MASTER

PREPARATION, ASSEMBLY AND ENTRY
OF DATA INTO THE SPEAKEASY DATA BASE

FINAL TECHNICAL REPORT
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Patent Status

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by

National Institute for Community Development, Inc.
1815 North Lynn Street, Suite 1000
Arlington, Virginia 22209

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I. INTRODUCTION

The purpose of this study was to provide assistance of non-policy nature in preparing data bases relating to the supply demand and price of crude oil, natural gas and other petroleum products. The data bases were to be used in determining the impact of decontrol of oil prices, announced by the President on April 5, 1979, on oil production, conservation of existing energy supplies, development of alternative energy sources, and dependency on foreign oil.

The Economic and Data Analysis staff have been strictly using TSO-SPEAKEASY system. The DOE/OSI computer facilities in general and TSO-SPEAKEASY system in specific are heavily over-utilized. This results in slow response rate and long turn-around time. Frequent loss of program and data files in case of unexpected power or system failure and lack of technical assistance were other generally expressed concerns. According to DOE/OSI computer center policy, the data sets which remain "inactive" for 15 or more days "retire" automatically.

Access to various data files is prohibited by their primary users in different divisions of DOE. Authorization to use some of these files was obtained during the course of this project. These files are

described in Sections II and III. Test files created for program debugging are described in Section IV and Utility Programs are presented in Section V.

1.1 Modified System

Various options and alternatives were explored to resolve the problems discussed earlier and to achieve flexibility in the present systems approach. It was necessary to look for system capabilities which allow easy access to other information files and offer better communication between the user and the system.

The DOE/OSI Computer Center currently maintains a number of data base management systems (DBMS). These include ADABASE, System 3000, and INQUIRE. Primary functions of these DBMS are file management and report writing. They have little use for the user who intends to perform scientific operations on his/her data files. Packages like SAS, SPSS, CGGS, BMD and TSP are widely used for scientific applications.

SUPERWYLBUR has been tested and found to be better than TSO. Its "Remote Job Entry", "Text Formatting", and "Macro Programming" features are much more versatile and useful. Program and data files are automatically saved by SUPERWYLBUR in

case of power failure and system breakdown. Moreover, programs written in SPEAKEZ, SAS, BMD, PL/I, etc. can be submitted via SUPERWYLBUR in a time sharing environment. These programs may be stored on SUPERWYLBUR files and can easily be retrieved whenever necessary for modifications and re-submission of batch jobs.

The modified system, as shown in Figure 1, will enable the Office of Economic Analysis to exploit the capabilities of the following systems:

1. SUPERWYLBUR
2. SAS (Statistical Analysis System)
3. SPEAKEZ
4. TSP (Time Series Processor)
5. CGGS (Computer Generated Graphic System)

Independent programs (say, in FORTRAN, PL/I or BASIC) may also be written and added to the existing files if necessary, but it may not be very advisable in the presence of the above mentioned systems which cover a wide range of applications.

Forty percent of the SAS programs are written in PL/I. Customized programs may be written in SAS, like in PL/I.

FIGURE - 1: MODIFIED SYSTEM APPROACH

The following four types of files were created during the contract period:

1. Analysis Program Files
2. Analysis Data Files
3. Test Data Files
4. Utility Program Files

A description of program and data files falling under each of the above-mentioned categories is presented in the following sections.

II. ANALYSIS PROGRAM FILES

These files include a number of programs which are written in SAS, SPEAKEASY, CGGS, and TSP. These programs are:

- i) PROG5
REGRESS -- SAS
- ii) SERUN
RUNSCORE
SPEAKRUN -- SPEAKEASY
CRUDE.DATA
SPEAKEZ.DATA
INTERACTIVE GRAPHICS
- iii) DANKEYS.DATA
RUNFILE
GRRUN -- CGGS
DISSPLA.SYSOUT.DATA
- iv) TYMDATA & TYMDAT1 -- TSP

2.1 SAS Programs

2.1.1 PROG5

This is an analytical program written in SAS. Time series data files of petroleum products in various formats can be input to this program. It prints monthly petroleum product data for the period January, 1975 to December, 1979. This period can be extended, without any problem, as the data becomes available. The program provides the following output.

- a) A time series of monthly petroleum product data.
- b) Absolute monthly change.
- c) Percent monthly change.
- d) Absolute monthly acceleration (change in change).
- e) Percent monthly acceleration (rate of change).
- f) Mean value of absolute and percent growth.
- g) Minimum value of absolute and percent growth.
- h) Maximum value of absolute and percent growth.
- i) Standard deviation of absolute and percent growth.

Data file name, input file format (i.e., column positions), and title may be changed in lines 3, 9, and 151 respectively (APPENDIX-Program #1). These changes should be made, if necessary, before submitting a run. Output from a test run is given on the next two pages.

2.1.2 REGRESS

REGRESS is a simple regression analysis program. It takes data input from cards but can easily be modified for a tape or desk data file input. All input

OUTPUT FROM PROG5 TEST RUN

REFINED PRODUCT SUPPLIED IN THE U.S. - 1975-1979

MONTH/YEAR	BASIC DATA	GROWTH ABSLOT %	ACCELERATION ABSLOT %	REMARKS, IF ANY
JAN76	18185	. 0	. 0	
FEB76	18647	462 2	. 0	
MAR76	17509	-1138 -6	462 2	
APR76	17302	-207 -1	-1138 -6	
MAY76	16672	-630 -3	-207 -1	
JUN76	15977	-695 -4	-630 -3	
JUL76	16825	848 5	-695 -4	
AUG76	16607	-218 -1	848 5	
SEP76	16642	35 0	-218 -1	
OCT76	16837	195 1	35 0	
NOV76	17090	253 1	195 1	
DEC76	18847	1757 10	253 1	
JAN77	20560	1713 9	1757 10	
FEB77	20504	-56 0	1713 9	
MAR77	20482	-22 0	-56 0	
APR77	18124	-2358 -11	-22 0	
MAY77	17580	-544 -3	-2358 -11	
JUN77	16972	-608 -3	-544 -3	
JUL77	18043	1071 6	-608 -3	
AUG77	17568	-475 -2	1071 6	
SEP77	18012	444 2	-475 -2	
OCT77	17714	-298 -1	444 2	
NOV77	17824	110 0	-298 -1	
DEC77	18437	613 3	110 0	
JAN78	20052	1615 8	613 3	
FEB78	19691	-361 -1	1615 8	
MAR78	20674	1183 6	-361 -1	

OUTPUT FROM PROG5 TEST RUN (continued)

REFINED PRODUCT SUPPLIED IN THE U.S. - 1975-1979

MONTH/YEAR	BASIC DATA	GROWTH ABSOLUTE	%	ACCELERATION ABSOLUTE	%	REMARKS, IF ANY
APR78	19627	-1247	-5	1183	6	
MAY78	17714	-1913	-9	-1247	-5	
JUN78	17992	278	1	-1913	-9	
JUL78	18270	278	1	278	1	
AUG78	17631	-639	-3	278	1	
SEP78	18611	980	5	-639	-3	
OCT78	17933	-678	-3	980	5	
NOV78	18408	475	2	-678	-3	
DEC78	19176	768	4	475	2	
JAN79	19920	744	3	768	4	
FEB79	20640	720	3	744	3	
MAR79	21152	512	2	720	3	
APR79	19140	-1972	-9	512	2	
MAY79	17311	-1869	-9	-1972	-9	
JUN79	17701	390	2	-1869	-9	
JUL79	17675	-26	0	390	2	
AUG79	16906	-769	-4	-26	0	
SEP79	17957	1051	6	-769	-4	
OCT79	17133	-824	-4	1051	6	
NOV79	18025	892	5	-824	-4	
DEC79	18276	251	1	892	5	

MEAN, MIN VALUE, MAX VALUE, AND STANDARD DEV. OF ABSOLUTE AND PERCENT

VARIABLE	MEAN	MINIMUM VALUE	MAXIMUM VALUE	STANDARD DEVIATION
GROWTH	1.93617021	-2358.00000000	1757.00000000	953.844095
PERCENT	0.12507000	-11.00000000	10.00000000	4.561407

variables are to be specified in the INPUT statement, and dependent and independent variables are to be specified in the MODEL statement (See APPENDIX-Program #2). Dependent variable has to be on the left side of equality.

In multiple regression, variables are to be separated by blank(s) and interaction variables are to be combined with asterisk '*', e.g.,

```
MODEL GASPROD = SUPPLY DEMAND SUPPLY*DEMAND;
```

2.2 SPEAKEASY Programs

2.2.1 SERUN

Primary purpose of this simple program was to make a SPEAKEASY test run under the modified system approach. This program takes CVOL data file from a SUPERWYLBUR partitioned data set (PDS) file, called SPEAKEZ.DATA, and tabulates it. The program was tested in a batch mode through SUPERWYLBUR and was found functional.

2.2.2 RUNSCORE

The SPEAKEASY program reads x, y, z column vectors from a file using a FORTRAN READ

statement and transforms them into a matrix. The program can be run under SUPERWYLBUR in batch mode.

2.2.3 SPEKRUN

This program, like SERUN, is also a test program. It takes various data sets from PDS files and prints them.

2.2.4 CRUDE.DATA

This is an old PDS file which contains program and data sets. These programs and data sets were developed in SPEAKEASY by the Government Project Monitor before the project was started. Only two members, i.e., FTREAD and TESTSAVE, were added during the project phase. A list of members in this file is given below:

CIMPACT
CIMPPRT
CMODEL
CMODEL1
CMODLPRT
CONVERT
CPR
CPRINT
CRULE
CRUN
CV
CVOLDUMP
CVOL2
DAYS
ENTADJ
FTREAD
GETCRUDE

LIBRARY
MONTH
MONTHS
NATGAS
PROCWSR
QAV
QPRT
REFCOMP
REFVOLS
TESTSAVE
WKSHEET

2.2.5 SPEAKEZ.DATA

This PDS file is also an old file created before the current project. Its programs and data sets are now accessible through SUPERWYLBUR. The member names are:

CMODLPRT
CONVERT
CPRICE
CRESTPRT
CREST1
CRUDMODL
CRULEPRT
CVOL
CVOLDEF
CVOLDMP
CVOLDUMP
CVOLLIST
LIBRARY
MITCH
MONTH
MONTHS
PRINTA
PRODUCTS
PRTSPEC
REPORT
RUNPEST
TESTB
TESTC.

CVOL and CPRICE are matrices containing crude oil volume and price data. Others are SPEAKEASY programs.

2.2.6 Interactive Graphics

The graphic capabilities of the SPEAKEASY graphic system were explored and implemented on CRT's as well as Tektronix terminal. A copy of the graph produced on Tektronix terminal is given on the next page. The graph shows the increasing trend in prices of regular and premium gasoline during January, 1978 to October, 1979.

2.3 CGGS Programs (Computer Generated Graphic System)

CGGS program and data files were obtained from EIA. These files are now restored and saved under SUPERWYLBUR. Data files may also be retrieved under TSO by using a utility program called WYLTOTSO described in Section V. CGGS system was tested and made operative by using some of these files through Tektronix terminal and a hard copy graph printer. The PDS file containing these programs and data sets is called DANKEYS.DATA.

2.3.1 DANKEYS.DATA

This is a master file which contains run files and data files for producing high quality graphs under Computer Generated

Graphic Systems (CGGS). The file, when originally created, contained only seven member files described below. Later, three sub-files were created from the original member files and added to the master file.

<u>Member File Name</u>	<u>No. of Records</u>	<u>Type</u>
RUNFILE	393	Program
RUNDATA	3,395	Data
SCMASTER	3,532	Data
SCDATA	3,917	Data
NATGAS	288	Data
GRTIM	342	Data
GRRUN	41	Program

Added Later:

SCDATA1	400	Data
SCDATA2	400	Data
SCMASTER	400	Data

2.3.2 RUNFILE

This is one of the member files of DANKEYS.DATA. It has 393 program lines written in CGGS. Computer Generated Graphic System requires two input files for generating graphs. A file which contains specifications and instructions for the desired graphs is called "Runfile." The second file which contains data to be used in making plots is called "Rundata."

RUNFILE provides specifications for about fifty graphs concerning crude oil volume, domestic production and imports.

2.3.3 GRRUN

GRRUN is a "Runfile" which consists of 41 program statements. It provides specifications for generating five graphs concerning natural gas.

2.3.4 DISSPLA.SYSOUT.DATA

This is one of the miscellaneous files created for experimental testing.

2.4 TSP Programs

Time Series Processor (TSP) is a computer language for statistical analysis of time series by ordinary least square or two-stage least square methods. TSP analysis provides information on statistical parameters needed for econometric analysis. It is also useful for model fitting, graphing, interpolation and for forecasting (extrapolation).

A test program was developed and tested on time series of crude oil production, stock, imports and refined products supplied during January 1976 to December 1979. A description is presented in the following section.

2.4.1 TYMDATA & TYMDATAL

These similar programs utilize printing, graphing and regression analysis capabilities of TSP system. The program prints the values of:

- Regression coefficients
- Standard error of regression coefficients
- T-statistic for regressions
- Likelihood function
- R-squared
- Durbin-Watson statistic
- Sum of squared residuals
- Standard error of regression
- Sum of residuals
- Number of observations used
- Mean of dependent variable
- F-statistic
- Variance-covariance matrix

The program may also fit a curve to the time series and plot actual and fitted values.

The data bank facilities of the TSP may be used for temporary or permanent storage of input and output data files. New variables may be created, automatically saved in the data bank, and retrieved for future use.

A sample output obtained from a test run is shown on pages 18-21. Dependent variable is refined product supplied

EQUATION 1

 ORDINARY LEAST SQUARES
 DEPENDENT VARIABLE: RFSUPP

RIGHT-HAND VARIABLE	ESTIMATED COEFFICIENT	STANDARD ERROR	T- STATISTIC
C	15540.4	2574.35	6.03661
COSTOK	.866937E-02	.816410E-C2	1.06189

LOG OF LIKELIHOOD FUNCTION = -411.551
 R-SQUARED = 0.0240
 DURBIN-WATSON STATISTIC (ADJ. FOR 0. GAPS) = 0.5749
 SUM OF SQUARED RESIDUALS = .754308E+08
 STANDARD ERROR OF THE REGRESSION = 1280.55
 SUM OF RESIDUALS = .159064E-01
 NUMBER OF OBSERVATIONS = 48.
 MEAN OF DEPENDENT VARIABLE = 18267.0
 F-STATISTIC(1., 46.) = 1.13041

ESTIMATE OF VARIANCE-COVARIANCE MATRIX OF ESTIMATED COEFFICIENTS

	C	COSTOK
C	.662728E+07	-20.9630
COSTOK	-20.9630	.666526E-04
	1	2

EQUATION 2

 ORDINARY LEAST SQUARES

DEPENDENT VARIABLE: RFSUPP

RIGHT-HAND VARIABLE	ESTIMATED COEFFICIENT	STANDARD ERROR	T- STATISTIC
C	11686.7	5841.07	2.00077
COPROD	.784341	.695880	1.12712

LOG OF LIKELIHOOD FUNCTION = -411.478
 R-SQUARED = 0.0269
 DURBIN-WATSON STATISTIC (ADJ. FOR 0. GAPS) = 0.5633
 SUM OF SQUARED RESIDUALS = .752029E+08
 STANDARD ERROR OF THE REGRESSION = 1278.61
 SUM OF RESIDUALS = .208858E-01
 NUMBER OF OBSERVATIONS = 48.
 MEAN OF DEPENDENT VARIABLE = 18267.0
 F-STATISTIC(1., 46.) = 1.27322

ESTIMATE OF VARIANCE-COVARIANCE MATRIX OF ESTIMATED COEFFICIENTS

	C	COPROD
C	.341181E+08	-4062.66
COPROD	-4062.66	.484249
	1	2

EQUATION 3

 ORDINARY LEAST SQUARES

DEPENDENT VARIABLE: RFSUPP

RIGHT-HAND VARIABLE	ESTIMATED COEFFICIENT	STANDARD ERROR	T- STATISTIC
C	15232.2	1633.74	9.32350
COIMPT	.505416	.270418	1.86902

LOG OF LIKELIHOOD FUNCTION = -410.375
 R-SQUARED = 0.0706
 DURBIN-WATSON STATISTIC (ADJ. FOR 0. GAPS) = 0.5596
 SUM OF SQUARED RESIDUALS = .718254E+08
 STANDARD ERROR OF THE REGRESSION = 1249.57
 SUM OF RESIDUALS = .258709E-01
 NUMBER OF OBSERVATIONS = 48.
 MEAN OF DEPENDENT VARIABLE = 18267.0
 F-STATISTIC(1., 46.) = 3.45618

ESTIMATE OF VARIANCE-COVARIANCE MATRIX OF ESTIMATED COEFFICIENTS

	C	COIMPT
C	.266910E+07	-439.091
COIMPT	-439.091	.731258E-01
	1	2

KFSUPP PLOTTED WITH (*)
 COSTOK PLOTTED WITH (-)
 COPROB PLOTTED WITH (:)
 COIMPT PLOTTED WITH (!)

POINTS EXCEEDING THE SCALE OF THE GRAPH AND POINTS WHERE TWO OR MORE VARIABLES HAVE THE SAME VALUE WILL BE PLOTTED WITH (\$). THE VARIABLE CONCERNED WILL BE INDICATED ON THE FAR RIGHT HAND SIDE OF THE GRAPH

MINIMUM= 4208.000000

MAXIMUM= 350077.000000

(RFSUPP) and the independent variables are crude oil stock (COSTOK), production (COPROD), and imports (COIMPT). The three regression equations are:

$$\text{RFSUPP} = C + \text{COSTOK} + (\text{Error})$$

$$\text{RFSUPP} = C + \text{COPROD} + (\text{Error})$$

$$\text{RFSUPP} = C + \text{COIMPT} + (\text{Error})$$

Actual values of the four variables are used in plotting the graph.

III. ANALYSIS DATA FILES

Analysis data files include a number of data files created under SUPERWYLBUR system. These files are used by SPEAKEASY, CGGS and SAS programs. A brief description of these files is presented in the following sections.

3.1 DANKEYS.DATA

The members of this PDS file have been described in Section 2.3.1. Eight out of ten member files contain data on various crude oil commodities, their volumes and natural gas. Generally the data are in the form of monthly time series for different years between 1972 - 1979. SCMASTER data file has weekly information.

<u>File Member Name</u>	<u>Period</u>	<u>Description</u>
RUNDATA	1976-1979	Monthly data on demand, supply, and stock of various petroleum products.
SCMASTER	1976-1979	Weekly data of various commodities.
SCMASTER1	1976-1979	Bi-weekly data of various commodities.
SCDATA	1972-1979	Monthly data of 53 various commodities.
SCDATA1	1972-1979	Monthly data of 5 various commodities.
SCDATA2	1975-1979	Monthly data of 6 various commodities.
NATGAS	1975-1979	Monthly data of 5 natural gas commodities.
GRTIM	1976-1979	Monthly data of 5 natural gas commodities.

3.2 RUNDATA

This file, when executed along with RUNFILE through TSO-CGGS via Tektronix terminal, generates high quality graphs of production, supply and stocks of various petroleum products. Some of the graphs obtained during training and experimental sessions are shown on pages 25-28.

It is necessary to modify and improve the existing CGGS files--programs and data--in order to be able to fulfill the needs of the Economic and Data Analysis staff in terms of evaluating changes in the supply, demand and prices of crude oil, natural gas and other forms of fossil energy.

3.3 CVOL

CVOL is a SUPERWYLBUR 5x66 data file. It was originally restored from TSO-SPEAKEASY data files. The file contains crude oil volume information for twenty-two months.

3.4 NELSON

This catalogued data file was created from a card file. The utility program called "IEBGENER" was used in setting up this file. It has 148 records.

CRUDE OIL PRODUCTION

CRUDE OIL IMPORTS EXCLUDING STRATEGIC PETROLEUM RESERVE

CRUDE OIL STOCKS EXCLUDING STRATEGIC PETROLEUM RESERVE

TOTAL REFINED PRODUCTS SUPPLIED

3.5 WHALL.DATA

This file consists of 3,632 records. The information pertains to weekly data for twenty-one commodities from January 1977 to February 1980.

3.6 NGHALL.DATA

This is a monthly data file for January 1975 to December 1979. The file has 293 records and contains information on five commodities (i.e., N1-N5).

IV. TEST DATA FILES

Format of a new historic data file (January 1975 to present) was discussed with Government Project Monitor and an outline was prepared. Availability of information on data items like ID, company code, region/state, units, type of product and day of month (if daily series) were required in order to meet the structural requirements of the proposed file. Unavailability of such detailed information caused changes in the proposed file structure.

Present data files suit the requirements of SAS, CGGS, TSP and SPEAKEASY programs. SAS program is flexible enough to accept a file in any sequential order format.

Two files were set up to test and debug various programs. These files are described in the following sections.

4.1 TESTF1

A test file (called TESTF1) was created in accordance with the specifications of the new file structure. This test data file was used for:

- a) Debugging new programs, and
- b) Test if the new file structure needed further modifications.

Later experiences and practical problems led to the creation of data files which were executable by various programs.

4.2 TESTF2

This test file consists of 48 records. The data indicate the volumes of refined product supplied in the United States during January, 1976 to December, 1979.

V. UTILITY PROGRAMS

A number of utility programs were written, debugged and added to the SUPERWYLBUR library. These programs described below serve various purposes, e.g., copy a PDS file, generate a disk or tape file from a card file, transfer files from TSO to SUPERWYLBUR or vice versa, etc.

5.1 COPYFILE

This SAS program copies a tape or disk file onto another tape or disk file. It counts the number of records being copied and prints this number. The program catalogs the data set name specified for the new data.

5.2 LISTFILE

This program reads a file (tape or disk) and lists it on the standard output form. The counter in the program counts the records and prints "total records copied".

5.3 IEBCOPY

This is an IBM utility program which reads a PDS disk file and copies it to another disk file under a different data set name (DSN). The new DSN is catalogued.

5.4 TSOTOWYL

A program called TSOTOWYL was developed, tested, and stored in the WYLBUR library. This program when used under TSO, recalls a TSO data set, reconstructs it in the fixed block format and stores it under a user given name. The new data set, thus created, can be accessed via SUPERWYLBUR. The program used the Fortran Write statement in SPEAKEASY.

5.5 WYLTOTSO

This program is the opposite of TSOTOWYL. It reconstructs a SUPERWYLBUR data array which can, then, be used by TSO-SPEAKEASY programs. The program uses the Fortran Read statement in SPEAKEASY.

5.6 IEBGENER

This IBM utility program reads a file from a deck of cards, stores it on a disk and catalogs the data set name.

5.7 CREAT

This is an SAS program which reads a deck of cards and stores the information under a user specified name. It catalogs the DSN.

The program accepts 80-column card format numerical files only.

5.8 FIND.MACRO

This is a SUPERWYLBUR macro. This macro, when called, searches for a DSN on all 53 DOE/OSI computer center disk volumes and indicates the DSN and its associated volume number if any.

VI. APPENDICES

Program #1

00000

```

1.  //MISATEST JOB (6042,5,,,,,,), 'ALT'
2.  // EXEC SAS, TIME=(0,10)
3.  // CDDATA DD DSN=006442.MIS.TESTF2, DISP=SHR
4.  //SYST1 DD *
5.  OPTIONS DATE NUMBER;
6.  *THIS TEST PROGRAM MAKES A RUN ON TEST DATA FILE CALLED TESTF2;
7.  DATA ONE;
8.  INFILE CDDATA END=EOF;
9.  INPUT RESIDR 3-7 DT 9-12 YR 9-10;
10. IF DT=7601 THEN YRMD='JAN76';
11. IF DT=7602 THEN YRMD='FEB76';
12. IF DT=7603 THEN YRMD='MAR76';
13. IF DT=7604 THEN YRMD='APR76';
14. IF DT=7605 THEN YRMD='MAY76';
15. IF DT=7606 THEN YRMD='JUN76';
16. IF DT=7607 THEN YRMD='JUL76';
17. IF DT=7608 THEN YRMD='AUG76';
18. IF DT=7609 THEN YRMD='SEP76';
19. IF DT=7610 THEN YRMD='OCT76';
20. IF DT=7611 THEN YRMD='NOV76';
21. IF DT=7612 THEN YRMD='DEC76';
22. IF DT=7701 THEN YRMD='JAN77';
23. IF DT=7702 THEN YRMD='FEB77';
24. IF DT=7703 THEN YRMD='MAR77';
25. IF DT=7704 THEN YRMD='APR77';
26. IF DT=7705 THEN YRMD='MAY77';
27. IF DT=7706 THEN YRMD='JUN77';
28. IF DT=7707 THEN YRMD='JUL77';
29. IF DT=7708 THEN YRMD='AUG77';
30. IF DT=7709 THEN YRMD='SEP77';
31. IF DT=7710 THEN YRMD='OCT77';
32. IF DT=7711 THEN YRMD='NOV77';
33. IF DT=7712 THEN YRMD='DEC77';
34. IF DT=7801 THEN YRMD='JAN78';
35. IF DT=7802 THEN YRMD='FEB78';
36. IF DT=7803 THEN YRMD='MAR78';
37. IF DT=7804 THEN YRMD='APR78';
38. IF DT=7805 THEN YRMD='MAY78';
39. IF DT=7806 THEN YRMD='JUN78';
40. IF DT=7807 THEN YRMD='JUL78';
41. IF DT=7808 THEN YRMD='AUG78';
42. IF DT=7809 THEN YRMD='SEP78';
43. IF DT=7810 THEN YRMD='OCT78';
44. IF DT=7811 THEN YRMD='NOV78';
45. IF DT=7812 THEN YRMD='DEC78';
46. IF DT=7901 THEN YRMD='JAN79';
47. IF DT=7902 THEN YRMD='FEB79';
48. IF DT=7903 THEN YRMD='MAR79';
49. IF DT=7904 THEN YRMD='APR79';
50. IF DT=7905 THEN YRMD='MAY79';
51. IF DT=7906 THEN YRMD='JUN79';
52. IF DT=7907 THEN YRMD='JUL79';
53. IF DT=7908 THEN YRMD='AUG79';
54. IF DT=7909 THEN YRMD='SEP79';
55. IF DT=7910 THEN YRMD='OCT79';
56. IF DT=7911 THEN YRMD='NOV79';
57. IF DT=7912 THEN YRMD='DEC79';
100. PROC SORT; BY DT;
101. DATA TWO;
102. SET ONE;

```

```

103. DIFF=LAG(RFSUPP);
104. DIFF1=DIF(RFSUPP);
105. DIFFA=LAG(DIFF);
106. DIFF2=DIF(DIFF);
107. IF DIFF1=. OR DIFF2=. THEN P1=0;
110. ELSE P1=INT((DIFF1/DIFF)*100);
112. IF DIFF2=. OR DIFFA=. THEN P2=0;
118. ELSE P2=INT((DIFF2/DIFFA)*100);
150. FILE PRINT;
151. TITLE REFINED PRODUCT SUPPLIED IN THE U.S. - 1975-1979;
152. TITLE3 MONTH/YEAR BASIC GROWTH ACCELERATION REMARKS.;
153. TITLE4 DATA ABSLUT % ABSLUT % IF AKA;
154. TITLES -----;
155. PUT ' ';
156. PUT 800 YRMD RFSUPP 51-56 DIFF1 59-63 P1 65-67 DIFF2 71-75 P2 78-82;
160. DATA THREE;
161. SET TWO;
162. DIFF1='ABSOLUTE GROWTH';
163. P1 = 'PERCENT GROWTH';
165. PROC MEANS MEAN MIN MAX STD;
166. VARIABLES DIFF1 P1;
167. TITLE "MEAN, MIN VALUE, MAX VALUE, AND STANDARD DEV. OF GROWTH";
180. /*

```

Program #2

```

1.  REGRESS
2.  //SUBTEST JOB (6002,'S',,,,,), 'ALI'
3.  // EXEC SAS, TIME=(0,10)
4.  //SYSIN DD *
5.  OPTIONS DATE NUMBER 6=72 ;
6.  *THIS TEST PROGRAM MAKES A REGRESSION RUN ON MR MAYNARD'S DATA;
7.  DATA;
8.  INPUT BANKSALE 1-7 PASSTHRU 9-13;
9.  CARDS;
10. 000.190 59.62
11. 750.000 55.16
12. 007.550 53.75
13. 002.190 50.76
14. 015.570 52.33
15. 002.300 53.70
16. 000.030 52.10
17. 029.450 50.26
18. 003.036 50.53
19. 007.007 47.67
20. 000.091 49.80
21. 113.001 51.54
22. 015.630 49.00
23. 005.900 49.46
24. PROC GLM;
25. MODEL BANKSALE = PASSTHRU;
26. /

```

Program #3

```

TYM DATA
1. //WJEU TEST JOB (5442,,5,,,,,,),'ALI'
2. // EXEC TSPMEDD,TIME=(0,15)
3. //SYSIN DD *
4. $$$NAME NICODEE 'TEST RUN FOR TSP ON DANKEYS.DATA:RUNDATA';
5. SMPL 1 48;
5.1 LOAD;
5.2 NOPRINT;
5.3 SAMAM RFSUPP SUPPSA ALL A;
5.4 RETRV SUPPSA 75 T;
5.5 SAMAM COSTOK STOKSA ALL A;
5.6 RETRV STOKSA 75 T;
5.7 SAMAM COPROD PRODSA ALL A;
5.8 RETRV PRODSA 75 T;
5.81 SAMAM COIMPT IMPTSA ALL A;
5.82 RETRV IMPTSA 75 T;
6. PRINT YEAR;
6.01 PRINT RFSUPP;
6.02 PRINT COSTOK;
6.03 PRINT COPROD;
6.04 PRINT COIMPT;
6.1 OLSQ RFSUPP C COSTOK;
6.11 OLSQ RFSUPP C COPROD;
6.12 OLSQ RFSUPP C COIMPT;
6.13 PLOT RFSUPP * COSTOK - COPROD : COIMPT !;
6.14 GRAPH COSTOK YEAR;
6.15 PLTPRM ;
6.2 STOP;
6.3 END;
6.4 SMPL 1 48;
6.5 LOAD ID;
6.6 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26
6.7 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48;
7. LOAD YEAR;
8. JAN76 FEB76 MAR76 APR76 MAY76 JUN76 JUL76 AUG76 SEP76 OCT76 NOV76
9. DEC76 JAN77 FEB77 MAR77 APR77 MAY77 JUN77 JUL77 AUG77 SEP77 OCT77
10. NOV77 DEC77 JAN78 FEB78 MAR78 APR78 MAY78 JUN78 JUL78 AUG78 SEP78
11. OCT78 NOV78 DEC78 JAN79 FEB79 MAR79 APR79 MAY79 JUN79 JUL79 AUG79
12. SEP79 OCT79 NOV79 DEC79;
13. LOAD RFSUPP;
800. 18185
801. 18647
802. 17509
803. 17302
804. 16672
805. 15977
806. 16825
807. 16607
808. 16642
809. 16837
810. 17090
811. 19847
812. 20560
813. 20504
814. 20482
815. 18124
816. 17580
817. 16972
818. 18043
819. 17568
820. 18012

```

821.	17714
822.	17824
823.	18437
824.	20052
825.	19691
826.	20874
827.	19627
828.	17714
828.5	17992
829.	18270
830.	17631
831.	18611
832.	17933
833.	18408
834.	19176
835.	19920
836.	20640
837.	21152
838.	19180
839.	17311
840.	17701
841.	17675
842.	16906
843.	17957
844.	17133
845.	18025
846.	18276
846.1	LOAD COSTOKS
847.	271354
848.	289296
849.	277414
850.	283112
851.	286628
852.	283982
853.	281715
854.	282599
855.	277272
856.	284357
857.	297683
858.	298836
859.	285471
860.	294116
861.	291462
862.	299533
863.	318872
864.	328755
865.	333746
866.	335313
867.	338865
868.	334133
869.	340549
870.	345197
871.	339857
872.	340082
873.	335794
874.	345333
875.	343201
876.	329020
877.	333247
878.	332691
879.	316730

880.	321213
881.	324765
882.	322315
883.	309915
884.	302728
885.	302981
886.	317432
887.	319759
888.	316355
889.	325893
890.	312352
891.	325130
892.	324297
893.	344540
894.	350077
894.1	LOAD COPROJ
895.	8254
896.	8232
897.	8231
898.	8232
899.	8077
900.	8125
901.	8094
902.	8127
903.	8111
904.	8150
905.	8063
906.	8080
907.	8061
908.	7854
909.	8139
910.	8090
911.	8145
912.	8075
913.	8102
914.	8105
915.	8307
916.	8480
917.	8573
918.	8579
919.	8487
920.	8347
921.	8373
922.	8807
923.	8708
924.	8801
925.	8822
926.	8747
927.	8788
928.	8787
929.	8830
930.	8729
931.	8651
932.	8457
933.	8498
934.	8585
935.	8533
936.	8585
937.	8409
938.	8355
939.	8570

940.	8510
941.	8460
942.	8576\$
942.1	LOAD COIMPT\$
943.	4476
944.	4594
945.	4208
946.	4738
947.	4790
948.	4669
949.	5628
950.	5792
951.	5556
952.	5975
953.	5689
954.	5946
955.	5925
956.	6281
957.	6659
958.	6699
959.	6821
960.	6818
961.	7065
962.	7069
963.	6395
964.	6429
965.	6409
966.	6248
967.	6248
968.	5974
969.	5551
970.	5981
971.	5331
972.	5452
973.	6227
974.	6036
975.	6118
976.	6720
977.	6298
978.	6413
979.	6711
980.	6562
981.	6250
982.	6180
983.	6047
984.	6093
985.	6523
986.	6120
987.	6213
988.	5821
989.	6366
990.	6208\$
991.	END\$
992.	/*

Program #4

```

TYMDATA1
1. //WJSUTEST JOB (6442,,5,,,,), 'ALI'
2. // EXEC TSPMEDD, TIME=(0,15)
3. //SYSIN DD *
4. $$$NAME NICDDE *TEST RUN FOR TSP ON DANKEYS.DATA:RUNDATA*;
5. SMPL 1 48;
5.1 LOAD;
5.2 NOPRINT;
5.3 SAMAM RFSUPP SUPPSA ALL A;
5.4 RETRV SUPPSA 75 T;
5.5 SAMAM COSTOK STOKSA ALL A;
5.6 RETRV STOKSA 75 T;
5.7 SAMAM COPROD PRODSA ALL A;
5.8 RETRV PRODSA 75 T;
5.81 SAMAM COIMPT IMPTSA ALL A;
5.82 RETRV IMPTSA 75 T;
6. PRINT YEAR;
6.11 OLSQ RFSUPP C COPROD COIMPTS
6.13 PLOT RFSUPP * COSTOK - COPROD : COIMPT !$
6.14 GRAPH COSTOK YEAR;
6.15 PLTPRM ORG;
6.2 STOP;
6.3 END;
6.4 SMPL 1 48;
6.5 LOAD ID;
6.6 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26
6.7 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48;
7. LOAD YEAR;
8. 76001 76002 76003 76004 76005 76006 76007 76008 76009 76010 76011
9. 76012 77001 77002 77003 77004 77005 77006 77007 77008 77009 77010
10. 77011 77012 78001 78002 78003 78004 78005 78006 78007 78008 78009
11. 78010 78011 78012 79001 79002 79003 79004 79005 79006 79007 79008
12. 79009 79010 79011 79012;
13. LOAD RFSUPP;
800. 18185
801. 18647
802. 17509
803. 17302
804. 16672
805. 15977
806. 16825
807. 16607
808. 16642
809. 16837
810. 17090
811. 18847
812. 20560
813. 20504
814. 20482
815. 18124
816. 17580
817. 16972
818. 18043
819. 17568
820. 18012
821. 17714
822. 17824
823. 18437
824. 20052
825. 19691
826. 20874

```


827.	19627
828.	17714
828.5	17992
829.	18270
830.	17631
831.	18611
832.	17933
833.	18408
834.	19176
835.	19920
836.	20640
837.	21152
838.	19180
839.	17311
840.	17701
841.	17675
842.	16906
843.	17957
844.	17133
845.	18025
846.	182765
846.1	LOAD COSTOKS
847.	271354
848.	289236
849.	277414
850.	283112
851.	286628
852.	283982
853.	281715
854.	282599
855.	277272
856.	284357
857.	297683
858.	298336
859.	285471
860.	294116
861.	291462
862.	299533
863.	318872
864.	328755
865.	333746
866.	335313
867.	338865
868.	334133
869.	340549
870.	345197
871.	339857
872.	340082
873.	335794
874.	345333
875.	343201
876.	329020
877.	333247
878.	332691
879.	316730
880.	321213
881.	324765
882.	322315
883.	309915
884.	302728
885.	302981

886.	317432
887.	319759
888.	316355
889.	325893
890.	312852
891.	325130
892.	324297
893.	344540
894.	350077s
894.1	LOAD COPRODs
895.	8254
896.	8232
897.	8231
898.	8232
899.	8077
900.	8125
901.	8094
902.	8127
903.	8111
904.	8150
905.	8063
906.	8080
907.	8061
908.	7854
909.	8139
910.	8090
911.	8145
912.	8075
913.	8102
914.	8105
915.	8307
916.	8480
917.	8573
918.	8579
919.	8487
920.	8347
921.	8373
922.	8807
923.	8708
924.	8801
925.	8822
926.	8747
927.	8788
928.	8787
929.	8930
930.	8729
931.	8651
932.	8457
933.	8498
934.	8585
935.	8533
936.	8585
937.	8409
938.	8355
939.	8570
940.	8510
941.	8460
942.	8576s
942.1	LOAD COIMPTS
943.	4476
944.	4594

945.	4208
946.	4738
947.	4790
948.	4669
949.	5628
950.	5792
951.	5556
952.	5875
953.	5689
954.	5946
955.	5925
956.	6281
957.	6659
958.	6699
959.	6821
960.	6818
961.	7055
962.	7068
963.	6385
964.	6429
965.	6409
966.	6248
967.	6248
968.	5974
969.	5551
970.	5981
971.	5331
972.	5452
973.	6227
974.	6036
975.	6118
976.	6720
977.	6298
978.	6413
979.	6711
980.	6562
981.	6250
982.	6180
983.	6047
984.	6093
985.	6523
986.	6120
987.	6213
988.	5821
989.	6366
990.	6203\$
991.	END\$
992.	/*

Program #5
COPYFILE

```
//WJ5UTEST JOB (6442,,5,,,,), 'ALI'
// EXEC SAS, TIME=(0,10)
//PLUG DD DSN=CN6442.WJ5.TESTF1, DISP=SHR
//OUTPUT DD DISP=(NEW,CATLG,DELETE), UNIT=DASD,
// DSN=CN6442.WJ5.ANYNAME, VOL=SER=FEA028,
// SPACE=(TRK,(5,5),,CONTIG),
// DCB=(RECFM=FB,LRECL=80,BLKSIZE=6160)
//SYSIN DD *
OPTIONS DATE NUMBER;
*THIS PROGRAM COPIES A FILE(TAPE OR DISK) AND STORES IT ON A DISK;
DATA _NULL_;
INFILE PLUG END=EOF;
INPUT ;
RETAIN N 0;
FILE OUTPUT; PUT _INFILE_;
N+1;
IF EOF THEN GO TO EODATA;
RETURN;
EODATA: FILE LOG;
PUT / 'NUMBER COPIED= ' N;
/*
```

Program #6

```

LIST=FILE
1. //JISHLIST JOB (6442,M20,01,60,,,,), 'BELLS', TIME=(0,10)
2. // EXEC SAS
3. //PLUG DD DISP=SHR,DSN=CN6442.PRJ.ADDHDC(JINDEX)
4. //SYSIN DD *
5. OPTIONS DATE NUMBER;
6. *THIS PROGRAM LISTS AND COPIES FILES;
7. DATA _NULL_;
8. INFILE PLUG END=EOF;
9. INPUT;
10. RETAIN N 0;
11. N+1;
12. FILE PRINT;
13. PUT _INFILE_;
14. IF EOF THEN GO TO EODATA;
15. RETURN;
16. EODATA: FILE PRINT;
17. PUT ' 1';
18. PUT 'TOTAL RECORDS COPIED = ' N 24-29;
19. STOP;
20. /*

```

Program #7

```

IEBCOPY
1. //A15UCOPY JOB (6442,20,1,1,0), 'ALI'
2. //STEP1 EXEC PGM=IEBCOPY,REGION=170K,TIME=(0,19)
3. //SYSPRINT DD SYSOUT=A *** THIS JCL GOES WITH :PDSCOPY
4. //INPDS DD DISP=SHR, *** MACRO. -DD NOT SCRATCH- ***
5. // VOL=SER=FEA013,UNIT=DASD,
6. // DSN=CM6442.WJ5.SPEAKEZ.TEMP
7. //OUTPDS DD DSN=CM6442.WJ5.SPEAKEZ.DATA
8. // SPACE=(TRK,(50,50,20)),
9. // DISP=(NEW,CATLG,DELETE),
10. // VOL=SER=FEA023,UNIT=DASD
11. //SYSUT3 DD UNIT=SYSDA,SPACE=(TRK,(20,20))
12. //SYSUT4 DD UNIT=SYSDA,SPACE=(TRK,(20,20))
13. //SYSIN DD *
14. COPY INDD=INPDS,OUTDD=OUTPDS

```

Program #8
TSOTOWYL

TSO
READY

ATTR ANYNAME1 LRECL(80) BLKSIZE(800) RECFM(F B)
ALLOC FI(FT08F001) DA(ANYDATANAME) SPACE(1,1) NEW USING(ANYNAME1) CATALOG TRACKS

SPEAKEZ

!_X = ARRAY(22,15:) .
!_X = KEPT (CVOL)
!_FMT = "(SF10.4,30X)" .
WRITE (9,FMT:X)
ENDWRITE 8
QUIT

Program #9
WYLTOTSO

```
FTREAD
1.  ALLDC FI(FTORF001), DACHELS M) SHR
2.  SPEAKEZ
3.  X = ARRAY(148: )
4.  FMT = '(F2,76X)'
5.  READ(A,FMT:X)
6.  ENOREAD
7.  KEEP X
8.  WHATIS X
9.  X IS A 148 ELEMENT REAL ARRAY
10. QUIT
```


IEBGENER

Cards

GREAT

८३५५७५

Program #12

FIND.MACRO TO FIND VOLUME NUMBERS FOR A DSN

1.	SHD DSN LIKE XXXXXX ON FEA000
2.	SHD DSN LIKE XXXXXX ON FEA001
3.	SHD DSN LIKE XXXXXX ON FEA002
4.	SHD DSN LIKE XXXXXX ON FEA003
5.	SHD DSN LIKE XXXXXX ON FEA004
6.	SHD DSN LIKE XXXXXX ON FEA005
7.	SHD DSN LIKE XXXXXX ON FEA006
8.	SHD DSN LIKE XXXXXX ON FEA007
9.	SHD DSN LIKE XXXXXX ON FEA008
10.	SHD DSN LIKE XXXXXX ON FEA009
11.	SHD DSN LIKE XXXXXX ON FEA010
12.	SHD DSN LIKE XXXXXX ON FEA011
13.	SHD DSN LIKE XXXXXX ON FEA012
14.	SHD DSN LIKE XXXXXX ON FEA013
15.	SHD DSN LIKE XXXXXX ON FEA014
16.	SHD DSN LIKE XXXXXX ON FEA015
17.	SHD DSN LIKE XXXXXX ON FEA016
18.	SHD DSN LIKE XXXXXX ON FEA017
19.	SHD DSN LIKE XXXXXX ON FEA018
20.	SHD DSN LIKE XXXXXX ON FEA019
21.	SHD DSN LIKE XXXXXX ON FEA020
22.	SHD DSN LIKE XXXXXX ON FEA021
23.	SHD DSN LIKE XXXXXX ON FEA022
24.	SHD DSN LIKE XXXXXX ON FEA023
25.	SHD DSN LIKE XXXXXX ON FEA024
26.	SHD DSN LIKE XXXXXX ON FEA025
27.	SHD DSN LIKE XXXXXX ON FEA026
28.	SHD DSN LIKE XXXXXX ON FEA027
29.	SHD DSN LIKE XXXXXX ON FEA028
30.	SHD DSN LIKE XXXXXX ON FEA029
31.	SHD DSN LIKE XXXXXX ON FEA030
32.	SHD DSN LIKE XXXXXX ON FEA031
33.	SHD DSN LIKE XXXXXX ON FEA032
34.	SHD DSN LIKE XXXXXX ON FEA033
35.	SHD DSN LIKE XXXXXX ON FEA034
36.	SHD DSN LIKE XXXXXX ON FEA035
37.	SHD DSN LIKE XXXXXX ON FEA036
38.	SHD DSN LIKE XXXXXX ON FEA037
39.	SHD DSN LIKE XXXXXX ON FEA038
40.	SHD DSN LIKE XXXXXX ON FEA039
41.	SHD DSN LIKE XXXXXX ON FEA040
42.	SHD DSN LIKE XXXXXX ON FEA041
43.	SHD DSN LIKE XXXXXX ON FEA042
44.	SHD DSN LIKE XXXXXX ON FEA043
45.	SHD DSN LIKE XXXXXX ON FEA044
46.	SHD DSN LIKE XXXXXX ON FEA045
47.	SHD DSN LIKE XXXXXX ON FEA046
48.	SHD DSN LIKE XXXXXX ON FEA047
49.	SHD DSN LIKE XXXXXX ON FEA048
50.	SHD DSN LIKE XXXXXX ON FEA049
51.	SHD DSN LIKE XXXXXX ON FEA050
52.	SHD DSN LIKE XXXXXX ON FEA051
53.	SHD DSN LIKE XXXXXX ON FEA052

PHASE II

```

1 GEN A LABELED PLOT;
2 CURVE 1 SYMBOL COUNT=1;
3 CURVE 2 SYMBOL COUNT=1;
4 CURVE 3 SYMBOL COUNT=1;
5 FRAME;
6 Y GRID 1;
7 X GRID 1;
8 GO.
9 GEN A LABELED PLOT;
10 CURVE 1 SYMBOL COUNT=1;
11 CURVE 2 SYMBOL COUNT=1;
12 CURVE 3 SYMBOL COUNT=1;
13 FRAME;
14 Y GRID 1;
15 X GRID 1;
16 GO.
17 GEN A LABELED PLOT;
18 CURVE 1 SYMBOL COUNT=1;
19 CURVE 2 SYMBOL COUNT=1;
20 CURVE 3 SYMBOL COUNT=1;
21 FRAME;
22 Y GRID 1;
23 X GRID 1;
24 GO.
25 GEN A LABELED PLOT;
26 CURVE 1 SYMBOL COUNT=1;
27 CURVE 2 SYMBOL COUNT=1;
28 CURVE 3 SYMBOL COUNT=1;
29 FRAME;
30 Y GRID 1;
31 X GRID 1;
32 GO.
33 GEN A LABELED PLOT;
34 CURVE 1 SYMBOL COUNT=1;
35 CURVE 2 SYMBOL COUNT=1;
36 CURVE 3 SYMBOL COUNT=1;
37 FRAME;
38 Y GRID 1;
39 X GRID 1;
40 GO.
41 GEN A LABELED PLOT;
42 CURVE 1 SYMBOL COUNT=1;
43 CURVE 2 SYMBOL COUNT=1;
44 CURVE 3 SYMBOL COUNT=1;
45 FRAME;
46 Y GRID 1;
47 X GRID 1;
48 GO.
49 GEN A LABELED PLOT;
50 CURVE 1 SYMBOL COUNT=1;
51 CURVE 2 SYMBOL COUNT=1;
52 CURVE 3 SYMBOL COUNT=1;
53 FRAME;
54 Y GRID 1;
55 X GRID 1;
56 GO.
57 GEN A LABELED PLOT;
58 CURVE 1 SYMBOL COUNT=1;
59 CURVE 2 SYMBOL COUNT=1;
60 CURVE 3 SYMBOL COUNT=1;

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61. FRAME;
62. Y GRID 1;
63. X GRID 1;
64. GO;
65. GEN A LABELED PLOT;
66. CURVE 1 SYMBOL COUNT=1;
67. CURVE 2 SYMBOL COUNT=1;
68. CURVE 3 SYMBOL COUNT=1;
69. FRAME;
70. Y GRID 1;
71. X GRID 1;
72. GO;
73. GEN A LABELED PLOT;
74. CURVE 1 SYMBOL COUNT=1;
75. CURVE 2 SYMBOL COUNT=1;
76. CURVE 3 SYMBOL COUNT=1;
77. FRAME;
78. Y GRID 1;
79. X GRID 1;
80. GO;
81. GEN A LABELED PLOT;
82. CURVE 1 SYMBOL COUNT=1;
83. CURVE 2 SYMBOL COUNT=1;
84. CURVE 3 SYMBOL COUNT=1;
85. FRAME;
86. Y GRID 1;
87. X GRID 1;
88. GO;
89. GEN A LABELED PLOT;
90. CURVE 1 SYMBOL COUNT=1;
91. CURVE 2 SYMBOL COUNT=1;
92. CURVE 3 SYMBOL COUNT=1;
93. FRAME;
94. Y GRID 1;
95. X GRID 1;
96. GO;
97. GEN A LABELED PLOT;
98. CURVE 1 SYMBOL COUNT=1;
99. CURVE 2 SYMBOL COUNT=1;
100. CURVE 3 SYMBOL COUNT=1;
101. FRAME;
102. Y GRID 1;
103. X GRID 1;
104. GO;
105. GEN A LABELED PLOT;
106. CURVE 1 SYMBOL COUNT=1;
107. CURVE 2 SYMBOL COUNT=1;
108. CURVE 3 SYMBOL COUNT=1;
109. FRAME;
110. Y GRID 1;
111. X GRID 1;
112. GO;
113. GEN A LABELED PLOT;
114. CURVE 1 SYMBOL COUNT=1;
115. CURVE 2 SYMBOL COUNT=1;
116. CURVE 3 SYMBOL COUNT=1;
117. FRAME;
118. Y GRID 1;
119. X GRID 1;
120. GO;
121. GEN A LABELED PLOT;

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122. CURVE 1 SYMBOL COUNT=1;
123. CURVE 2 SYMBOL COUNT=1;
124. CURVE 3 SYMBOL COUNT=1;
125. FRAME;
126. Y GRID 1;
127. X GRID 1;
128. GO;
129. GEN A LABELED PLOT;
130. CURVE 1 SYMBOL COUNT=1;
131. CURVE 2 SYMBOL COUNT=1;
132. CURVE 3 SYMBOL COUNT=1;
133. FRAME;
134. Y GRID 1;
135. X GRID 1;
136. GO;
137. GEN A LABELED PLOT;
138. CURVE 1 SYMBOL COUNT=1;
139. CURVE 2 SYMBOL COUNT=1;
140. CURVE 3 SYMBOL COUNT=1;
141. FRAME;
142. Y GRID 1;
143. X GRID 1;
144. GO;
145. GEN A LABELED PLOT;
146. CURVE 1 SYMBOL COUNT=1;
147. CURVE 2 SYMBOL COUNT=1;
148. CURVE 3 SYMBOL COUNT=1;
149. FRAME;
150. Y GRID 1;
151. X GRID 1;
152. GO;
153. GEN A LABELED PLOT;
154. CURVE 1 SYMBOL COUNT=1;
155. CURVE 2 SYMBOL COUNT=1;
156. CURVE 3 SYMBOL COUNT=1;
157. FRAME;
158. Y GRID 1;
159. X GRID 1;
160. GO;
161. GEN A LABELED PLOT;
162. CURVE 1 SYMBOL COUNT=1;
163. CURVE 2 SYMBOL COUNT=1;
164. CURVE 3 SYMBOL COUNT=1;
165. FRAME;
166. Y GRID 1;
167. X GRID 1;
168. GO;
169. GEN A LABELED PLOT;
170. CURVE 1 SYMBOL COUNT=1;
171. CURVE 2 SYMBOL COUNT=1;
172. CURVE 3 SYMBOL COUNT=1;
173. FRAME;
174. Y GRID 1;
175. X GRID 1;
176. GO;
177. GEN A LABELED PLOT;
178. CURVE 1 SYMBOL COUNT=1;
179. CURVE 2 SYMBOL COUNT=1;
180. CURVE 3 SYMBOL COUNT=1;
181. FRAME;
182. Y GRID 1;

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183: X GRID 1;
184: GO;
185: GEN A LABELED PLOT;
186: CURVE 1 SYMBOL COUNT=1;
187: CURVE 2 SYMBOL COUNT=1;
188: CURVE 3 SYMBOL COUNT=1;
189: FRAME;
190: Y GRID 1;
191: X GRID 1;
192: GO;
193: GEN A LABELED PLOT;
194: CURVE 1 SYMBOL COUNT=1;
195: CURVE 2 SYMBOL COUNT=1;
196: CURVE 3 SYMBOL COUNT=1;
197: FRAME;
198: Y GRID 1;
199: X GRID 1;
200: GO;
201: GEN A LABELED PLOT;
202: CURVE 1 SYMBOL COUNT=1;
203: CURVE 2 SYMBOL COUNT=1;
204: CURVE 3 SYMBOL COUNT=1;
205: FRAME;
206: Y GRID 1;
207: X GRID 1;
208: GO;
209: GEN A LABELED PLOT;
210: CURVE 1 SYMBOL COUNT=1;
211: CURVE 2 SYMBOL COUNT=1;
212: CURVE 3 SYMBOL COUNT=1;
213: FRAME;
214: Y GRID 1;
215: X GRID 1;
216: GO;
217: GEN A LABELED PLOT;
218: CURVE 1 SYMBOL COUNT=1;
219: CURVE 2 SYMBOL COUNT=1;
220: CURVE 3 SYMBOL COUNT=1;
221: FRAME;
222: Y GRID 1;
223: X GRID 1;
224: GO;
225: GEN A LABELED PLOT;
226: CURVE 1 SYMBOL COUNT=1;
227: CURVE 2 SYMBOL COUNT=1;
228: CURVE 3 SYMBOL COUNT=1;
229: FRAME;
230: Y GRID 1;
231: X GRID 1;
232: GO;
233: GEN A LABELED PLOT;
234: CURVE 1 SYMBOL COUNT=1;
235: CURVE 2 SYMBOL COUNT=1;
236: CURVE 3 SYMBOL COUNT=1;
237: FRAME;
238: Y GRID 1;
239: X GRID 1;
240: GO;
241: GEN A LABELED PLOT;
242: CURVE 1 SYMBOL COUNT=1;
243: CURVE 2 SYMBOL COUNT=1;

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244 CURVE 3 SYMBOL COUNT=1;
245 FRAME;
246 Y GRID 1;
247 X GRID 1;
248 GO;
249 GEN A LABELED PLOT;
250 CURVE 1 SYMBOL COUNT=1;
251 CURVE 2 SYMBOL COUNT=1;
252 CURVE 3 SYMBOL COUNT=1;
253 FRAME;
254 Y GRID 1;
255 X GRID 1;
256 GO;
257 GEN A LABELED PLOT;
258 CURVE 1 SYMBOL COUNT=1;
259 CURVE 2 SYMBOL COUNT=1;
260 CURVE 3 SYMBOL COUNT=1;
261 FRAME;
262 Y GRID 1;
263 X GRID 1;
264 GO;
265 GEN A LABELED PLOT;
266 CURVE 1 SYMBOL COUNT=1;
267 CURVE 2 SYMBOL COUNT=1;
268 CURVE 3 SYMBOL COUNT=1;
269 FRAME;
270 Y GRID 1;
271 X GRID 1;
272 GO;
273 GEN A LABELED PLOT;
274 CURVE 1 SYMBOL COUNT=1;
275 CURVE 2 SYMBOL COUNT=1;
276 CURVE 3 SYMBOL COUNT=1;
277 FRAME;
278 Y GRID 1;
279 X GRID 1;
280 GO;
281 GEN A LABELED PLOT;
282 CURVE 1 SYMBOL COUNT=1;
283 CURVE 2 SYMBOL COUNT=1;
284 CURVE 3 SYMBOL COUNT=1;
285 FRAME;
286 Y GRID 1;
287 X GRID 1;
288 GO;
289 GEN A LABELED PLOT;
290 CURVE 1 SYMBOL COUNT=1;
291 CURVE 2 SYMBOL COUNT=1;
292 CURVE 3 SYMBOL COUNT=1;
293 FRAME;
294 Y GRID 1;
295 X GRID 1;
296 GO;
297 GEN A LABELED PLOT;
298 CURVE 1 SYMBOL COUNT=1;
299 CURVE 2 SYMBOL COUNT=1;
300 CURVE 3 SYMBOL COUNT=1;
301 FRAME;
302 Y GRID 1;
303 X GRID 1;
304 GO;

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305 GEN A LABELED PLOT;
306 CURVE 1 SYMBOL COUNT=1;
307 CURVE 2 SYMBOL COUNT=1;
308 CURVE 3 SYMBOL COUNT=1;
309 FRAME;
310 Y GRID 1;
311 X GRID 1;
312 GO;
313 GEN A LABELED PLOT;
314 CURVE 1 SYMBOL COUNT=1;
315 CURVE 2 SYMBOL COUNT=1;
316 CURVE 3 SYMBOL COUNT=1;
317 FRAME;
318 Y GRID 1;
319 X GRID 1;
320 GO;
321 GEN A LABELED PLOT;
322 CURVE 1 SYMBOL COUNT=1;
323 CURVE 2 SYMBOL COUNT=1;
324 CURVE 3 SYMBOL COUNT=1;
325 FRAME;
326 Y GRID 1;
327 X GRID 1;
328 GO;
329 GEN A LABELED PLOT;
330 CURVE 1 SYMBOL COUNT=1;
331 CURVE 2 SYMBOL COUNT=1;
332 CURVE 3 SYMBOL COUNT=1;
333 FRAME;
334 Y GRID 1;
335 X GRID 1;
336 GO;
337 GEN A LABELED PLOT;
338 CURVE 1 SYMBOL COUNT=1;
339 CURVE 2 SYMBOL COUNT=1;
340 CURVE 3 SYMBOL COUNT=1;
341 FRAME;
342 Y GRID 1;
343 X GRID 1;
344 GO;
345 GEN A LABELED PLOT;
346 CURVE 1 SYMBOL COUNT=1;
347 CURVE 2 SYMBOL COUNT=1;
348 CURVE 3 SYMBOL COUNT=1;
349 FRAME;
350 Y GRID 1;
351 X GRID 1;
352 GO;
353 GEN A LABELED PLOT;
354 CURVE 1 SYMBOL COUNT=1;
355 CURVE 2 SYMBOL COUNT=1;
356 CURVE 3 SYMBOL COUNT=1;
357 FRAME;
358 Y GRID 1;
359 X GRID 1;
360 GO;
361 GEN A LABELED PLOT;
362 CURVE 1 SYMBOL COUNT=1;
363 CURVE 2 SYMBOL COUNT=1;
364 CURVE 3 SYMBOL COUNT=1;
365 FRAME;

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366 Y GRID 1;
367 X GRID 1;
368 GO;
369 GEN A LABELED PLOT;
370 CURVE 1 SYMBOL COUNT=1;
371 CURVE 2 SYMBOL COUNT=1;
372 CURVE 3 SYMBOL COUNT=1;
373 FRAME;
374 Y GRID 1;
375 X GRID 1;
376 GO;
377 GEN A LABELED PLOT;
378 CURVE 1 SYMBOL COUNT=1;
379 CURVE 2 SYMBOL COUNT=1;
380 CURVE 3 SYMBOL COUNT=1;
381 FRAME;
382 Y GRID 1;
383 X GRID 1;
384 GO;
385 GEN A LABELED PLOT;
386 CURVE 1 SYMBOL COUNT=1;
387 CURVE 2 SYMBOL COUNT=1;
388 CURVE 3 SYMBOL COUNT=1;
389 FRAME;
390 Y GRID 1;
391 X GRID 1;
392 GO;
393 DONE.

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GEN 1;
1. GEN A LABELED PLOT;
2. CURVE 1 SYMBOL COUNT=1;
3. CURVE 2 SYMBOL COUNT=1;
4. CURVE 3 SYMBOL COUNT=1;
5. FRAME;
6. Y GRID 1;
7. X GRID 1;
8. GO;
9. GEN A LABELED PLOT;
10. CURVE 1 SYMBOL COUNT=1;
11. CURVE 2 SYMBOL COUNT=1;
12. CURVE 3 SYMBOL COUNT=1;
13. FRAME;
14. Y GRID 1;
15. X GRID 1;
16. GO;
17. GEN A LABELED PLOT;
18. CURVE 1 SYMBOL COUNT=1;
19. CURVE 2 SYMBOL COUNT=1;
20. CURVE 3 SYMBOL COUNT=1;
21. FRAME;
22. Y GRID 1;
23. X GRID 1;
24. GO;
25. GEN A LABELED PLOT;
26. CURVE 1 SYMBOL COUNT=1;
27. CURVE 2 SYMBOL COUNT=1;
28. CURVE 3 SYMBOL COUNT=1;
29. FRAME;
30. Y GRID 1;
31. X GRID 1;
32. GO;
33. GEN A LABELED PLOT;
34. CURVE 1 SYMBOL COUNT=1;
35. CURVE 2 SYMBOL COUNT=1;
36. CURVE 3 SYMBOL COUNT=1;
37. FRAME;
38. Y GRID 1;
39. X GRID 1;
40. GO;
41. DONE.