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BENCHMARKS Reader/User feedback is encouraged.
Send all letters, suggestions, etc., to:
North Texas State University
The Computing Center
NT Station, Box 13495
Denton, Texas 76203

Claudia Putnam, BENCHMARKS Editor
Richard Harris,
Director of Computer Systems
Thomas Madron, Manager,
Academic Computing Services
SERVICES AVAILABLE TO USERS OF THE NTSU COMPUTING FACILITIES

All people mentioned below may be contacted by calling (817) 788-2586.

Information and Project Numbers - Sandy Franklin or Sue Heffley in the Computing Center Reception Area, ISB 119

Test Scoring and Analysis - Sue Heffley or Sandy Franklin

Newsletter Questions/Contributions/etc. - Claudia Putnam

Statistical/Research Support (provided for graduate students and faculty members) - Bob Brookshire, George Morrow, Claudia Putnam, and Mohammad Salahshour.

Non-Research Student Programming Problems - student consultants from the Computer Science Department found in ISB 134A near dispatch and the user keypunch area. Student consulting provided by the College of Business is available at the BA Computing Access Facility.

JCL and Debugging Problems - Mohammad Salahshour.


Keypunch Requests and Questions Regarding Layout of Keypunch Sheets - Betty Grise, ISB 227.

Academic Timesharing Information and/or Problems HP/2000 and AS/5000 MUSIC (McGill University System for Interactive Computing) information and problems, including terminal problems - Mohammad Salahshour.

Administrative Applications - Coy Hoggard.

AS/5000 Computer Hardware/Software/Billing Problems - Sandy Franklin.

JOB Submission and Retrieval - RJE operators.

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SPRING COMPUTING HOURS

Computing facilities will be open during the following times throughout the Spring Semester (not applicable to holidays):

Computing Center RJE: 7 AM Monday to Midnight Saturday; Noon to Midnight Sunday.

College of Business RJE: 7:30 AM - Midnight, Monday - Friday; 8 AM - Midnight, Saturday; Noon - Midnight Sunday.

Media Library(GAB): 8:00 AM to 12:00 PM Monday through Thursday; 8:00 AM to 6:00 PM Friday; 11:00 AM to 5:00 PM Saturday; 4:00 PM to 12:00 PM Sunday.
SPRING BREAK COMPUTING HOURS

The following facilities will be open during spring break:

Computing Center RJE 8 a.m. - 12 p.m. Saturday March 13
                    12 noon - 12 p.m. Sunday March 14
                    8 a.m. - Midnight March 15 - 19.

Media Library              8 a.m. - 5 p.m. March 15 - 19.

The College of Business RJE will be CLOSED Midnight March 12 until 8 a.m. Saturday March 20.

ACADEMIC TIMESHARE COORDINATOR TO LEAVE

Abdi Salahshour, Academic Timeshare Coordinator and all-around nice
guy has accepted a position with IBM and will be leaving us next month.
We wish Abdi the best of luck with his new endeavors and look forward to
seeing his contributions in the marketplace.

SPRING WORKSHOPS AND SHORT COURSES

If you intend to use the Computing facilities for
Research/ Instructional or word processing projects, the Computing Center
is offering the following short courses for your benefit.

The course schedule is as follows:

Introduction to MUSIC Monday March 22, 1982, from 3-5 p.m.
in WH Room 122. Good for those who
wish to learn the interactive computing
system here at NTSU.
INSTRUCTOR: Tom Madron.

Introduction to MUSIC/SCRIPT Monday March 22, 1982, from 6:30-8:30 p.m.
in GAB Room 105. Good for those who wish
to utilize the computer do to word
processing. INSTRUCTOR: Claudia Putnam.

Introduction to SPSS Tuesday/ Wednesday March 23/24, 1982, from
3-5 p.m. in ISB Room 231. A general
purpose statistical package especially
good for social science data.
INSTRUCTOR: Bob Brookshire.

Introduction to SAS Tuesday/ Thursday March 23/25, 1982, from
6:30-8:30 p.m. in WH Room 122. General
purpose statistical package with many
other capabilities.
INSTRUCTOR: Claudia Putnam.

Advanced Topics in MUSIC Thursday March 25, 1982 from 3-5 p.m.
in ISB Room 231. Advanced usage of MUSIC
NOT including MUSIC/SCRIPT.
INSTRUCTOR: Mohammad Salahshour.
A registration form is located at the back of this issue of BENCHMARKS and should be completed and returned IMMEDIATELY if you wish to attend any of these sessions (copy the form and pass it on to a friend, if you like). If you have further questions or suggestions, please call us at (817) 788-2324, or send MAIL to the SYSTEM (see the June 1981 BENCHMARKS or enter HELP MAIL while logged on to MUSIC for more information on sending MAIL).

EXACTLY WHAT IS "THE SYSTEM?"

A phrase that is heard around the Computing Center from time to time is "the system is down." "Exactly what does that mean?" you may ask yourself, although almost certainly not out loud. Actually, it may mean a variety of things. It may mean, for example, that the computer is shut down for maintenance. In this case, no computing would be going on. On the other hand, "the system is down" may mean that there is a problem with one or more of the operating systems. In this case, computing would continue on the unaffected operating systems.

The NTSU Computing Center supports the University through the use of four operating systems: VM, CMS, OS/MVT, and MUSIC, which reside on a National Advanced Systems AS/5000 computer. An operating system can be viewed, simplistically, as a large computer program. In fact, some operating systems are called "System Control Programs." The difference between operating systems and ordinary computer programs is that operating systems can control an entire computer system by themselves and allow other programs to run under their control. Special "supervisor" instructions are used by operating systems to control the devices connected to the computer, such as printers, card readers, and typewriter-like devices called terminals.

VM/370 is an operating system that manages the resources of a single IBM System/370 compatible computer so that multiple computing systems (Virtual Machines) appear to exist. All the other operating systems on the AS/5000 operate under the supervision of VM, which also allows for communication between operating systems (largely transparent to the user).

CMS (Conversational Monitor System) is a single-user operating system designed to operate in a virtual machine. It is maintained primarily for use by the systems programming staff of the Computing Center.

OS/MVT is a configuration of the System/360-370 Operating System. It is an operating system which allows for a variable number of tasks to be in memory at the same time (Multiprogramming with a Variable number of Tasks), and is the system that handles most of the batch processing here at NTSU.

MUSIC (McGill University System for Interactive Computing) is an interactive operating system that comes complete with a comprehensive package of programs and facilities designed to meet the varied needs of interactive computing. It has an interface which enables submission and
retrieval of batch jobs to and from MVT.

Batch processing is a method of processing data in which data items are collected and forwarded to the computer in a group or "batch," while interactive processing involves conversation (interaction) between a user and a computer via an online terminal. Interactive computing is accomplished through time-sharing, a facility through which two or more users can concurrently share the resources of one computer and receive what seem to be simultaneous results. In interactive systems, jobs usually run in "real time", so that data, instructions, etc. are processed as they occur. MUSIC can be classified as a time-sharing system as well as an interactive system.

Batch processing is more efficient for a number of jobs, especially when there is no need to interact with the computer very frequently. The following description may help you to "get a handle" on the way our most heavily used operating system, OS/MVT, works.

A program is submitted, either on cards or card-images to OS/MVT. For efficiency, MVT allows a job stream to contain more than one program plus more than one set of data. Each program and its data are called a STEP. One or more STEPs grouped together in one job stream is called a JOB. Since MVT is expected to control the flow of jobs through the computer, there must be a way for the job to communicate with it. This is done by including special control statements in the job, to tell MVT how the job is to be processed. These special control statements are called Job Control Language, or JCL.

JCL includes your project number and name. It tells MVT who you are (for billing purposes - usually departmental), and ensures that you are authorized to use the computer. While your job runs, MVT will keep track of resources your job used and will bill the department that your project number is authorized under for services you received.

JCL specifies the resources your job will need. It tells MVT which disks and tapes your job will use, how much main storage your job will require, how many lines of output your job will print, how much Central Processing Unit (CPU) time your job will take, and whether your job's priority is regular or deferred. You can tell MVT many other things with JCL. For example, if you are creating a new file on disk, you would use JCL to tell MVT how big the file will be, how the data on the file will be organized, what to do with the file when the job fails (or if it fails), and how big the biggest record on the file will be.

JCL is also used to tell MVT what language or package your program uses. JCL is even used to tell MVT to use precoded lists of JCL (called catalogued procedures) so you don't have to write as much JCL.

When you read your cards onto the card reader or send them to MVT through OSJE in MUSIC, they are copied onto a disk. Jobs are not run in the order in which they are read, and you do not have to wait at the card reader or terminal until your job is run, because anything read onto a disk is copied for later processing. Directing input or output to a disk for later processing is called "spooling."

When MVT has decided your job can run, the job is initiated. As your job runs, other jobs are running concurrently with it. At times, your job and another job will both require use of the CPU. MVT decides which of the jobs running gets to use the CPU first.
Your job could transfer data to and from disks and tapes itself, but this is hard to do. Instead of performing any input/output (I/O) operations itself, your job will request that MVT do the I/O operations. When your job has to print or punch anything, MVT will spool the printed or punched output to a disk. After the job is completed, MVT will carry out your requests for disposing of or keeping disks and tapes. Later, your output will be printed or punched.

*Adapted from an article that appeared in The Kentucky Register, January 1982.

USING THE COMPUTER FOR RESEARCH: PART I
By Bob Brookshire

The following represents the beginning of a series of articles on computing and data analysis. Hopefully they will prove useful to those of you who are about to engage in such an endeavor.

* * * * * *

No other technological development has had the profound impact that the development of the modern, high-speed, digital computer has had on the conduct of research, especially in the academic setting. The computer has freed the researcher (and his graduate assistants) from the seemingly endless hours of computation necessary to perform even the most rudimentary research in mathematics and physics, and has made widely available a range of statistical procedures previously accessible only to a few specialized technicians.

Indeed, the ability of the computer to perform, rapidly and accurately, complex series of mathematical processes on large amounts of data has radically transformed research methods in many disciplines, especially in the social and behavioral sciences. Routinely, sociologists and political scientists analyze the characteristics of thousands of survey or census respondents, psychologists and educators set up intricate, multifactor experimental designs, and economists and business researchers model the behavior of complicated economic processes. Statistical methods such as factor analysis, which involve hours of computation when performed by hand or with the aid of a calculator, can be done with a computer in minutes, or even seconds. The computer also offers researchers in the physical, military and social sciences the ability to simulate the effects of experimental conditions which would be impossible or undesirable to produce in the real world.

Four things are required of the computer user who wishes to take advantage of these abilities for research. First, the researcher must have adequate knowledge of the research design he intends to employ and the statistical procedures needed to answer the research questions or test the hypotheses generated by the design. Second, the researcher must have some sort of data to be analyzed. This data might be of the characteristics of subjects, text of documents to be content-analyzed, attributes of nations or economies to be modeled, or the outcomes of experiments in the physical or biological sciences. Whatever its type, it must obviously be collected before the computer analysis is run, and the researcher must be thoroughly familiar with the format and characteristics of the data. Third, a researcher who wishes to perform statistical analyses must have access to the appropriate package of statistical programs for the analysis of the data. If the type of
analysis desired is not available as part of a package, the researcher must be able to write, or have someone else write, the programs necessary to do the job. Finally, the user of a statistical package or other computer program must be able to write the job control language (JCL) that instructs the computer in the processing of the package or program. Thus, these requirements are hierarchical in nature: the researcher must know the research questions he wants answered and the methods necessary to get the answers; he must have the data that will provide the answers; he must have the programs to analyze the data; and he must have the instructions so that the computer can use the programs.

The requirements sound formidable, and in some respects, they are just that. Most of us, however, already are equipped with at least the rudiments of the most complex of these requirements: that of the proper research design and knowledge of research tools. The fact that you are reading this article implies that you already have some ideas about research questions to which you want to find answers. It also implies that you think that the computer may be one of the appropriate tools to aid you in the search for these answers. If you are at all advanced in your training in research skills, you probably have had some formal coursework in research design and statistical analysis. If you think about it, you will see that this first requirement is by far the most stringent and most difficult to satisfy, yet you are at least on the road to its completion. The other requirements, of data, statistical programs and job control language, are less rigorous to meet. Again, data collection is the most complex of these remaining requirements. By comparison, the last two are much less demanding.

The point of this discussion is that although the use of a computer for research is a complicated and sometimes difficult task, by far the toughest of its requirements are much the same as for any other research, and the additional demands put on the researcher by the computer are reasonably easy to meet. Indeed, the ease of use of the computer has led to a serious problem in research, one which has examples in every discipline: computer abuse.

Just because a computer can produce 500 correlation coefficients does not mean that there is necessarily any good reason to do so, especially if the researcher has no concrete theoretical expectations about the results. There are fairly compelling reasons not to do this sort of "exploratory" research, or data snooping. Consider, for example, that in a correlation matrix of 100 variables, each of which is merely a collection of random numbers, the laws of probability suggest that about 250 of these correlations will be "statistically significant" at the .05 level. Statistical significance does not guarantee theoretical significance, however. There is a danger that the computer user can generate more statistical analyses than anyone could ever possibly interpret, even given that they are all capable of substantive interpretation.

Another serious problem is the uninformed use of available statistical techniques. Just because a computer can perform a maximum likelihood factor analysis with equimax rotation and pairwise exclusion of missing data does not mean that this type of procedure is suitable for the data being analyzed. Statistical packages don't realize the theoretical significance of your variables, nor do they (most of the time) recognize when the distributional or measurement assumptions required by their procedures are being violated. Computer programs are merely sets of instructions to a machine, and the machine will try to perform the instructions given to it regardless of how appropriate the
instructions are. Computer users quickly find out that it is easy to make a computer do silly things; the problem occurs when a researcher makes the computer, either intentionally or accidentally, do something that doesn't make sense, and then, either knowingly or unwittingly, ignores the fact that this has occurred. Computers, like any other powerful tools, should be used carefully, and with as complete an understanding as possible about what it is that the tool is doing.

In conclusion, computers are useful tools that can make research quicker, easier, and more fun. Although they can't do everything, they can do a lot, and their repertoire is growing all the time. Most of what is required for their use can be accomplished with careful thought, planning, and the basic skills common to research of any type. Many people have a sort of "computer anxiety" caused by unfamiliarity and the seeming complexity of these powerful machines. The development of statistical packages and the availability of trained consultants in their use can make using computers for research a much less threatening and even enjoyable process, however. All you really need is a little fortitude and a willingness to try new things.

RECOMMENDED REFERENCES FOR RESEARCH

The following references are available for inspection, upon request, from the Academic Computing Staff of the Computing Center.


The Sage University Paper Series: Quantitative Applications in the Social Sciences - Publication Numbers:

1. Analysis of Variance by Osmund R. Iverson and Helmut Norpoth
2. Operations Research Methods by Stuart S. Nagel with Marian Neff
3. Causal Modeling by Herbert B. Asher
4. Tests of Significance by Ramon E. Henkel
5. Cohort Analysis by Norval D. Glenn
6. Canonical Analysis and Factor Comparison by Mark S. Levine
7. Analysis of Nominal Data by H.T. Reynolds
8. Analysis of Ordinal Data by David K. Hildebrand, James D. Laing, and Howard Rosenthal
10. Ecological Inference by Laura Irwin Langbein and Allan J. Lichtman
11. Multidimensional Scaling by Joseph B. Kruskal and Myron Wish
12. Analysis of Covariance by Albert R. Wildt and Olli T. Ahtola
15. Multiple Indicators: An Introduction by John L. Sullivan and Stanley Feldman
16. Exploratory Data Analysis by Frederick Hartwig with Brian E. Dearing
17. Reliability and Validity Assessment by Edward G. Carmines and Richard A. Zeller
18. Analyzing Panel Data by Gregory B. Markus
19. Discriminant Analysis by William R. Klecka
20. Log-Linear Models by David Knoke and Peter J. Burke

BMDP Technical Reports - Publication Numbers:

27. The Effect of Population Skewness on Confidence Intervals Determined From Mean-Like Statistics by Norman J. Johnson
34. Letting BMDP8V Tell Us Something About Randomized Blocks, Repeated Measures and Split-Plots by Robert I. Jennrich
40. Part I - The 1978 Interface Between BMDP-77 and SAS and Some BMDP Features of Interest to SAS Users
Part II - (1979) Recent Developments in BMDP of Special Interest to SAS Users by James W. Franey
41. BMD and BMDP Approaches to Unbalanced Data by James W. Franey
42. Sample Program to Write a Data Matrix on a BMDP File by James W. Franey
44. Detecting and Describing Statistical and Numerical Ill-Conditioning by James W. Franey
45. Missing Data and BMDP: Some Pragmatic Approaches by James W. Franey
46. Fitting Nonlinear Models to Data by Robert I. Jennrich and Mary L.Ralston
47. Cox Regression by Means of Nonlinear Least Squares by Robert I. Jennrich
48. Annotated Computer Output for Regression Analysis by MaryAnn Hill
49. Analysis of Time Series With Calendar Effects by Lon-Mu Liu
51. A Spectral Analysis of a Time Series in Which Probabilities of Observation are Periodic: Treatment of Missing Values by Anthony D. Thrall
52. Some Computing Methods for Unbalanced Analysis of Variance and Covariance by James W. Franey
54. Parameter Estimation in Dynamic Models by Lon-Mu Liu
55. Annotated Output for BMDP4V (URMAS) by Jerome Toporek
57. User's Manual for BMDQ2T (TSPACK) Time Series Analysis (Box-Jenkins) by Lon-Mu Liu
59. ANOVA with General Cell Weights by Michael L. Davidson and Jerome D. Toporek
60. Spectral Estimation Following Simple Seasonal Adjustment by Anthony Thrall
62. A Bayesian Approach to Random Coefficient Regression Models by Lon-Mu Liu
64. Random Coefficient First Order Autoregressive Models by Lon-Mu Liu and George C. Tiao
68. Identification of Multiple-Input Transfer Function Models by Lon-Mu Liu and Dominique M. Hansens
69. The Univariate Approach to Repeated Measures - Foundation, Advantages, and Caveats by James W. Franey
71. Annotated Computer Output for BMDPKM - K-Means Clustering by Laszlo Engelmann
72. Some Considerations in Univariate and Bivariate Spectral Analysis -- A Preliminary Report by Anthony D. Thrall
74. Stepwise Logistic Regression by Maximum Likelihood or Asymptotic Covariance by Laszlo Engelman
75. The Multivariate Approach to Repeated Measures by Michael L. Davidson
76. An Efficient Algorithm for Computing Covariance Matrices From Data With Missing Values by Laszlo Engelman
77. Annotated Computer Output for Data Screening by MaryAnn Hill

PASCAL DOCUMENTATION

On-line documentation is available for Stanford PASCAL, which runs under MUSIC. This documentation can be accessed by executing PASCAL.DOC while logged on to MUSIC.

USING THE MANOVA PROCEDURE FOR VARIOUS ANOVA DESIGNS

Dr. William K. Brookshire of the College of Education Faculty, has prepared a paper illustrating the use of MANOVA in SPSS to replicate examples presented in Experimental Design by Roger E. Kirk. The following are setups for various designs presented in Dr. Brookshire's paper.

I. RUN NAME KIRK COMPLETELY RANDOMIZED DESIGN CR-4 P. 105
   VARIABLE LIST B SCORE
   INPUT FORMAT FIXED (F1.0,F2.0)
   READ INPUT DATA
   MANOVA
   MANOVA SCORE BY B (1,4)/
   METHOD=SSTYPE(UNIQUE)
   CONTRAST(B)=SIMPLE/
   PARTITION(B)/
   DESIGN=B(1),B(2),B(3)/
   PRINT=OMEANS(TABLES(B))
   FORMAT(NARROW),SIGNIF(SINGLEDF)/
   NOPRINT=PARAMETERS(ESTIM)/
   <Note: the data are arranged in such a way that B=1 eight times, 2 eight times, 3 eight times, 4 eight times.>

II. RUN NAME KIRK RANDOMIZED BLOCK RB-4 P. 133
    VARIABLE LIST S B TIME
INPUT FORMAT FIXED (2F1.0, F2.0)
READ INPUT DATA
END INPUT DATA
MANOVA
TIME by S(1,8) B(1,4)/
NO PRINT=PARAMETERS(ESTIM) / PRINT=FORMAT(NARROW) /
DESIGN=S B/
<Note: the data are arranged in such a way that B varies from
1 to 4 with S so that S is equal to 1 four times, 2 four times...
8 four times; i.e. s=1 b=1, s=1 b=2, s=1 b=3, s=1 b=4, s=2 b=1 etc.>

III. RUN NAME KIRK LATIN SQUARE LS-4 P. 156
VARIABLE LIST A B C SCORE
INPUT FORMAT FIXED (3F1.0, F2.0)
READ INPUT DATA
END INPUT DATA
MANOVA
SCORE BY A(1,4) B(1,4) C(1,4)/
NO PRINT=PARAMETERS(ESTIM) / PRINT=FORMAT(NARROW) /
DESIGN=A B C/
<Note: the data are arranged in such a way that B and C vary with
A so that A=1 eight times, 2 eight times, ... 4 eight times, and
B and C=1 twice for every change in a value of A; i.e. A=1 B=1
C=1, A=1 B=2 C=1, A=2 B=1 C=2>

IV. RUN NAME KIRK 2-WAY ANOVA CR P. 175
VARIABLE LIST A B SCORE
INPUT FORMAT FIXED (2F1.0, F2.0)
READ INPUT DATA
END INPUT DATA
MANOVA
SCORE BY A(1,2) B(1,4)/
NO PRINT=PARAMETERS(ESTIM) / PRINT=OMEANS(TABLES(A, B, A BY B)) FORMAT(NARROW) /
DESIGN= A, B, A BY B/
DESIGN= A, B WITHIN A(1) B WITHIN A(2)/
DESIGN= B, A WITHIN B(1) A WITHIN B(2) A WITHIN B(3)
A WITHIN B(4)/
<Note: the data are arranged so that A=1 16 times and 2 16 times,
while B=1 four times, 2 four times, ... 4 four times for A=1,
repeating the sequence for A=2>

V. RUN NAME KIRK 2-WAY ANOVA CR-24 P. 201 UNBALANCED
VARIABLE LIST A B SCORE
INPUT FORMAT FIXED (2F1.0, F2.0)
READ INPUT DATA
END INPUT DATA
MANOVA
SCORE BY A(1,2) B(1,4)/
NO PRINT=PARAMETERS(ESTIM) / PRINT=OMEANS(TABLES(A, B, A BY B)) FORMAT(NARROW) /
DESIGN=A, B, A BY B/
METHOD=ESTIMATION(NOBALANCED) SSTYPE(SEQUENTIAL) /
DESIGN=A, B, A BY B/
METHOD=ESTIMATION(NONBALANCED) SSTYPE(UNIQUE) /
DESIGN=A, B, A BY B/
<Note: the data are arranged so that A=1 16 times and 2 16 times,
while B=1 three times, 2 five times, 3 three times, 4 five times,
then 1, 2, 3, 4, four times each; i.e. A=1 B=1, A=1 B=1, A=1 B=1,
A=1, B=2, ... A=2 B=1, A=2 B=1, A=2 B=1, A=2 B=2, etc.>

VI. RUN NAME KIRK 3-WAY ANOVA CRF-222 P. 219
VARIABLE LIST A B C SCORE
INPUT FORMAT FIXED (2F1.0, F2.0)
READ INPUT DATA
END INPUT DATA

 MANOVA
   SCORE BY A(1,2) B(1,2) C(1,2)/
   NOPRINT=PARAMETERS(ESTIM)/
   PRINT=OMEANS(TABLES(A, B, C, A BY B, A BY C, B BY C, 
   A BY B BY C)) FORMAT(NARROW)/
   DESIGN=A, B, C, A BY B, A BY C, B BY C, A BY B BY C/
   DESIGN=B, C, B BY C, A WITHIN B(1) BY C(1),
   A WITHIN B(1) BY C(2), A WITHIN B(2) BY C(1),
   A WITHIN B(2) BY C(2)/
   DESIGN=B, C, B BY C, A WITHIN B(1), A WITHIN B(2)/
   DESIGN=A, C, A BY C, B WITHIN A(1), B WITHIN A(2)/
   DESIGN=A, B, A BY B, C WITHIN A(1), C WITHIN A(2)/
   <Note: the data are arranged so that A=1 16 times and 2 16 times; 
   B=1 eight times, 2 eight times, 1 eight times, 2 eight times; 
   C=1 four times, 2 four times, 1 four times, 2 four times, etc.>

VII. RUN NAME       KIRK HIERARCHICAL(NESTED) ANOVA CRH-2(8) P. 232
VARIABLE LIST      A B SCORE
INPUT FORMAT       FIXED (2F1.0,F2.0)
READ INPUT DATA
END INPUT DATA

 MANOVA
   SCORE BY A(1,2) B(1,8)/
   NOPRINT=PARAMETERS(ESTIM)/PRINT=FORMAT(NARROW)/
   DESIGN=A VS 1, B WITHIN A(1) VS WITHIN/
   <Note: the data are arranged so that A=1 16 times, 2 16 times; 
   while B=1 four times, 2 four times, ... 8 four times>

VIII. RUN NAME      KIRK RANDOMIZED BLOCK FACTORIAL ANOVA RBF-24 P. 239
VARIABLE LIST      S A B SCORE
INPUT FORMAT       FIXED (3F1.0,F2.0)
READ INPUT DATA
END INPUT DATA

 MANOVA
   SCORE BY S(1,4) A(1,2) B(1,4)/
   NOPRINT=PARAMETERS(ESTIM)/PRINT=FORMAT(NARROW)/
   DESIGN=S, A, B, A BY B/
   <Note: the data are arranged so that S=1 eight times, 2 eight 
   times, ... 4 eight times; while A=1 four times, 2 four times, 1 
   four times, etc; and B=1 then 2 then 3 then 4 then 1, etc.>

IX. RUN NAME        KIRK SPLIT-LOT:2-WAY WITH 1 REPEATED MEASURE, 
SPF-2.4 P.249
VARIABLE LIST      S A B SCORE
INPUT FORMAT       FIXED (3F1.0,F2.0)
READ INPUT DATA
END INPUT DATA

 MANOVA
   SCORE BY S(1,8) A(1,2) B(1,4)/
   NOPRINT=PARAMETERS(ESTIM)/
   PRINT=FORMAT(NARROW)/
   DESIGN=A VS 1, S WITHIN A=1, B, A BY B/

 MANOVA
   SCORE BY S(1,8) A(1,2) B(1,4)/
   NOPRINT=PARAMETERS(ESTIM)/
   PRINT=FORMAT(NARROW), OMEANS(TABLES(A,B,A BY B))/
   DESIGN=B, A WITHIN B(1), A WITHIN B(2), A WITHIN B 
   (3), A WITHIN B(4)/
   <Note: the data are arranged so that A=1 four times, 2 four times, 
   ... 8 four times; while A=1 16 times and 2 16 times; and B=1 then 
   2 then 3 then 4 then 1 etc.>
X. RUN NAME  KIRK SPLIT-LOT: 2-WAY 1 REPEATED MEASURE, SPF-24 (UNBAL)p. 278
VARIABLE LIST  S A B SCORE
INPUT FORMAT  FIXED (3F1.0,F2.0)
READ INPUT DATA
END INPUT DATA
MANOVA
SCORE BY S(1,8) A(1,2) B(1,4)/
NOPRINT=PARAMETERS(ESTIM)/PRINT=FORMAT(NARROW)/
METHOD=ESTIMATION(NOBALANCED) SSTYPE(SEQUENTIAL)/
DESIGN=A VS 1, S WITHIN A=1, B, A BY B/  
METHOD=ESTIMATION(NOBALANCED) SSTYPE(UNIQUE)/
DESIGN=A VS 1, S WITHIN A=1, B, A BY B/

<Note: the data are arranged so that A=1 four times, 2 four times, ... 8 four times; while A=1 12 times and 2 20 times; and B=1 then 2 then 3 then 4 then 1, etc.>

XI. RUN NAME  KIRK SPLIT-LOT 3-WAY ONE REPEATED MEASURE, SPF-22.4 P. 285
VARIABLE LIST  A B C S SCORE
INPUT FORMAT  FIXED (4F1.0,F2.0)
READ INPUT DATA
END INPUT DATA
MANOVA
SCORE BY A(1,2) C(1,2) B(1,4) S(1,8)/
NOPRINT=PARAMETERS(ESTIM)/PRINT=FORMAT(NARROW)/
DESIGN=A VS 1, C VS 1, A BY C VS 1, S WITHIN A BY
C=1, B, A BY B, B BY C, A BY B BY C/

<Note: the data are arranged so that A=1 16 times and 2 16 times; while B=1 then 2 then 3 then 4 then 1 ... ; and C=1 eight times, 2 eight times, 1 eight times, 2 eight times; and S=1 four times, 2 four times ... 8 four times.>

XII. RUN NAME  KIRK SPLIT-LOT 3-WAY 2 REPEATED MEASURES, SPF-22.22 P. 300
VARIABLE LIST  A B C S SCORE
INPUT FORMAT  FIXED (4F1.0,F2.0)
READ INPUT DATA
END INPUT DATA
MANOVA
SCORE BY A(1,2) B(1,2) C(1,2) S(1,8)/
NOPRINT=PARAMETERS(ESTIM)/
PRINT=FORMAT(NARROW)/
DESIGN=A VS 1, S WITHIN A=1, B VS 2, A BY B VS 2,
B BY S Within A=2, C VS 3, A BY C VS 3, C BY S
WITHIN A=3, B BY C, A BY B BY C/

<Note: the data are arranged so that A=1 16 times, 2 16 times; while B=1 twice, 2 twice, 1 twice, etc.; and C=1 then 2 then 1 then 2, etc.; and S=1 four times, 2 four times, 3 four times, ... 8 four times.>
PROBLEMS: PROC TRANPOSE, PROC CONVERT

Both PROC TRANPOSE and PROC CONVERT have some problems that are inherent in SAS and must be solved by the SAS distributors. If you try to use PROC CONVERT with an SPSS system file, you will get a message in the JCL which states, in part, "protection exception," and the job will bomb. PROC TRANPOSE keeps asking for more memory, virtually ad infinitum. Don't allocate more than 512K in the REGION parameter if you decide to take your chances with this procedure. Otherwise, you will find yourself at the mercy of some potentially hostile operations personnel (you have to get special permission to ask for more than 512K, as it can tie up the resources of the computer - see BENCHMARKS Vol. 3 No. 1, pg. 6 for more information on processing CLASS L jobs). SAS Institute is working on the PROC TRANPOSE problem and is sending us a fix for the problem with PROC CONVERT.

ADDENDUM: Since this article was written, the PROC CONVERT problem was supposedly fixed. Please notify someone in Academic Computing if you have problems with it.

COMPUTER HUMOR

GENESIS

Release 21.6*

*Adapted from an adaptation of an article "Genesis Release 2.5" by Michael L. Coleman

Chapter 1

1. In the beginning the Project Manager created the Programming Staff. The Programming Staff was without form and structure.

2. And the Project Manager said, "Let There be Organization:" and there was Organization. And the Project Manager saw that the Organization was good.

3. And the Project Manager separated the workers from the supervisors, and he called the supervisors Management and he called the workers Exempt.

4. And the Project Manager said, "Let there be a Mission in the midst of the Organization, and let it separate the workers, one from another."
5. And the Project Manager created the Mission; and he did call it the System. And the Project Manager separated those who were to benefit from the System from those who were to build it.

6. And he called the former Users, and he called the latter Programmers.

7. And the Project Manager said, "Let all the Programmers in the Organization be gathered into one place, and let a Chief Programmer be brought up to lead them."

8. Wherefore it was done; and the Project Manager saw that he was competent.

9. And the Project Manager said unto the Chief Programmer, "Create for me a Schedule; in order that I may look upon the Schedule and know the Due Date."

10. And the Chief Programmer went among all his Staff and he did consult with them.

11. And it came to pass that the Staff was divided into two parts; and one part was called Analysts and the remainder was called Application Programmers.

12. And the Analysts went back to their desks and estimated, as was their custom.

13. And it came to pass that each Analyst did bring his estimate unto the Chief Programmer.

14. And the Chief Programmer did collect the sundry estimates, and he did summarize them.

15. And he drew a PERT Chart.

16. And the Chief Programmer did go unto the Project Manager and he did present him the Estimate; and he said, "It shall be ten months."

17. And the Project Manager was mightly angered and he did vent his displeasure upon the Chief Programmer.

18. And the Project Manager said unto the Chief Programmer, "I have brought you up from the depths of the Staff; you have not yet grasped the Big Picture."

19. And the Project Manager did hire Outside Consultants, and authorized overtime.

20. And it came to pass that the Project Manager called another Meeting; and he did say unto the Chief Programmer, "Behold all that I have done! The Due Date will be five months."

21. And the Chief Programmer was sore afraid.

22. And the Chief Programmer went forth and proceeded to implement the System.
Chapter 2

1. And the Chief Programmer did send his Analysts unto the Users; and the Analysts did say unto the Users, "Let us write the Specifications."

2. And there were many diverse meetings, and lunches, and telephone calls.

3. And it came to pass that the Specifications were written. And there was a Payday and a Happy Hour, a first month.

4. And the Chief Programmer did examine the Specifications and he saw that they were ambitions.

5. Wherefore he did separate the mandatory features from the optional features; and he did call the mandatory features Requirements, and he did call the optional features Deferred.

6. And the Users did call him names.

7. And the Chief Programmer gave the Specifications to the Analysts and said, "Let the Requirements be analyzed even unto the Laying Out of Files."

8. And it was done.

9. And it came to pass that the Software Houses did bring forth all manner of Salesmen who presented their packages and claimed wondrous things from them, each according to his own File Structure.

10. And it came to pass that a Data Management System was selected; and the Chief Programmer saw that it was good.

11. And there was a Payday and a Happy Hour, a second month.

12. And the Chief Programmer said, "Let the System be divided into parts, and let each part be called a Module."

13. And let programming teams be formed and let each be assigned to write a Module; and it was done.

14. And the Chief Programmer did create the programming teams with two levels, a greater and a lesser; and he did call the greater, Senior Programmers; and he did call the lesser, Junior Programmers.

15. And he gave the greater dominion over the lesser; and the Chief Programmer looked upon it and he saw that it was good, and the Junior Programmers looked upon it and they saw it differently.

16. And there was a Payday and a Happy Hour, a third month.

Chapter 3

1. And the Chief Programmer said, "Let the programming be started and let much overtime be consumed, for there is but two months left."
2. And the Programmers both the Senior and also the Junior were sore afraid, and they did strive mightily to please the Chief Programmer.

3. And they did flowchart, and they did code, each according to his own fashion.

4. And the Chief Programmer looked upon the work and he liked it not. And the Chief Programmer said, "Let there be a Standard."

5. And there was a Standard; and the Programmers looked upon the Standard and they liked it not.

6. And there was a Payday and a Happy Hour, a fourth month.

7. And the Chief Programmer said, "Let there be Progress Reports, in order that we may monitor and control." And there were Progress Reports.

8. And the the Chief Programmer looked upon the Progress Reports; and he saw that the Due Date was not to be met;

9. Wherefore the Chief Programmer did arise, press his suit, and shave his beard; and he did go even unto the Project Manager; and he did grovel mightily.

10. And the Chief Programmer did point his fingers, and he did cause blame to be issued forth, even upon all manner of creatures who sold Hardware and Software.

11. And he did ask for an Extension.

12. And the Project Manager was exceedingly wroth; and he did cast doubts upon the ancestry of the Chief Programmer; and he did utter a multitude of threats.

13. Nevertheless it came to pass that an Extension was granted; and the Chief Programmer did take the Extension back to the Programming Teams; and there was much rejoicing.

14. And the programming of Modules was completed. And there was a Payday and a Happy Hour, a fifth month.

15. And the Chief programmer said, "Let the Modules be integrated, one with another, so that System Testing may begin."

16. Wherefore two by two the Modules were integrated, one with another. And great difficulties were experienced, and many hours of Overtime were consumed.

17. And it came to pass that System Testing was completed. And there was a Payday and a Happy Hour, a sixth month.

18. And it came to pass that the Chief Programmer did go even unto the Project Manager, and he did say unto him, "Behold, I bring you good tidings of a great joy which will come unto all the Users; for on this day The System is completed."

19. And suddenly there was among them a great multitude of Users praising the Chief Programmer and saying, "Glory be to the System in the highest, but can you make this one small change?"
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CALLING ALL COURSES USING STATISTICAL PACKAGES - AGAIN

Last semester, a list of courses dealing with the various statistical packages (SPSS, SAS, etc.) was compiled and published in BENCHMARKS. We would like to continue this practice, so once again, please notify us if you are planning on teaching such a course. (If you do not want to fool with the paper work, you can call 788-2324 OR send a message to the "SYSTEM" while logged on to MUSIC - see "Electronic Mail System Revisited" in the June 1981 issue of BENCHMARKS, or enter HELP MAIL while logged on to MUSIC - for more information on sending mail.)

1. Course Title (if known) ____________________________________________

2. School/Department course taught in __________________________________

3. Short description of course __________________________________________

4. Semester(s) course will be taught ____________________________________

5. Prerequisites for attending course _____________________________________

6. Specific packages used:

   ______SPSS ______SAS ______BMDP ______OSIRIS

   Other (please specify): _____________________________________________

7. Other pertinent information: ________________________________________
PLEASE RETURN TO:
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The Computing Center
NT Box 13495
North Texas State University
Denton, TX 76203
REGISTRATION FORM FOR COMPUTING CENTER SHORT COURSES

Please complete this form and return it IMMEDIATELY if you wish to attend any of the short courses announced in this issue.

NAME: ______________________________ DEPARTMENT: ________________
PHONE: ______________________________

I wish to attend:

Introduction to MUSIC ___ March 22, 3-5 p.m. WH 122

Introduction to MUSIC/SCRIPT
___ March 22, 6:30-8:30 p.m. GAB 105

Introduction to SPSS ___ March 23/24, 3-5 p.m. ISB 231

Introduction to SAS ___ March 23/25, 6:30-8:30 p.m. WH 1

Advanced MUSIC ___ March 25, 3-5 p.m. ISB 231

Introduction to BMDP ___ March 30/31, 3-5 p.m. ISB 231
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BENCHMARKS is a vital link between the NTSU Computing Center and the users of our facilities. It is important for all users of the computing facilities to maintain a file of these newsletters because they contain materials which will periodically update existing documents as well as information and suggestions on uses of OS-MVT, MUSIC, the HP-2000, and other resources available to NTSU students and faculty. To facilitate the dispersal of BENCHMARKS, *** FREE *** subscriptions are now available. To receive yours, send the following information to us either by "snail mail" (the post office or campus mail) or electronically, through the MAIL facility on MUSIC.

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