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GRAPHICS FOR STATISTICAL APPLICATIONS

Statisticians use graphs extensively to "eyeball" data, to look at basic data descriptive functions, to see the "goodness of fit" of a regression line, to analyze residuals, and for many other purposes. The range of possibilities offered by TELL-A-GRAF and DISSPLA, two graphics packages available on the VAX/VMS system at the University Computer Center, is extensive and exciting. Users will find these packages extremely useful, easy to use, and the graphs they create accurate and interesting to look at. In the May issue of the *Newsletter*, we detailed the types of hard copy output available with these packages and the costs associated with these. This article will examine three kinds of graphs available with TELL-A-GRAF: PIEs, BARs, and PLOTs.

(NOTE: SPSS Graphics are not available for the CDC version of SPSS. TELL-A-GRAF, the package used by the SPSS Graphics Option Postprocessor, can produce all the graphs available with SPSS Graphics.)

PIES

A pie is one way to view a frequency distribution that is easier to digest than a mere set of numbers. To get the data necessary for making a pie, pick the appropriate numbers off the output from an SPSS FREQUENCIES run, and use these as input data for TELL-A-GRAF. Suppose you had a variable JOBGRADE, which had been coded 1,2,3 to indicate Sales Staff, Supervisory Staff, or Managerial Staff, respectively, and you did the following FREQUENCIES run:

```
FREQUENCIES INTEGER=JOBGRADE(1,3)
```

and received the output below (assuming you had put in the appropriate VALUE LABELS for the three job grades):

```
- - - FREQUENCIES - - -
      JOB GRADE

                                          RELATIVE    CUM
                          ABSOLUTE        FREQ        FREQ
CATEGORY LABEL     CODE   FREQ            (PCT)       (PCT)
SALES STAFF        1      170             69.1        69.1
SUPERVISORY STAFF  2      54              22.0        91.1
MANAGERIAL STAFF   3      22              8.9         100.0
TOTAL                     246             100.0
VALID CASES  246    MISSING CASES  0
```

You would have the numbers necessary to produce the pie shown in figure 1. The following TELL-A-GRAF commands would produce this graph (prompts and responses from TELL-A-GRAF are in bold type):

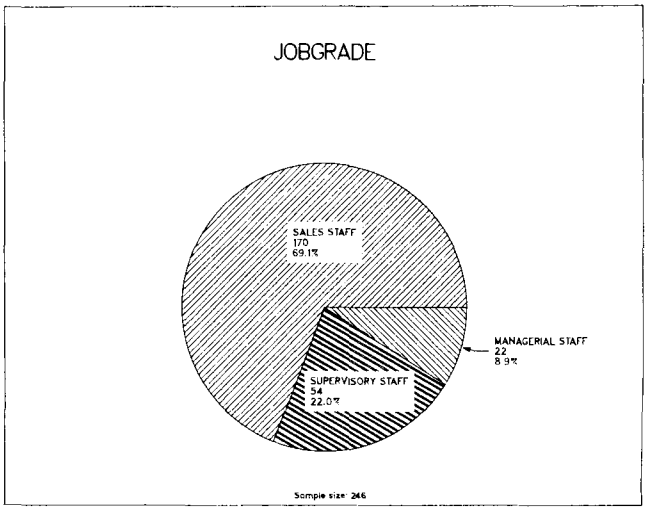

Figure 1. Pie chart generated using data from an SPSS FREQUENCIES run.

GENERATE LEVEL...ENTER.
GENERATE A PIE.
GENERATING A PIE CHART.
ENTER:

```
INPUT DATA.
1,170 2,54 3,22
END OF DATA.
DIVISION LABELS IS "SALES STAFF" "SUPERVISORY
    STAFF" "MANAGERIAL STAFF".
ANNOTATION DATA EXISTENCE ON.
TITLE IS "JOBGRADE".
MESSAGE 1 "Sample size: 246", X=45, Y=2,
    UNITS=PAGE %.
GO.
```

Now suppose you wanted to break JOBGRADE down within a second variable, STORE, which has been coded 1,2 to indicate the Suburban or Downtown store respectively. If you did the following CROSSTABS run:

```
CROSSTABS     VARIABLES=JOBGRADE(1,3)
                  STORE(1,2)/TABLES=
                  JOBGRADE BY STORE/
OPTIONS       3,5
```

and received the following output (assuming you had entered the appropriate VALUE LABELS for the job grades and stores):

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CORRECTION

In last month's article on the Computer Store, the WRITEUP control statement for a complete list of materials available at the Store, and their costs, was incorrect. The correct control statment is:

WRITEUP(STORE=PRICE)

NOTE TO OUR READERS: The "IMS Journal" articles that have become a monthly feature of the *Newsletter* will not appear this month. They'll be back in July.

Director: Peter C. Patton
Editor: Christine Mack Gordon

Comments about the content of this newsletter, or suggestions for changes may be directed to the editor, 235a Experimental Engineering, or call 612/376-9832.

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```
- - - CROSSTABS - - -
      JOBGRADE
      BY STORE
```

COUNT / COL PCT	STORE: SUBURBAN (1)	DOWNTOWN (2)	ROW TOTAL
JOBGRADE 1	57	113	170
SALES STAF	58.2	76.4	69.1
2	28	26	54
SUPERVISOR	28.6	17.6	22.0
3	13	9	22
MANAGERIAL	13.3	6.1	8.9
COLUMN TOTAL	98	148	246
	39.8	60.2	100.0

You would have the data necessary to produce the pies shown in figure 2. Each column of the CROSSTABS output contains the data for one pie. The TELL-A-GRAF commands to produce figure 2 are as follows:

```
GENERATE LEVEL...ENTER.
GENERATE A PIE.
GENERATING A PIE CHART.
ENTER:
INPUT DATA.
"SUBURBAN"
1,57 2,28 3,13
"DOWNTOWN"
1,113 2,26 3,9
END OF DATA.
DIVISION LABELS IS "SALES STAFF" "SUPERVISORY
    STAFF" "MANAGERIAL STAFF".
ANNOTATION DATA EXISTENCE ON.
TITLE IS "JOBGRADE BY STORE".
MESSAGE 1 "Sample size:98",X=17,Y=2, UNITS=
    PAGE %.
MESSAGE 2 "Sample size:148",X=67,Y=2,
    UNITS=PAGE %.
PIE 1 BOX 0.0 5.5 0.0 6.0.
PIE 2 BOX 5.5 11.0 0.0 6.0.
OVERPLOT.
GO.
```

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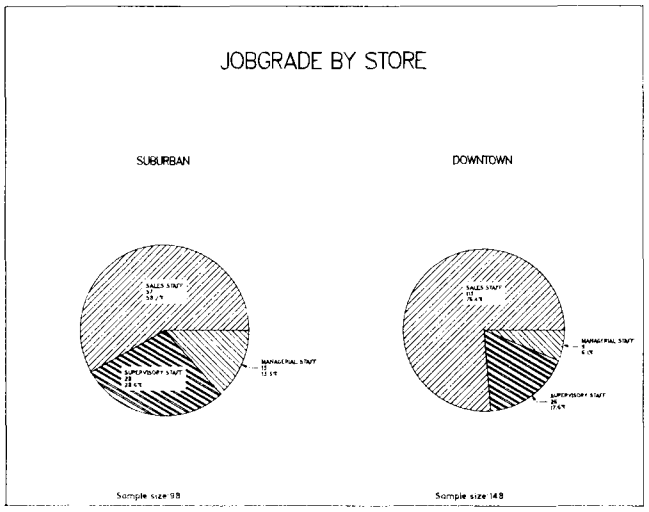

Figure 2. Pie charts generated using data from an SPSS CROSSTABS run.

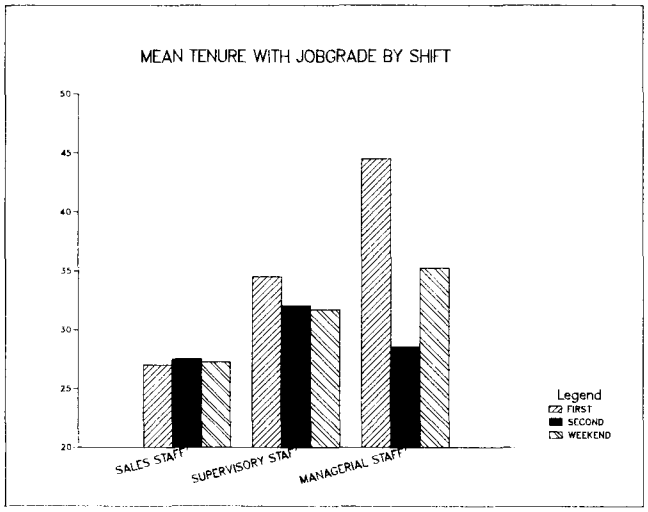

Figure 3. Bar chart generated using data from an SPSS BREAKDOWN run.

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BARS

Bar graphs are another way of viewing one or more frequency distributions. To get the data necessary for producing a bar graph with a single distribution, you can use the SPSS procedure FREQUENCIES. To get the data necessary for producing a bar graph with more than one distribution represented, you can use the SPSS procedure CROSSTABS. These procedures will provide counts or percentages (FREQUENCIES will also produce cumulative percentages). If you want the bars to represent the cell mean or sum of a variable, you can use the SPSS procedure BREAKDOWN to obtain those statistics.

Suppose you had two variables, JOBGRADE and SHIFT, which were both coded 1,2,3, and you wished to calculate the mean of a third variable, TENURE, within each of the nine cells of JOBGRADE by SHIFT. The following BREAKDOWN run would produce those numbers:

```
BREAKDOWN    VARIABLES=TENURE(LO,HI),
                 JOBGRADE(1,3),SHIFT(1,3)/
                 TABLES=TENURE BY
                 JOBGRADE BY SHIFT/
```

If the output from this BREAKDOWN run looked like (excluding the irrelevant parts and assuming the VALUE LABELS shown were entered):

```
- - - BREAKDOWN - - -
 CRITERION VARIABLE  TENURE
  BROKEN DOWN BY  JOBGRADE BY SHIFT
```

VARIABLE	CODE	VALUE LABEL	MEAN
JOBGRADE	1	SALES STAFF	
SHIFT	1	FIRST	27.00
SHIFT	2	SECOND	27.50
SHIFT	3	WEEKEND	27.25
JOBGRADE	2	SUPERVISORY STAFF	
SHIFT	1	FIRST	34.50
SHIFT	2	SECOND	32.00
SHIFT	3	WEEKEND	31.70
JOBGRADE	3	MANAGERIAL STAFF	
SHIFT	1	FIRST	44.50
SHIFT	2	SECOND	28.50
SHIFT	3	WEEKEND	35.20

You could then produce the bar graph shown in figure 3 with the following TELL-A-GRAF commands:

```
GENERATE LEVEL...ENTER.
GENERATE A BAR.
GENERATING A VERTICAL BAR CHART.
ENTER:
INPUT DATA.
"FIRST"
1,27 2,34.5 3,44.5
"SECOND"
1,27.5 2,32.0 3,28.5
"WEEKEND"
1,27.25 2,31.7 3,35.2
END OF DATA.
TITLE IS "MEAN TENURE WITH JOBGRADE BY SHIFT".
X AXIS DIVISION LABELS "SALES STAFF"
   "SUPERVISORY STAFF" "MANAGERIAL STAFF".
X AXIS ANGLE 15.
GO.
```

PLOTS

Plots are line graphs. They may have one or several lines; they may be connected, scattered, or both. The following set of commands would produce a single line plot of X vs. Y (see figure 4):

```
GENERATE LEVEL...ENTER.
GENERATE A PLOT.
GENERATING A PLOT.
ENTER:
INPUT DATA.
x1,y1 x2,y2 x3,y3 x4,y4 (etc.)
END OF DATA.
TITLE IS "SIMPLE LINE PLOT".
GO.
```

In figure 4, the X and Y axis divisions have been numbered to fit the range of the data. If the X values are not data values (for example, if the Y data represents population counts for a set of cities), the X values should be entered as integers (1,2,...) and a command of the form:

```
X AXIS DIVISION LABELS ARE "NEW YORK"
   "CHICAGO" "BUFFALO" "MINNEAPOLIS".
```

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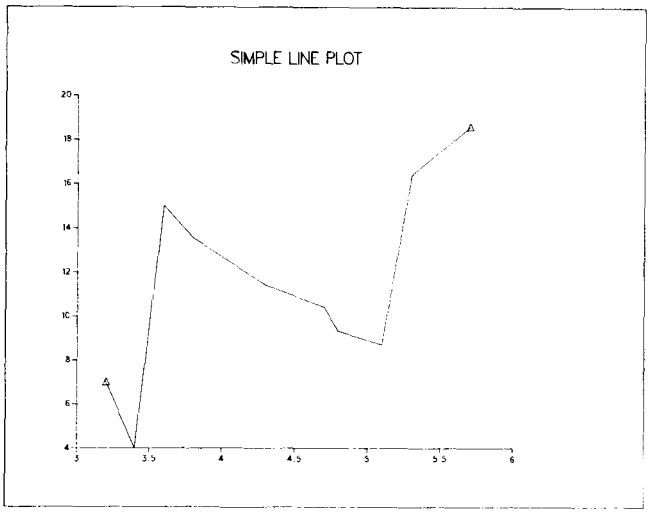

Figure 4. A simple line plot generated by TELL-A-GRAF.

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should be included to provide labels for the X-axis divisions. To add a second curve to this graph, simply enter the data for that curve as a second data set. TELL-A-GRAF will then put a legend beside the graph, using the data set names as legend labels to identify the curves.

SUMMARY

We have attempted to provide you with an idea of the kinds of graphs available through TELL-A-GRAF that are useful to statisticians for viewing data and related statistics. For more details about the commands used, see an extended version of this article on:

WRITEUP(TAGSTAT) on the Cyber systems.

Additional features of the TELL-A-GRAF package can enhance these graphs even further, and we refer you to the documentation for details.

If you have a file of data on the Cyber machines that you would like to use as input for TELL-A-GRAF, you can transfer it to the VAX/VMS system via tape, and then write a program that calls FORTRAN routines to create a TELL-A-GRAF data file. This tape transfer and subsequent reformatting are not straightforward at the moment, however, and we do not recommend it. We are currently writing utility routines to do this and expect them to be available by the end of summer. At the present time, you will find it easier to use the INPUT DATA command in TELL-A-GRAF to enter the data directly. This is fairly simple for PIE and BAR graphs, since so few numbers are involved; it could be considerably more tedious for PLOTS.

In conclusion, we would like to assure you that it is quite easy to produce graphs using TELL-A-GRAF, and for those of you who wish to produce SPSS Graphics-type graphs, all the facilities exist with the TELL-A-GRAF package for doing so.

REFERENCES

TELL-A-GRAF User's Manual, ISSCO, 1981.
TELL-A-GRAF Pocket Guide, ISSCO, 1980.
SPSS Update 7-9, McGraw-Hill, 1981.
WRITEUP(TAGDSPL) and WRITEUP(SERVICE=VAXVMS) on the Cyber systems.
sys$writeup:tagdspl.lis and sys$writeup:vaxvms.lis on the VAX/VMS.
UCC *Newsletter*, May 1982.
help tellagraf on the VAX/VMS.

(Betty Hinkley)

SYSTEM NEWS/NOTES

Cyber News

LAST CALL FOR FREE GUIDES

During the past few years, we have steadily expanded and improved the Cyber Guides to Interactive and Batch Computing. We believe that these *Guides* are excellent publications, providing you with pertinent and accurate information about the UCC Cyber systems. We have given the *Guides* to you, without cost, in 140 Experimental Engineering and through various short courses.

Because we have been affected by the budget cuts applied to all University units, we unfortunately can no longer distribute these booklets free of charge. Effective July 1, 1982, both *Guides* will be available only at our Computer Store, 211 Experimental Engineering, and through UCC short courses. The *Guides* will be priced at $1.20 each at the Store, and will be distributed without charge to registered students in some summer 1982 short courses. *(Mary C. Boyd, 373-4599)*

BASIC ON THE CYBERS

We currently have BASIC Version 3.5 available as FUTURE(BASIC). This version of the language conforms to the ANSI standard for minimal BASIC. BASIC 3.5 differs from our current BASIC (Version 3.4) in several ways. These differences are documented in the BASIC Version 3 Reference Manual (CDC Pub. No. 19983900, Revision G) and include the following changes and additions:

Array Boundaries - Default base for arrays is element zero (0) and may by changed by OPTION BASE. BASIC 3.4 uses one (1) as base and BASE to change the base.

Rounding vs. Truncation - BASIC 3.5 rounds all index, subscript, or pointer values that require integer values. BASIC 3.4 truncates these values to obtain integers. The function INT may be used in BASIC 3.5 to force truncation.

Collating Sequence - Default collating sequence for BASIC 3.5 is ASCII; in BASIC 3.4 the collating sequence depends on the character set being used. In BASIC 3.5 an alternate collating sequence can be selected using OPTION COLLATE.

Input Data - Changes include: input data validation; responses to "NOT ENOUGH DATA"; handling of unquoted strings; numeric data read as string data; input array data.

Output Data - Changes include: new TAB features; numbers 1E6 output in E format (BASIC 3.4 prints integers up to 1E9 in integer format); print comma spacing control; PRINT USING integer field rounds values (BASIC 3.4 truncates).

New Statements - OPTION BASE, OPTION COLLATE, RANDOMIZE

New RND and DET function forms

Matrices - BASIC 3.5 automatically redimensions a result matrix to accomodate the result; BASIC 3.4 generates a fatal error if result matrix does not conform to specified dimensions.

FOR...NEXT Loop - In BASIC 3.4 the value of the loop control variable, after normal exit from a FOR loop via the NEXT statement, is equal to the last value used in the loop. In BASIC 3.5 the value on normal exit via NEXT is the first value not used, i.e. the last value used plus the STEP value (which is +1 if STEP is not specified).

Some statements and functions generate a BASIC 3.5 compile-time diagnostic OBSOLETE FORM and should be avoided. These include BASE, CHANGE, and SUBSTR$; use substring notation SUBVAR (first:last) instead.

Check the manual for details on these features and other miscellaneous changes. (*Susan Steffen, 376-5602*)

NOTICE/NOTIFY UPDATE

As announced in the May *Newsletter*, we will install a new version of the NOTICE/NOTIFY subsystem on our NOS systems (including MERITSS) on Sunday, June 13, 1982. However, we will *not* remove any procedure file pointers set up in NOTIFY (as indicated in that article). Instead, we will convert all procedure file pointers to the new format, and change the associated procedure files from KCL to CCL for you. The CCL procedure name we will use is LOGIN. Thus, if you currently have a NOTIFY procedure file pointer set up as:

```
PROC,procfil,usernum,packnam.
```

we will change it to:

```
PROC,LOGIN,procfil,usernum,packnam.
```

and we will insert the line:

```
.PROC,LOGIN.
```

as the first line of the file "procfil" on user number "usernum" on pack "packnam". The conversion will occur on June 13 before production time. If you encounter any problems as a result of this conversion, please call Andy Hastings, 376-5604, or Brad Blasing, 376-9721. (*Andy Hastings*)

CALLPRG UPDATE

In the May *Newsletter* we announced that we will install a new version of our CALLPRG utility on June 13. Since the new CALLPRG program does not support KCL procedures, the DO control statement will be removed. All existing DO procedures will be changed to FETCH-type. Thus, instead of

```
DO(name)
```

you should use (after June 13):

```
FETCH(name)
name.
```

Questions about this or any other aspect of the new CALLPRG program may be referred to Andy Hastings, 376-5604, or K. C. Matthews, 376-9720. (*Andy Hastings*)

Cray News

CRAY FORTRAN COMPILER

We have received a pre-release version of the Cray FORTRAN compiler (CFT) level 1.10. This version of the compiler contains ANSI 77 standard features including type CHARACTER and list-directed I/O.

Three versions of the Cray FORTRAN compiler are now available. They can be accessed as follows:

1) CFT.	(CFT 1.09 Bugfix 6)
LDR.	(Use FORTRAN library level 1.09 Bugfix 6)
2) CFTPAST.	(CFT 1.09 Bugfix 5)
LDR,LIB=$FTLIBP.	(Use FORTRAN library level 1.09 Bugfix 5)
3) CFTFUT.	(CFT 1.10 Pre-release version)
LDR,LIB=$FTLIBF:$SYSF.	(Use Pre-release version of FORTRAN library and system library)

(*Susan Steffen*)

CHANGING PASSWORDS

Cray users can now change their Cray passwords in interactive or batch mode with a NOS control statement available on the Cyber 730 and the Cyber 74. This is a NOS command issued from a Cyber job that results in a Cray job transparent to the user. To complete the actual password change on the Cray, you may have to wait 30 to 60 seconds. When the change is complete, you will receive a message informing you of its success. This control statement cannot be issued from a Cray job. The format of the NOS control statement is as follows:

```
CRAYPW,OPW=oldpassword,NPW=newpass-
  word,AC=masteraccount.
```

Parameters:

OPW Required parameter. The old Cray password for the user number of the current NOS job.

The password must be valid. (For master users, this is an optional parameter and, if specified, will be checked for validity.)

NPW Required parameter. The new Cray password for the user number of the current NOS job. The password must be less than or equal to fifteen alphanumeric characters in length without spaces.

AC Optional parameter. The account number of a subordinate user whose Cray password is being changed by a master user. Master users can change the Cray passwords of subordinate users without their consent or knowledge.

If you have questions or comments, call K. C. Matthews or Tom Kovarik at 376-5608. (*Tom Kovarik*)

VAX Service

UNIX LICENSE UPGRADE

As of June 1, 1982, we will upgrade our UNIX license from educational to administrative status. This new licensing level allows the use of our UNIX VAX for work related to the administration or operation of any University department or office. Commercial use, including "research where a third party receives preferred access or rights to the fruits of such research" is still precluded.

The administrative license allows departments to use the following UNIX features in University research and publication without restriction: excellent implementations of the Pascal, FORTRAN-77, C, and LISP languages; the NROFF/TROFF text processing packages; the INGRES relational data base; and the S statistical analysis package.

If you have an application that requires the commercial license, please contact us. We will look into the feasibility of obtaining one if sufficient interest is expressed.

If you would like to use our UNIX service during the 1982-83 academic year, please contact Mike Skow, 373-7745, as soon as possible. UNIX service will be available for classroom, research, and administrative use if there is a demand for it. At the present time, our instructional labs have no communication with the UNIX system; we will set up such communications only if we are aware of a need for this service. An unanticipated demand for service during 1982-83 could probably not be met until the 1983-84 school year.

For UNIX access, call Jack Schwab at 373-4548. For UNIX questions, call the UNIX HELP-line at 376-8649 (376-UNIX), staffed MWF from 1-2 p.m. At other times, call our regular HELP-line, 376-5592. (*Chris Boylan, 376-5603*)

Graphics

GRAFLIB: GRAPHICS SOFTWARE LIBRARY ON THE CYBERS

On June 15th, we will move our Cyber graphics software off the MINNLIB FORTRAN library in an effort to simplify your use of these and other graphics packages. The packages most notably affected are PLOTPAC, CALCOMP, PLOT3D, PLOT3S, CNTOUR, and GRIDIT.

The following related changes will also occur:

- FETCH(GRAFLIB/V=xxx) will be required to access the graphics software. 'xxx' refers to the version of the compiler you use: MNF, FTN, FTN5, M77, Pascal.
- The CALCOMP routines previously available through FETCH(CALCOMP/V=xxx) will be added to the GRAFLIB graphics library. The FETCH version of these routines will no longer be available.
- MNCORE, our new plotting package, will be added to the GRAFLIB library with the routine name changes listed below.
- FUTURE,MNCORE will be available, although we are making the following routine name changes at this time. We now have a consistent set of names for our MNCORE package. If you use MNCORE, you must make these name change adjustments to your code.

OLD NAME	NEW NAME	OLD NAME	NEW NAME
HSIRGB	HSLRGB	RGBHSI	RGBHSL
ICHPLA	ICPLAN	SCHPLA	SCPLAN
ICHQLY	ICPREC	SCHQLY	SCPREC
ICHSIZ	ICSIZE	SCHSIZ	SCSIZE
ICHSPA	ICSPAC	SCHSPA	SCSPAC
ICOLOR	IKOLOR	SCOLOR	SKOLOR
ICPOS2	IPOS2	ICPOS3	IPOS3
IFONT	ICFONT	SCSTYP	SREFRM
INICOR	BGNCOR	SETHSI	SHSL
INQHSI	IHSL	SETRGB	SRGB
INQRGB	IRGB	SFONT	SCFONT
IPATR2	IAOUT2	SPATR2	SAOUT2
IPATR3	IAOUT3	SPATR3	SAOUT3
IVWDEP	IVDPTH	SVWDEP	SVDPTH
IVWPAR	IVPARM	SVWPAR	SVPARM
SELVSF	VSFON	DELVSF	VSFOFF
INIVSF	BGNVSF		

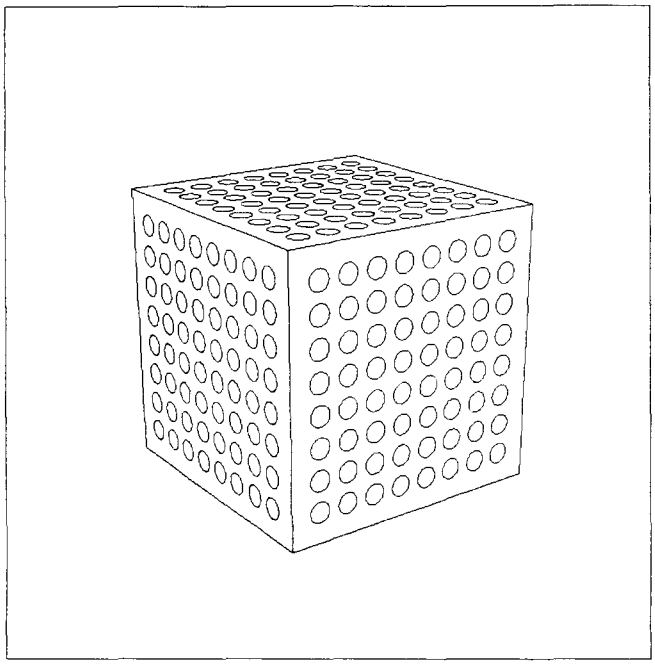
- Documentation for MNCORE is available through the indexed WRITEUP(MNCORE=*). A rudimentary version of this documentation, which describes each routine in the package, is currenly available (160 pages, upper and lower case text).

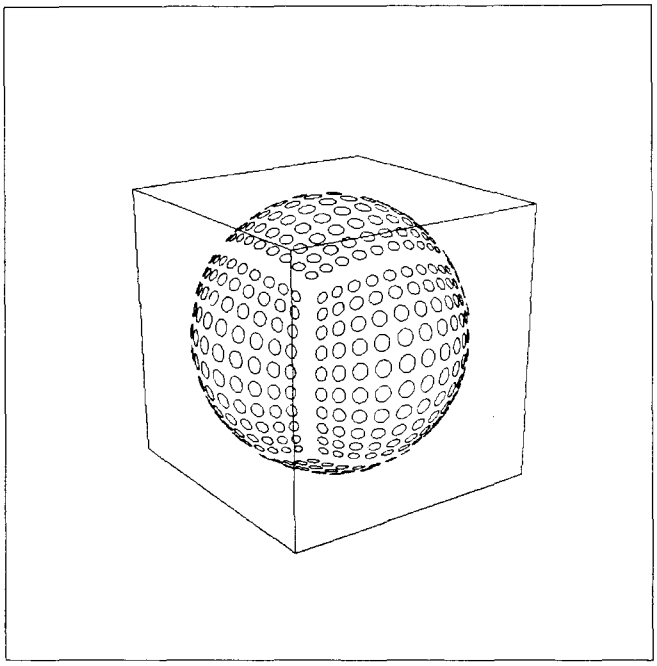
GRAPHICS METAFILE

Our changeover to a new graphics metafile, announced in the December *Newsletter*, will take place about September 15, during the summer break. We have delayed this metafile transition to allow you adequate time to try out these new systems. The lead time has allowed us an opportunity to install additional queueing facilities for the convenient transfer of graphics metafiles and text files between the Cybers and our VAX/VMS graphics and text processing facility.

PLOTPAC AND PASPLOT

We encourage you to try the new versions of PLOTPAC and PASPLOT to help us track down any problems. As we mentioned in the December *Newsletter*, the SYMPLOT feature of PLOTPAC will not be supported after the September 15 upgrade. Let us know if this causes





Aglobeonabox or Aboxonaglobe (compliments of MNCORE).

you major problems. As of June 15, you may test your PLOTPAC graphics programs under our new system with the following commands:

```
A(MYPROG)              <-- Get a copy of your
                           source program.
FUTURE(PLOTPAC)        <-- Be sure to get the
                           PLOTPAC code
                           BEFORE you
                           get GRAFLIB.
FETCH(GRAFLIB/V=MNF)
MNF(I=MYPROG,L=LIST,B=LGO)
LGO.
FUTURE(VIEW)           <-- Pick up FUTURE copy
                           of VIEW for display on
                           Tektronix terminals.
VIEW(MNPLOT) -or- VIEW.
FUTURE(PLOT31)         <-- Pick up FUTURE copy
                           of PLOT31.
PLOT31(MNPLOT,PLOTS) -or- PLOT31.
ROUTE(PLOTS,DC=PL,TID=BC,BIN=*EA)
```

For the Pascal PASPLOT program, add the following line to your Pascal source for linking to the procedures in the PASPLOT library:

```
(*$I'PASPLOT'/'PASPLOT'*)
```

Then, the following commands will test out the new graphics code:

```
A(MYPROG)
FUTURE(PASPLOT)
FETCH(GRAFLIB/V=PASCAL)
PASCAL(MYPROG,LIST,BINARY)
BINARY.
FUTURE(PLOT31)
PLOT31.
ROUTE(PLOTS,DC=PL,TID=BC,BIN=*EA)
```

For the next few months, the current versions of PLOT31 and VIEW will continue to expect our graphics metafile CALCOMP as input. If you try out the FUTURE versions of MNCORE, PLOTPAC, or PASPLOT, you must also acquire the FUTURE versions of VIEW and PLOT31 (which expect our new graphics metafile MNPLOT as input).

(Kevin McMahon)

VAX/VMS GRAPHICS

VIEW We have installed VIEW, a command that displays a graphics metafile on a variety of graphics terminals. This generalized metafile translator will display TELL-A-GRAF, DISSPLA, or MNCORE pictures on Tektronix 401X-series terminals, on terminals that emulate Tektronix (ID Systems 100, VT100 with graphics retrofit, ADM, etc.), on Terak 8510 or 8600 micros, on Apple micros with "high res" graphics capability, and on our Ramtek 9100 color monitor. The Terak micro must run our SIMTEK communications program and the Apple must run our TEXEM communications program to display the graphics. Both programs are available through the Computer Store. We will expand the number of supported graphics devices in the coming months. For more information on this product, log into the VAX/VMS and enter:

```
$ HELP VIEW
```

ENQUEUE ENQUEUE, a generalized procedure for sending your pictures to one of our hard copy devices, is up and running. With this UCC enhancement to the DEC operating system, you can send your pictures to the CALCOMP 4-color pen plotter, to the Dicomed D47 color film recorder, or to the Printronix printer/plotter. We will soon have a convenient way for you to send your pictures to the Cyber's Varian electrostatic plotter as well.

For more information about this product, log into the VAX/VMS and enter:

$ HELP ENQUEUE

MNCORE MNCORE is now availabe to VAX/VMS users. When you log into the system, enter the following command to add the MNCORE routines to the system library list:

$ ASSIGN MNCORE LNK$LIBRARY

As you write and debug your program, the following commands should suffice:

```
$ FORTRAN MYPROG.FOR  $ PASCAL MYPROG.PAS
$ LINK MYPROG.OBJ     -or-$ LINK MYPROG.OBJ
$ RUN MYPROG.EXE            $ RUN MYPROG.EXE
```

The file extensions .FOR, .PAS, .OBJ, and .EXE are assumed by VMS; we show them here for clarity. Note that no additional INCLUDE qualifiers are necessary for your Pascal program since VMS has a single record manager system for all supported languages.

When you execute these programs, they will produce a graphics metafile PLOT.PLT that you can view on a graphics device with the VIEW command. For example, to see the file on a Tektronix 4010 terminal, enter:

$ VIEW TEKTRONIX/4010 PLOT.PLT

(See HELP VIEW for the other alternatives.) If you like what you see, you can send it to the CALCOMP, Dicomed, or Printronix hard copy devices with the ENQUEUE command. To send the file to the CALCOMP four-pen plotter, enter:

$ ENQUEUE CALCOMP PLOT.PLT

ENQUEUE tells you where to find your output. By default, it goes to 131 Experimental Engineering, but you can change this. See HELP ENQUEUE for more information.

The MNCORE writeup (160 pages) is available on the VAX/VMS. Print the file:

$ sys$writeup:mncore.lis

(Kevin McMahon)

CRAY GRAPHICS

MNCORE now runs on the Cray! As of mid-May, we are working out a convenient method for getting the binary plot metafile back to the Cyber for plotting. We have achieved our goal of having the same versatile plotting package running on MERITSS, Cybers C74 and C730, the Cray, and the VAX/VMS. *(Kevin McMahon)*

Libraries

MINNLIB CHANGES

We will make the following changes to MINNLIB routines on June 13, 1982:

IRAN - corrected so that calls with different array sizes will still give the same sequence (e.g. N calls of array size one will be the same as one call with array size N). WARNING - THIS CHANGES THE RANDOM NUMBER SEQUENCE FROM THE PREVIOUS VERSION OF IRAN.

PERMUTE - corrected special case of N = 1 (this doesn't affect the random number sequence for other values of N).

RANBIT - corrected to use the bit mask from the initializing call.

RANT and RANBIT - random sequence corrected. WARNING - THIS CHANGES THE RANDOM NUMBER SEQUENCE FROM PREVIOUS VERSION OF RANT AND RANBIT.

NORMAL - some unused code deleted.

SCLPLT - the correction announced in the January *Newsletter* was withdrawn since it wasn't needed and had bad side effects.

Questions about these changes should be directed to Mike Frisch, 376-1636. *(Mike Frisch)*

EPISODE LIBRARY

We have tested and installed the EPISODE, "Effective Package for the Integration of Systems of Ordinary Differential Equations," library on the CDC Cyber computers. You can access it with the control statement:

FETCH(EPISODE/V=compilername)

where compilername is FTN, FTN5, MNF, M77, or PASCAL.

EPISODE can solve stiff and non-stiff initial value problems. The system of equations must be first order; higher-order equations can be reduced to first-order systems by standard methods described in the documentation. A writeup is available from Mike Frisch for $5; some supporting information is available in WRITEUP, LIBNDEX=EPISODE. For details, contact Mike Frisch, 376-1636. *(Mike Frisch)*

PERT-TIME CHANGES

On June 13, 1982, we will delete the old PERT-TIME package known as PERT66 and replace it with a slightly revised version known as PERT78. See the User Manual Supplement Guide to Applications Packages Vol. 2 (available from the Computer Store for $2.60) for details on using PERT78. *(Mike Frisch, 376-1636)*

All Systems Bulletins

DEATH OF A DINOSAUR

Effective July 1, 1982, we will no longer provide the complete set of card equipment available in the past. The following equipment will be removed at that time:

At Experimental Engineering—

1 026 keypunch
1 card reproducer
1 card sorter
1 verifier

At Lauderdale—

1 026 keypunch

Yes, folks, these are the first death throes of the card dinosaur. The use of this and all other card equipment has dropped significantly during the past few months and we can no longer justify its cost. (Is that a resounding cheer we hear?) *(R. T. Franta)*

UCC SUMMER SHORT COURSES

^Introduction to Computers, June 15-17 (TWTh)
3:15-5 p.m., MechE 221
^Introduction to UCC, June 24 (Th)
3:15-5 p.m., MechE 221
^NOS (system configuration), June 28 (M)
2:15-4 p.m., Arch 45
NOS (files/jobs), June 29-30 (TW)
2:15-4 p.m., Arch 45
NOS (permanent files), July 1 (Th)
2:15-4 p.m., Arch 45
NOS (program execution), July 2 (F)
2:15-4 p.m., Arch 45
^Interactive System Commands, July 6-8 (TWTh)
3:15-5 p.m., Arch 60
SPSS (basics),July 6 (T)
2:15-3:30 p.m., Arch 45
SPSS (data manipulation), July 7 (W)
2:15-3:30 p.m., Arch 45
SPSS (SPSS files), July 8 (Th)
2:15-3:30 p.m., Arch 45
SPSS (on-line), July 9 (F)
2:15-3:30 p.m., Arch 45
CP/M Software & UCC Systems, July 20-22 (TWTh)
10:15 a.m.-Noon, MechE 221
Beginning FORTRAN, July 20-29 (TWTh)
3:15-5 p.m., MechE 221
Introduction to VAX/VMS, July 12-16 (MTWThF)
2:15-4 p.m., AkerH 21
Graphics, July 19-28 (MW)
2:15-4 p.m., MechE 102
^XEDIT, July 26-28 (MW)
10:15 a.m.-Noon, MechE 102
Text Editing on VAX/VMS (EDT), July 20-29 (TTh)
1:15-3 p.m., MechE 102
Intro to System 2000 (DBMS), July 13-29 (TTh)
3:15-5 p.m., Arch 30
Pascal for Programmers, June 28-July 9 (MWF)
3:15-5 p.m., MechE 221
Intermediate FORTRAN, Aug 3-12 (TWTh)
3:15-5 p.m., AkerH 21
^Introduction to the Cray 1A, Aug 5 (Th)
3:15-5 p.m., AkerH 211
^COS (Cray Operating System), Aug 9-13 (MWF)
3:15-5 p.m., AkerH 211

NOTE: Caret (^) indicates this course is a prerequisite introductory course for other, unmarked courses.

Courses with the same name (e.g., NOS, SPSS) are designed as a sequence.

HOLIDAY: July 5 is a University holiday. No classes will be held.

NEW COURSE: CP/M Software & UCC Systems

This course is designed to provide users of a CP/M based microcomputer, such as the Xerox 820, with information about fully utilizing their micro in cooperation with the University's large computers. It will cover, in detail, use of the following software: WordStar, MailMerge, DataStar, Access-80, & UCC's COM program.

SUMMER EXTENSION CLASSES

The following classes are offered through University of Minnesota Continuing Education and Extension (CEE). They are listed under Professional Improvement Courses. You may obtain more information and registration materials from 101 Wesbrook Hall on the Minneapolis campus, or call (612) 373-3195.

Computing: What Is It?	$24
PIC 0913	June 14-16, 21-23 (MTW)
	6:15-8 p.m., Physics 131

SHORT COURSE FEES BEGIN IN FALL '82

We will begin charging for our short courses in fall quarter, 1982. The decision to charge for courses was made as a result of the state and University fiscal crises. The charges are still much lower than those for similar courses elsewhere.

Short courses are divided into two categories: "Introductory Courses" (Column A), and "Electives" (Column B). Courses in each category include those listed below.

Column A (Introductory Courses)	Column B (Electives)
Computing: What Is It?	FORTRAN
Introduction to Computers	Pascal
Introduction to UCC	SNOBOL
NOS (Network Operating System)	COBOL
Interactive System Commands	COS (CRAY Operating System)
Text Processing: An Overview	CRAY FORTRAN Features (CFT)
Introduction to VAX/VMS	CRAY Assembly Language (CAL)
EDT (VAX/VMS Editor)	SPSS
XEDIT	SCSS
Introduction to the CRAY 1A	Introduction to System 2000
Introduction to DBMS	SIR
Introduction to Programming	RIM
Graphics I: An Overview	PROSE
Introduction to Batch Computing	Scribe
	Text Processing on Micros
	Graphics II, III

Course registrants are divided into three categories: University students, University faculty/staff, and non-University users. Introductory courses have a fixed fee for each registrant category. Elective classes have a range of fees for each registration category depending on the length of the course and the resources used. Fee ranges for these categories are as follows:

	Column A	Column B
Student	$10	$20-30
Faculty/Staff	$20	$30-50
Non-University User	$30	$50-100

Watch this *Newsletter* for registration details. If you have questions about our short courses, call Jerry Stearns, 373-4360.

FOR SALE

New Commodore 4032 computer, 32K user memory; includes green CRT tape drive, IEEE-488 interface. $625. Call 698-8905, evenings.

Have a
good
summer!

PHONE NUMBERS

Budgets 373-2521
Computer-Aided Instruction 376-2975
Computer Hours (recorded message) 373-4927
Computer Store 373-4877
Consulting
  HELP-line 376-5592
    9 a.m.-5 p.m., Monday-Friday
  Business Data Products 376-1761
    1-3 p.m., Monday-Friday
  Statistics Packages 376-5062
    1-2 p.m., Monday-Friday
  Data Bases 376-1761
    1-3 p.m., Monday-Friday
  Microcomputers 376-4276
    10-12 a.m. and 2-4 p.m., Monday-Friday
  Humanities 373-5780
    10:30-11:30 a.m., Monday, Wednesday, Friday
  UNIX 376-8649
    1-2 p.m., Monday, Wednesday, Friday
Contract Programming 376-1764
Data Base Applications 376-1764
Educational Services 376-3963
EDUNET Liaison 373-7745
Engineering Services 376-8153, 376-1023
Engineering Services—Service Contracts 376-8153
Equipment Purchase 376-8153
Experimental Engineering I/O 373-4596
Graphics Software 376-5592
HELP-line 376-5592
  9 a.m.-5 p.m., Monday-Friday
HOURS-line (recorded message) 373-4927
Image Processing 376-2895
Information, Experimental Engineering 373-4360
Information, Lauderdale 373-4912
Information Systems 376-1764
Instructional Labs 376-3963
Job Status, ExpEng (recorded message) 373-4994
Lauderdale Computer Room 373-4940
Lauderdale Operations Manager 373-4920
Lauderdale Services 373-4995
Lauderdale Services Manager 373-7538
Lauderdale Users' Room 373-4921
MECC Liaison 373-4573
Newsletter Subscription 376-4668
Permanent File Restoration 376-5605
Professional Services Division (PSD) 376-1764
Project Assistance 376-1764
Program Librarian 376-1636
Programming Languages 376-7290
Reference Room 373-7744
Remote Batch (RJE) Services 376-3963
Short Courses 373-4360
Shuttle Bus Service 376-3068
System Status (recorded message) 373-4927
Tape Librarian: see Lauderdale Services
Text Processing Services 376-2943
User Accounts 373-4548
User Services 376-3963

OPERATING HOURS

	Cyber 74/730	Cray	MERITSS (Cyber 172)	VAX
M-F	8 a.m. - 4 a.m.	8 a.m. - midnight	7:45 a.m. - 1:30 a.m.	8 a.m. - 6 a.m.
Sat	4 a.m. - 5:15 p.m.	8 a.m. - 5 p.m.	7:45 a.m. - 1:30 a.m.	24 hours
Sun	4 p.m. - 1 a.m.	4 p.m. - midnight	4 p.m. - midnight	24 hours

PUBLIC LABS—TWIN CITIES CAMPUS

Location	Batch	Interactive	Micro
East Bank			
Arch 160		X	X
CentH		X	
ComH		X	
DiehlH 270		X	
ElecE 38	X		
EltH 121, 125		X	
EltH N640	X		
ExpE 130	X		
FolH 304a		X	X
FrontH		X	
KoltH S191	X		
LindH		X	
MasCan 39	X		
Mayo D388	X		
MechE 308		X	
MinMet 325	X		
Physics 69	X		
SanfH		X	
TerrH	X	X	
VincH 4		X	
WaLib 204		X	
Zoology	X		
West Bank			
BlegH 140		X	
MdbH		X	
OMWL 2	X	X	
SocSci 167, 1009	X	X	
St. Paul			
BaH		X	
BioSci 257	X		
ClaOff 125	X	X	
McN	X		
NorH 24	X		
Lauderdale			
Users Room	X		

University Computer Center Newsletter

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