
- 1 IBM PC/AT with 512K memory
- 2 IBM PS/2 model 50 with 1 Mb memory
- 1 Apple IIe with 128k memory
- 6 Macintosh Plus with 1 Mb memory
- 3 Macintosh SE with 1 Mb memory
- 1 Macintosh II with 1 Mb memory

MTThF 9 am - 4:30 pm  
W 9 am - 7:30 pm  
Saturday 2 pm - 5 pm  
(Saturday hours only through July 14)

6 2 4 - 3 2 6 9

# Serious SAS®

## Linear Models

This will be old hat to experienced users of SAS, but for those of you new to the system, here's a rundown on our recommendations for linear models in SAS.

There are three commonly used SAS procedures for the analysis of linear models: PROC ANOVA, PROC REG, and PROC GLM. We will not discuss ETS procedures for times series analysis in this article.

PROC GLM is the most versatile of the three procedures. It can handle most of the analyses usually done by PROC ANOVA and PROC REG, but it is also less efficient than PROC REG and PROC ANOVA. Here are some guidelines for choosing a procedure for analyzing a linear model.

- 1 - If you have data from a balanced designed experiment, where all the independent variables are category variables (class variables), then use PROC ANOVA.
- 2 - If all of your independent variables are continuous variables (direct variables), then use PROC REG.
- 3 - Use PROC GLM if you have a designed experiment with unbalanced or missing data, or if you have missing cells in your layout.

Guidelines 1 - 3 are summarized in the following table:

One Response Variable per Analysis			
Independent Variables are:			
	class	continuous	both
Data are:			
balanced complete	to do analysis of variance, use PROC ANOVA	to do regression, use PROC REG	to do parallel regressions, etc. use PROC REG or to do analysis of variance, use PROC GLM
unbalanced or incomplete	to do analysis of variance, use PROC GLM		

You may also want to use PROC REG if your main interest is in the continuous independent variables, and the data are from qualitatively different groups. For example, you may want to test for parallel regressions vs. concurrent regressions. If so, you would use both continuous variables and dummy independent variables in your regression model, after creating the necessary dummy variables in a DATA step.

PROC GLM is the usual choice for analysis of covariance, which you would do if you had a designed experiment (balanced or not) in which you wanted to account for the effects of additional continuous variables that were recorded for each case. PROC GLM also allows you to simultaneously analyze several responses in a single multivariate analysis of variance. ▲

# Serious SAS®

---

## ▼ Anova using PROC GLM

At the Help Desk, we've been hearing lots of questions about doing Analysis of variance (Anova) using PROC GLM. Our Statistical Consultant's recommendations for unbalanced data are:

- ▼ use the Type III Sums of Squares and F tests for complete, unbalanced layouts, and
- ▼ don't try to interpret the Least Squares estimates produced by the SOLUTION option. They are biased.

In this article, we are going to focus on the first of these recommendations. We'll explain the Least Squares estimates problem in our next newsletter.

The following DATA step creates a data set TESTDS with:

grand mean: 20  
factor A effects:  $A(1) = -A(2) = 5$   
factor B effects:  $B(1) = -B(2) = 3$   
AB interaction effects:  $AB(1,1) = -AB(1,2) = -AB(2,1) = AB(2,2) = 2$   
a randomly generated error term with variance = .25  
cell sample sizes:  $N(1,1) = 4$   $N(1,2) = 2$   $N(2,1) = 7$   $N(2,2) = 4$

```
DATA TESTDS;
  INPUT A B RESP;
CARDS;
1 1 31.2674
1 1 29.2700
1 1 30.5106
1 1 30.2161
1 2 19.4496
1 2 20.3368
2 1 15.8408
2 1 16.1674
2 1 15.9583
2 1 15.5841
2 1 15.6081
2 1 16.0182
2 1 16.3229
2 2 13.7000
2 2 14.2072
2 2 14.3242
2 2 14.4996
```

The Analysis step:

```
PROC GLM;
  CLASS A B;
  MODEL RESP = A B A*B;
```

We'll look at the output of the PROC GLM to talk about Type III Sums of Squares:

```

GENERAL LINEAR MODELS PROCEDURE

CLASS LEVEL INFORMATION

CLASS      LEVELS  VALUES
A          2      1 2
B          2      1 2

NUMBER OF OBSERVATIONS IN DATA SET = 17

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: RESP

SOURCE          DF      SUM OF SQUARES      MEAN SQUARE      F VALUE      PR > F      R-SQUARE      C.V.
MODEL          3      669.69219610      223.23073203      892.56      0.0001      0.995169      2.51814
ERROR          13      3.25131138      0.25010088      ROOT MSE      RESP MEAN
CORRECTED TOTAL 16      672.94350749      0.50010087      19.377319412
  
```

This first ANOVA table doesn't split the MODEL Sums of Squares into portions for main effects and interaction effect, so we can't do the tests we are interested in just yet. The most useful piece of information in this table is the Mean Square for ERROR, which is an unbiased estimate of sigma-squared. The estimate matches the value used to generate the data fairly well (remember, .25 was the error variance in data simulation). The rest of the output:

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE III SS	F VALUE	PR > F
A	1	517.22648643	2068.07	0.0001	1	352.88228467	1410.96	0.0001
B	1	86.34680597	345.25	0.0001	1	129.23067251	516.71	0.0001
A*B	1	66.11890371	264.37	0.0001	1	66.11890371	264.37	0.0001

The output shows the Types I and III breakdown of MODEL Sums of Squares (SS). Type I SS are sequential, so they would change if we rearranged the effects in our model statement. Type III SS are more useful because the SS for each effect has been corrected for the presence of the other effects. The Type III SS for an effect is basically the Type I SS we would get if that effect came last in the model statement. For this reason, Type III SS don't add up to the MODEL SS like Type I SS do. *When doing tests for unbalanced data, use Type III SS.* The issue of which kind of Sums of Squares to use never comes up with balanced data because Type I and III SS are the same for balanced data. ▲

## **N**EW: Statistician on Staff

Stop by and welcome our new Statistical Consultant, Julie Buckel. Julie is a Ph.D. candidate in the School of Statistics. She also has a masters degree in Agriculture and and Bachelor of Arts in Mathematics (both from Colorado State University). She'll be working in 90 Coffey Hall part-time this summer and will be on hand to answer stats-oriented questions, consult on longer-term projects, and work in conjunction with Stat Clinic consultants on your projects. Check with the Help Desk to obtain her schedule and to make an appointment. ▲





# Consulting Corner

**Q** When I'm running a FORTRAN program, everything runs fine but I keep getting PROGRAM INTERRUPT messages that a FLOATING-POINT UNDERFLOW EXCEPTION occurred. Since STANDARD CORRECTIVE ACTION is taken, the program continues and works fine. Is there any way I can prevent these messages from being displayed?

**A** Yes. These underflow exceptions are situations where a number is so small (very close to zero) that the computer cannot represent it. The STANDARD CORRECTIVE ACTION is to treat the number as a true zero, and keep going. If you know that all of these underflow exceptions are not error situations, then you would clearly want to keep them off your screen and out of your output.

There is an execution-time option called NOXUFLOW that will do what you want. When you specify this option, the underflow exceptions are corrected by the hardware, and thus the program is not interrupted. With the hardware doing the correction (rather than the software), the program will actually run faster, too.

You probably use the LOAD command with the START option to run your programs, like this (assuming PROGRAM1 is the name of your program):

```
LOAD PROGRAM1 (START
```

To specify the NOXUFLOW option, you will need to separate this into a LOAD command and a START command, like this:

```
LOAD PROGRAM1
START * NOXUFLOW
```

If, instead of using LOAD and START, you execute a program that has been made into a module, you can specify the option after the module name. For example, if PROGRAM1 was the module name:

```
PROGRAM1 NOXUFLOW
```

There is also a built-in subroutine called XUFLOW which your program can call to keep underflow

exceptions from being displayed. To keep the messages from being displayed, do this:

```
CALL XUFLOW (0)
```

This does the same thing as the NOXUFLOW option.

To make the messages display at some other point in the program, do this:

```
CALL XUFLOW (1)
```

This does the same thing as the XUFLOW option, which is the same as turning off the NOXUFLOW option. XUFLOW is the default execution-time option that is causing the messages to be displayed in the first place. ▲

**Q** I have raw data in which commas separate the name and weekly values for an observation. How do I go about creating a SAS data set when the data is in this form?

```
|...+....1....+....2....+....3....+....
Smith,92.29,183.02,28.29,1392.02
Stevenson,1145.37,898.34,99.40,935.63
Jackson,123.20,62.93,70.87,227.39
```

**A** To read data delimited by commas, use the SCAN function. The SCAN function returns the nth word of a character string. It is used to extract words from a character string when the relative order of words is known, but their starting positions are not. For this example, you would read the whole line as a character string, then use the SCAN function to pull the name and weekly values out of the line. This program would do it:

```
DATA AMOUNTS (DROP=LINE);
  INFILE RAWDATA;
  INPUT LINE $80.;
  LENGTH NAME $ 10;
  NAME=SCAN(LINE,1,',');
  DO WEEK=1 TO 4;
  TOTAL=INPUT(SCAN(LINE,WEEK+1,','),8.);
  OUTPUT;
  END;
RUN;
```

The result:

OBS	NAME	WEEK	TOTAL
1	Smith	1	92.29
2	Smith	2	183.91
3	Smith	3	28.29
4	Smith	4	1392.02
5	Stevenson	1	1145.37
6	Stevenson	2	898.34
7	Stevenson	3	99.40
8	Stevenson	4	935.63
9	Jackson	1	123.00
10	Jackson	2	62.93
11	Jackson	3	70.87
12	Jackson	4	227.39

## TROLL System

The TROLL system for research in economics and other social sciences is now available for use at SPCS. TROLL is an interactive system for simulation, regression, and data analysis originally designed for econometric research.

TROLL's simulation capabilities allow the development, testing, and use of models of time dependent series like markets or international relations. For dynamic simulations the Newton, Jacobi, and Gauss-Seidel algorithms are available. Single-equation forecasting and one-period simulation are also available.

TROLL performs regression by various methods, including ordinary least squares, serial correlation correction, two-stage least squares, instrumental variables, nonlinear least squares, distributed lag and polynomial distributed lag. Also available are bounded influence and robust regression, ARIMA models, ridge regression, multinomial logistic (LOGIT), generalized limited dependent variable estimation (PROBIT), full information maximum likelihood, three-stage least squares, spectral regression, and estimation of time-varying parameters.

SPCS will be providing limited support for TROLL. For more information, please contact the Help Desk consultant. ▲

## Time Grant Users!

If you have not returned a Time Grant Renewal Form (a pink form), your Time Grant computing account has been put on HOLD (you no longer have access to the SPCS IBM mainframe) as of July 1, 1990. In order to continue using your account, you must return a signed Time Grant Renewal Form as soon as possible. You must also pay the \$50 initial fee to obtain up to \$1000 in computing services for the new fiscal year.

The Time Grant program was established to provide computing support for unfunded faculty and staff research and graduate student thesis work. Faculty and staff who have exhausted their funded research accounts or who are unable to obtain funding from granting agencies may apply for these grants. Graduate students may apply for grants for their thesis and for research work.

Time Grant accounts may be used for bulletin boards, electronic mail, file transfer, statistical analysis, programming, text formatting, and miscellaneous computer resources. These accounts may not be used for data entry, supplies, contract consulting/programming, short courses, manuals, or supplies.





## How to Renew

Complete the Time Grant Renewal Form mailed to you in May, 1990, and return it to our Main Office. If you cannot find your form, call us (624-7788) and we'll send you a new one.

## How to Apply

Pick up a Time Grant application in our Main Office, or call (624-7788) to have one mailed to you. Upon approval, you will be assigned an account number, userid, and password. This process usually takes 2 - 3 business days. If you've never used our system, you may opt to attend the appropriate short courses. We also provide some free documentation, and on-line help is always available. For further assistance, call or stop by our Help Desk. ▲

# Summer Short Course Calendar

    *July - August*    

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
<i>July</i> 1	2	3	4	5	6	7
8	9	10 <i>User Orientation 10 - 12</i>	11 <i>CMS Intro (day 1) 10 - 12</i>	12 <i>CMS Mail 10 - 12</i>	13 <i>CMS Intro (day 2) 10 - 12</i>	14
15	16	17 <i>SAS Base (day 1) 10 - 12:30</i>	18 <i>CMS BATCH 10 - 12</i>	19 <i>SAS Base (day 2) 10 - 12</i>	20 <i>CMS Utilities 10 - 12</i>	21
22	23	24 <i>SAS/Stat 10 - 12</i>	25 <i>YTERM 11 - 12</i>	26 <i>SAS/GRAPH 10 - 12</i>	27 <i>CMS Tapes 9 - 12</i>	28
29	30	31 <i>TinCan 11 - 12</i>	1 <i>PROCOMM 11 - 12</i>	2 <i>PC SAS Overview 10 - 12</i>	3 <i>NOMAD2 10:30 - 12</i>	4
5	6	7 <i>CMS REXX 10 - 12</i>	8	9	10	11 <i>August</i>



# Short Course Descriptions

## 001 User Orientation

July 10, 10 am to noon  
125 Coffey Hall

Introduction for new and prospective users to our facility, with a brief description of our hardware and software and a tour of our facilities. No charge

## 100 CMS Introduction

July 11 and 13, 10 am to noon

Two-day introduction to CMS, the operating system on the IBM mainframes at SPCS and Carlson School of Management. Topics include full screen editing with XEDIT, program execution (examples in SAS, FORTRAN, NOMAD2), and basic communication with other users. \$10/\$15/\$20

## 110 CMS Electronic Mail

July 12, 10 am to noon

Introduction to electronic correspondence with computer users at SPCS and, via networks, worldwide. Our network connections include BITNET, which provides access to over 400 research and educational institutions throughout Europe, Asia, the Americas, and Africa. No Charge

## 120 CMS BATCH

July 18, 10 am to noon

Presentation of the CMS BATCH processing facility. Learn about the Job Control Language (JCL) used for submitting programs to BATCH and about BATCH's special features. Prerequisite: CMS Introduction or equivalent knowledge. \$10/\$15/\$20

## 130 CMS Utilities

July 20, 10 am to noon

Introduction to using CMS utilities for inexpensive archival storage and retrieval of files, disk space and password management, system query, temporary disk usage, and other functions. Prerequisite: CMS Introduction or equivalent knowledge. \$10/\$15/\$20

## 140 CMS Tapes

July 27, 9 am to noon

Overview of CMS tape management facilities. Topics include tape specifications, reading/writing standard labeled and unlabeled tapes, and tape positioning and formatting commands. Prerequisite: CMS Introduction or equivalent knowledge. \$10/\$15/\$20

## 150 CMS REXX

August 7, 10 am to noon

Introduction to macro writing in CMS programming languages REXX and EXEC 2. Learn to make the power of these languages work for you -- save time, reduce errors, and relieve tedium. Previous programming helpful, but not necessary. Prerequisite: CMS Introduction or equivalent knowledge. \$10/\$15/\$20

## 200 SAS/Base

July 17, 10 - 12:30 and July 19, 10 - 12:00

Two-day presentation of the essentials of SAS, a comprehensive statistical package that provides software tools for analysis, data storage and retrieval, report writing, general programming, and graphics. Prerequisite: CMS Introduction or equivalent knowledge. \$15/\$20/\$30

## 210 SAS/Stat

July 24, 10 am to noon

Presentation of the statistical analysis features of SAS, including correlation, regression, analysis of variance, and other exploratory data analysis and modelling techniques. Prerequisite: SAS/Base or equivalent knowledge. \$15/\$20/\$30

## 220 SAS/GRAPH

July 26, 10 am to noon

Introduction to SAS graphics capabilities for displaying data as 2-D or 3-D plots, charts (bar, block, pie, or star), tables, maps, contour plots, and viewgraph presentations. Prerequisite: SAS/Base or equivalent knowledge. \$10/\$15/\$45

## 230 PC SAS Overview

August 2, 10 am to noon

Discussion of the basic features specific to the PC version of SAS. \$10/\$15/\$45

## 300 YTERM

July 25, 11 am to noon

Demonstration of YTERM's terminal emulation capabilities as well as its features for transferring files between the SPCS mainframe and your PC and for printing mainframe files on a printer attached to your PC. We distribute YTERM and highly recommend it to those who use their IBM PC's or compatibles as terminals for the SPCS mainframe. No Charge

## 310 TinCan

July 31, 11 am to noon

Demonstration of TinCan's terminal emulation capabilities as well as its features for transferring files between the SPCS mainframe and your Mac and for printing mainframe files on a printer attached to your Mac. We distribute TinCan and highly recommend it to those who use their Macintoshes as terminals for the SPCS mainframe. No Charge

## 320 PROCOMM

August 1, 11 am to noon

Demonstration of PROCOMM's terminal emulation capabilities for connecting to the SPCS mainframe as well as its Kermit features for transferring files between the mainframe and your PC. No Charge

## 400 NOMAD2

August 3, 10:30 to noon

Introduction to NOMAD2, a database management system with powerful report-writing and programming features. No Charge



# Short Course Policies

Each quarter, St. Paul Computing Services (SPCS) offers a number of short courses. These courses are offered to the University community for a modest fee, and to the public for a slightly higher fee. Special course arrangements for groups of 6 or more are available for a negotiated fee. Course credit is not earned for short course offerings.

## PRICES

Charges are categorized as follows:

- (1) University Student
- (2) University Faculty/Staff
- (3) SPCS Non-University User

The prices listed under each course description apply to groups 1, 2, and 3, respectively.

## PREREQUISITES

100 CMS Introduction or equivalent knowledge is required for CMS BATCH, CMS Utilities, CMS Tapes, CMS REXX, SAS/Base, SAS/Stat, and SAS/Graph. 200 SAS/Base or equivalent knowledge is required for SAS/Stat, SAS/GRAPH, and PC SAS Overview.

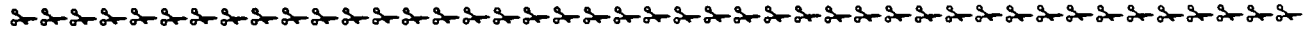
## REGISTRATION POLICY

The deadline is 4:30 p.m. on the day before the course begins. Full payment is due at the time of registration. Fees may be paid by cash, check, University budget number, or may be charged to your authorized SPCS user account. Most courses have an enrollment limit, so please register early.

When registering by mail, please allow one week for SPCS to return your copy of the completed registration form (required for course entry). If we receive your registration within a week of the course start date, we will retain your copy of the form in our main office (50 Coffey Hall) for pick up. Although short course dates and times are published, locations are revealed only on completed registration forms. If a course is cancelled, we will attempt to contact all registrants and process refunds.

## REFUND POLICY

No refunds will be made after the course has begun. You may request a refund in person or by mail, but you must return your copy of the registration form. Please allow 2-3 weeks for processing refunds or credits. ▲



## SPCS SHORT COURSE REGISTRATION FORM SUMMER 1990

### STATUS

- (1) U of M student ID #: \_\_\_\_\_
- (2) U of M faculty/staff Dept: \_\_\_\_\_
- (3) Non-U of M User Employer: \_\_\_\_\_

### METHOD OF PAYMENT

- cash
- check
- U of M Budget \_\_\_\_\_

NAME \_\_\_\_\_  
 ADDRESS \_\_\_\_\_  
 (campus/ \_\_\_\_\_  
 U.S.) \_\_\_\_\_

DEPARTMENT \_\_\_\_\_  
 PHONE \_\_\_\_\_

Course Number	Course Name	Dates	Fee	Location (SPCS will complete)
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

SPCS Use Only: Date \_\_\_\_\_ Receipt Number \_\_\_\_\_



# Rates

## Data Processing Charges

### IBM Computer Resource Charges

Computer processing performed after 5:00 PM daily (Monday through Friday) and all day Saturday and Sunday is considered Off-Hours computing (see the reduced rates below).

Computer Resource	Unit	U n i v e r s i t y		C o m m e r c i a l	
		Prime Time	Off-Hours	Prime Time	Off-Hours
Central Processor Time	Minute	\$15.85	\$11.90	\$21.15	\$15.85
Disk/Tape Input/Output	Block	\$.00084	\$.00063	\$.00112	\$.00084
Interactive Connect Time	Hour	\$1.75	\$1.30	\$2.75	\$2.00
Virtual Reader	Record	\$.0015	*	*	*
Virtual Punch	Record	\$.0015	*	*	*
Lines Printed	Line	\$.001**	*	*	*
Archive Storage/month	Byte	\$.000003	*	*	*
Disk Storage/month	Byte	\$.000011 < 10 megabytes ***			
Virtual Reader Storage/day	Byte	\$.00      First 2 days \$.000005    Next 28 days (30/90 day limit)			

\* Use normal U of M prime time rates.

\*\* A sample page of 50 lines costs \$.05.

\*\*\* Cumulative (decreased price for greater than 10 megabytes); one cylinder (465 blocks) costs \$5.24 per month.

### Other Computer-Related Charges

Magnetic Tape Storage	\$ 0.90/tape/month
Magnetic Tape Mounts	\$ 0.50
Special Forms Mounts	\$ 1.00

### Supply Sales & Miscellaneous

Magnetic Tape Reels	<i>individually priced</i>
Computer Paper	<i>individually priced</i>
Reference Materials	<i>individually priced</i>

### Personnel Charges

Application Programmers	\$ 35.00/hour
Data Processing Technicians	\$ 18.50/hour
Data Entry (Keypunching)	\$ 15.85/hour



# Newsletter Index

We've compiled a list of still-current articles published in past newsletters. Most of these files are available on the SPCS Bulletin Board through the Project-Group Menu. Remember: you may read, print, and/or download files from the Bulletin Board. A limited number of back issues of SPCS newsletters are available in 50 Coffey Hall.

	<u>ISSUE</u>	<u>PAGE</u>		<u>ISSUE</u>	<u>PAGE</u>
<b>CMS/XEDIT</b>					
Command Changes	June 1988	1	<b>PC SAS</b>		
Enhancing Your PROFILES	March 1989	1	PC SAS/GRAPH Available	April 1988	7
LINKACC Changes	April 1988	2	PC SAS/STAT Update	March 1989	6
P s s t!	March 1990	2	The SAS System for Personal	March 1989	6
The Reconnected Message	March 1989	4	Computers		
<b>COMMUNICATIONS</b>					
BITNET Nodes	June 1989	4	<b>SOFTWARE</b>		
BITNET Rules	June 1989	3	Expert System Available	June 1989	11
CICNet Completed	June 1989	4	Is your Math Coprocessor		
Electronic Communication	Jan. 1989	11	running too fast?	June 1989	6
Electronic Icons	March 1990	6	NOMAD2 Version 4.5	Jan. 1989	11
Electronic Postmaster	Oct. 1988	1	SAS/Graph Output on an		
A History of BITNET	June 1989	1	Apple Laser Writer	March 1990	4
Internet and SPCS	June 1989	4	SPSSx	Oct. 1988	5
LISTSERV Groups	Sept. 1989	6	VMARCHIVE	Jan. 1989	1
Micro-to-Host Link	Sept. 1989	8	VS PASCAL Available	Jan. 1989	5
PROJECT-GROUP Note Hints	June 1989	4			
TELNET and FTP (TCP/IP)	Oct. 1988	3			
<b>GENERAL INTEREST</b>					
Care and Cleaning of the Micro	March 1989	5			
Keyboard					
Got those reader handlin'					
blues?	March 1990	1			
Our Computer	Sept. 1989	2			
Taking the Pain Out of					
Computing	June 1989	10			
Where to Find Reference					
Manuals	March 1989	5			
<b>SERVICES</b>					
Computer Accounts	Sept. 1989	4			
ISAAC	Jan. 1989	9			
IBM Higher Education					
Consortium	Jan. 1989	9			
Services	Sept. 1989	3			
<b>STATISTICAL ANALYSIS SYSTEM (SAS)</b>					
<b>MAINFRAME SAS</b>					
SAS Computer Based Tutorial	April 1988	2			
Courses					
SAS/GRAPH Hints	March 1989	7			
SAS Manuals	March 1989	6			
Why SAS?	Sept. 1989	5			



## STATISTICAL CLINIC

The Statistical Clinic, staffed by graduate students of the School of Statistics and supervised by faculty members of the Applied Statistics Department, aids researchers on questions of experimental design, analysis, and interpretation.

The main Clinic is located in 133 Classroom-Office Building on the St. Paul campus (625-3121), with a branch office in the SSRFC at 25 Blegen Hall on the West Bank (625-8313). Facilities are ordinarily available on a walk-in basis, although appointments are recommended. Call 625-7030 to obtain exact hours.

# General Information

MAIN OFFICE	50 Coffey Hall	M - F	8:00 AM - 4:30 PM	624-7788
HELP DESK	90 Coffey Hall	M - F	8:00 AM - 5:00 PM	624-6235
STAT CLINIC	133 COB	M - F	call for hours	625-3121
MICRO LAB	B50 Central Library	MTThF	9:00 AM - 4:30 PM	624-3269
		W	9:00 AM - 7:30 PM	
		Sat	2:00 PM - 5:00 PM (until 7/14/90)	
DATA ENTRY	6 North Hall	M - F	8:00 AM - 4:30 PM	624-7297
INTERACTIVE DIALUP				624-4220
OPERATIONS				624-3482
COMPUTER HOURS	available 24 hours a day except 5:00 - 5:30 am Tuesday through Saturday reduced service from 4:00 pm Saturday until 2:40 pm Sunday and 10:00 pm Sunday until 6:00 am Monday			

User rooms (90 Coffey Hall) are open during Computer Hours, but after 6:00 pm weekdays and on Saturday and Sunday, the outside doors to Coffey Hall are locked. To gain access after hours, enter the tunnel system through the St. Paul Central Library or through the St. Paul Student Center.



*The University of Minnesota is committed to the policy that all persons shall have equal access to its programs, facilities, and employment without regard to race, religion, color, national origin, sex, handicap, age, or veteran status.*

## ST. PAUL COMPUTING SERVICES

UNIVERSITY OF MINNESOTA  
50 COFFEY HALL  
1420 ECKLES AVENUE  
ST. PAUL, MN 55108

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