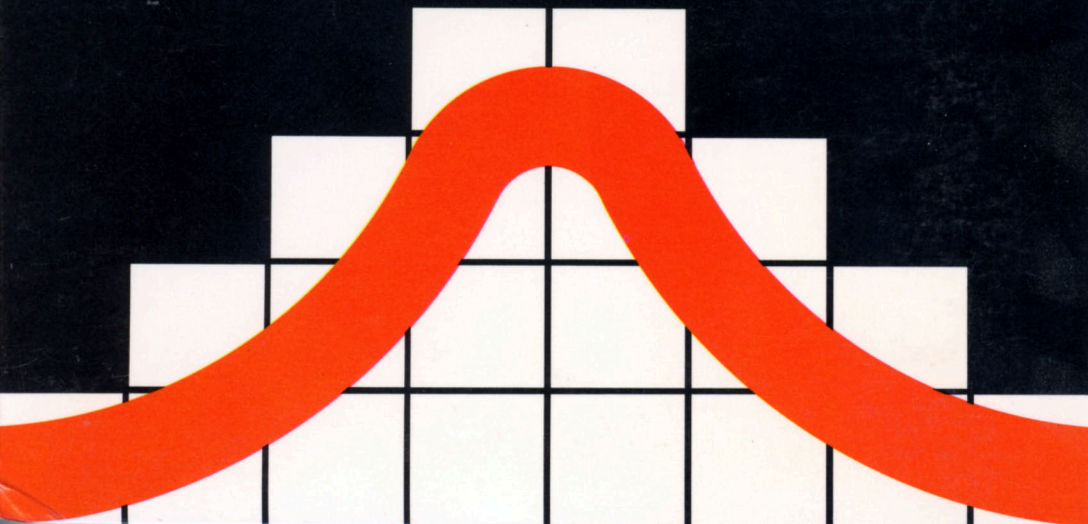
STATISTICS I.



STATISTICS I

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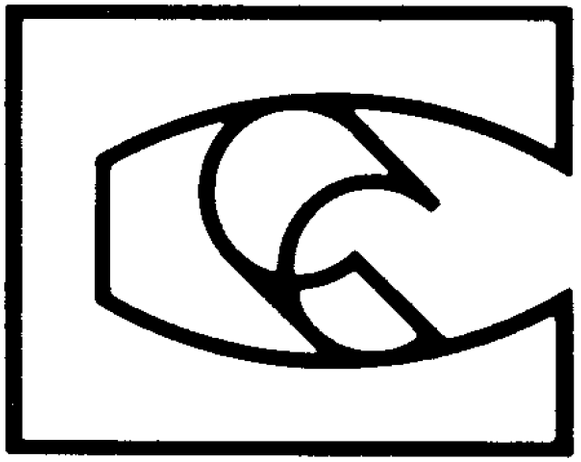

A system for computing and displaying statistical information in quantitative and graphical forms.

Manual No. 999248 Rev.
Library Album No. 993001

Requires 16K user RAM

STATISTICS I

(BASIC STATISTICS)

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STATISTICS I

(BASIC STATISTICS)

Statistics 1 is a system of 5 programs plus a "MENU" program which operates on numerical data and displays statistical information in quantitative and graphical forms. It consists of the following programs, each of which is described below: FILES, REGRES, PLOT, STAT and GRAPH.

FILES

This is the file manager program. It generates, maintains and displays files of numbers for use by the other programs. A file consists of a set of "observations" each of which is an n-tuple of numbers for a fixed n from 1 to 6. The first numbers in the n-tuples of a file form a data set referred to as "type 1", the second numbers form another data set, "type 2", etc. A file may contain up to 1 5 observations. This limit may be increased by adjustments of DIM statements in the FILES program (line 30) and in other programs which will use the files.

When FILES is run, the following prompt is displayed:

```
SELECT NUMBER OF DESIRED ACTION:
1)  CREATE FILE
2)  DELETE FILE
3)  ALTER OBSERVATIONS
4)  ADD AND/OR DELETE OBSERVATIONS
5)  DISPLAY FILE
6)  MERGE FILES
 )  END PROGRAM
?
```

1) To create a new file on disk, type "1", followed by a carriage return (CR). The following prompt is then displayed:

```
FILE NAME AND NUMBER OF TYPES:
```

The desired file name (1 to 6 characters) should now be entered, followed by a comma, followed by the number of items/observation. The next prompt is:

```
NUMBER OF OBSERVATIONS:
```

and when answered (followed by CR), the prompt

```
ENTER "0" WHEN DONE
DATA:
#
```

appears. Each observation is now entered by typing first the number of the observation, then (CR), then the numbers for the respective "types" of the observation, each followed by (CR). The observations may be typed in any order and mistakes may be

corrected by retyping the numbers of the observation. When finished, type "0" (CR) and the original prompt returns. The new file is now on disk.

2) To delete a disk file type "2" (CR) and the directory is displayed followed by the prompt:

```
COMPLETE NAME OF FILE TO BE DELETED:
```

The file name followed by ".", followed by file type, followed by ";", followed by version number should now be entered as it appears in the directory, then (CR). The file is deleted (using the screen memory in the process) and the revised directory is briefly displayed before the original prompt returns.

3) To alter observations already in a file, type "3" (CR) and the prompt

```
FILE NAME:
```

appears whereupon the name of the disk file to be altered should be entered. The file is loaded from disk followed by:

```
ENTER "0" WHEN DONE
DATA:
#
```

The corrected observations should now be entered as described above for the same prompt. The file on disk is corrected and the original prompt returns.

4) To add and/or delete observations from a disk file, type "4" (CR) and

ENTER "D" (DELETE) OR "A" (ADD) & OBSERVATION NUMBER
ENTER "F,0" WHEN DONE

appears. Additions and deletions as well as observation numbers may be processed in any order. To delete an observation, enter "D,", followed by the observation number (then (CR)). **Warning:** subsequent observation numbers are now decreased by 1. To add an observation enter "A,", followed by the observation number (then (CR)). **Warning:** already existing observation numbers from this one up are now increased by 1. When finished, enter "F," (CR). A new file of the same name and next higher version number is now placed on disk and the old file remains. The original prompt returns.

5) To display a file which is on disk, type "5" (CR) and the prompt

FILE NAME:

appears to which the name of the desired file (then (CR)) should be entered. This is followed by:

THIS FILE WAS CREATED BY
1 - THE "FILES" PROGRAM
2 - ONE OF THE OTHER STATISTICS PROGRAMS

a) If a "1" is input, the next prompt is

BEGINNING OBSERVATION NUMBER (OR '0' TO END):

When an observation number is typed in, a screen of successive observations beginning with that one is displayed, followed by the same prompt. When finished, enter "0" (CR) and the original prompt returns.

b) If a "2" is input, the file is displayed on the screen but no prompt appears. To return to the original prompt, press "return".

6) To merge two or more files together, type "6" (CR). Files may be merged in one of two ways: files which contain the same number of types may have observations merged, or files which contain the same number of observations may have types merged. The prompt

NEW FILE NAME:

is displayed whereupon the desired name for the merged file should be entered (and (CR)). Next appears

ENTER 1-MERGE OBSERVATIONS OR 2-MERGE TYPES

a) If a "1" is typed, the next prompt is

MERGE FILE NAME (OR "0" IF DONE)

and the name of the first disk file to be merged should be entered (and (CR)). As the names of the successive files to be merged are entered, the prompt MERGE FILE NAME is repeatedly displayed. After the last file name has been entered and the prompt again appears, enter "0" (CR) and the original prompt returns. The merged file is on disk.

b) If a "2" is typed, the next prompt is

FILE NAME & # TYPES TO MERGE (OR '0,0' IF DONE):

The name of the first file to be merged and the number of types from this file to be used in the merge should now be entered, separated by a comma and followed by (CR). The prompt TYPE 1: next appears and the number of the type (1 to 6) to be merged first is entered (and (CR)). If more than one type is to be used from this file then TYPE 2: appears next, etc. The prompt

MERGE FILE NAME & # TYPES TO MERGE:

is repeatedly displayed as the files to be used in the merge are called for. After all the merge information has been entered and the prompt reappears, enter "0,0" (CR) and the original prompt returns. The merged file is on disk.

7) To return to the MENU program, type " " (CR).

REGRES

This program performs a linear, logarithmic, exponential or reciprocal regression analysis with confidence limits and a graph. When REGRESS is run, the following prompt is displayed:

DATA SOURCE (F-FILE OR K-KEYBOARD):

If an already existing disk file created by the FILES program contains the data to be used, enter "F", otherwise, "K".

1) If an "F" is entered, the next prompt to appear is

FILE NAME AND TYPES (EG. TEST, 1, 3):

The directory name of the disk file and the "types" (described under "FILES" above) to be used are now entered (separated by commas). In the example given in the prompt, the file name is TEST, the first type contains the values of the independent variable and the third type contains the corresponding values of the dependent variable.

2) If a "K" is entered, the next prompt to appear is

NUMBER OF PAIRS:

After entering the number of pairs of data to be typed, in the prompt:

OBSERVATION NUMBER, INDEPENDENT VALUE, DEPENDENT VALUE:
#

is displayed. The data is now typed in, first the observation number (CR), then the independent value for the observation, (CR), then the dependent value (CR). The observations may be entered in any order and mistakes may be corrected by retyping the numbers for the observation. When finished, type "0" (CR).

After data has been entered, either from a disk file or from the keyboard, there appears:

SELECT NUMBER OF REGRESSION EQUATION:

1)	LINEAR	Y=AX+B
2)	LOGARITHMIC	Y=LOG(AX+B)
3)	EXPONENTIAL	Y=EXP(AX+B)
4)	RECIPROCAL	Y=1/(AX+B)

The number of the type of equation to be used to fit to the data by the least squares method is entered now. Note: a poor choice here may lead to extreme values which will not generate a regression equation or a graph. After a pause as calculations take place, a screen of statistics including the regression equation is displayed. At the bottom of the screen appears:

SAVE?

To save an image of the screen in a disk file, enter "Y" or "YES" and the file is created on disk with the name REGRES.DSP. Otherwise, enter "N" or "NO".

ARE CONFIDENCE LIMITS FOR A PREDICTED VALUE DESIRED?

appears next. If "Y" or "YES" is entered, then VALUE = is displayed to which the independent value for which confidence limits are to be computed should be entered. The 95 confidence limits are displayed and the question whether confidence limits are desired returns. If the answer entered is "N" or "NO", then a graph of the regression equation along with the data points is displayed on a rectangular coordinate system. At the bottom of the screen appears:

ENTER 1 - NEW CURVE, 2 - SAVE OR 3 - END:

If a "1" is entered, the prompt requesting the type of regression equation returns. To save the graph as a disk file, enter "2" and an image of the screen is saved in a disk file with the name RGPLOT.DSP. This is followed by:

ENTER 1 - NEW CURVE OR 2 - END:

which offers the same two alternatives as those not selected in the preceeding prompt. To return to MENU, enter the number corresponding to the "END" alternative.

PLOT

This program plots 1 to 3 graphs on a rectangular coordinate system from data in a disk file or from given equations.
When PLOT is run, the following prompt is displayed:

```
DATA SOURCE: 1 - EQUATION OR 2 - FILE
```

1) If one or more equations are to be graphed, input "1" to which appears:

```
ENTER FORMULAS IN BASIC NOTATION USING THE FOLLOWING
LINE NUMBERS AND VARIABLE NAMES (FOLLOWED BY "RUN"):
9000 A = FN (B)    (FIRST EQUATION TO GRAPH)
9100 C = FN (D)    (SECOND EQUATION TO GRAPH (OMIT IF NONE))
9200 E = FN (F)    (THIRD EQUATION TO GRAPH (OMIT IF NONE))

EXAMPLE:
9000 A = 4 * B-2
RUN

READY
```

Enter equation(s) as indicated and "RUN".

2) If data from a disk file is to be graphed, input "2" and the prompt

NUMBER OF GRAPHS:

appears to which should be input "1", "2" or "3" accordingly. For the first graph, the prompt

FILE NAME 1 AND TYPE NUMBERS:

is displayed to which should be input the name of the disk file containing the data for the first graph, the type concerning the values of the independent variable and the type containing the corresponding values of the dependent variable, separated by commas. If a second graph is to be displayed,

FILE NAME 2 AND TYPE NUMBERS:

appears next, etc.

After the equation(s) or data from disk file(s) has been entered, the prompt:

GRAPH NAME:

is displayed. The name entered now will appear at the top of the screen when the graph is displayed. There next appears:

SELECT PLOT from MENU
SELECT 2-FILE
NO. OF GRAPHS: 1
FILE NAME 1 & TYPE #'S GRANT, 1, 2
GRAPH NAME: GRANT
X SCALE NAME, Y SCALE NAME: DOLLARS, YEARS
X SCALE (START, END, DIFF): 0, 20, 2
Y [illegible] 0, 10, 2 → DRAWS GRAPH!

X-SCALE NAME, Y-SCALE NAME:

to which is entered the names of the scales to be displayed, separated by a comma.

X-SCALE (START, END, DIFFERENCE):

follows, to which is entered the desired beginning and ending marked x-scale values and the constant difference, separated by commas. A maximum of 8 marked values will be displayed so if the constant difference entered is too small, the ending value entered will not appear. The next prompt is:

Y-SCALE (START, END, DIFFERENCE)

Entries are made for the y-scale as were done for the x-scale in response to the preceeding prompt. However, a maximum of 14 marked values can appear. If the question has not already been answered, the prompt:

NUMBER OF GRAPHS (1, 2 OR 3):

appears which is answered accordingly. The graph is now displayed and at the bottom of the screen appears:

ENTER 1 - NEW SCALES, 2-SAVE OR 3-END:

1) To redisplay the graph(s) with different scales, enter "1" and the prompt requesting the x-scale parameters returns.

2) To save the graph(s) in a disk file, enter "2" and a disk file of the screen is created with the name PLOT.DSP. This is followed by:

ENTER 1 - NEW SCALES OR 2-END:

which offers the same alternatives as those not selected in the preceeding prompt.

3) To return to MENU, enter the number corresponding to the alternative "END".

STAT

This program computes and displays several measures of central tendancy and other quantiles, dispersions, skew, kurtosis and moments about the mean for grouped or ungrouped data. Cumulative frequencies and Z-scores are also displayed along with the data. When STAT is run, the following prompt is displayed:

```
IS DATA ALREADY GROUPED?
```

If "N" or "NO" is entered, then

```
NUMBER OF CLASSES AND LOWEST CLASS MARK:
```

appears and the requested numbers should be entered, separated by a comma. Thereupon follows:

```
CLASS WIDTH (OR "0" IF NOT CONSTANT):
```

Enter the class width if constant, otherwise, "0". If "0" is entered, the next prompt is:

```
ENTER CLASS WIDTHS (LOW CLASS TO HIGH):
#1
```

Upon entry of the first class width,

```
#2
```

appears, requesting the width of the second class, etc.

Whatever the prompts and responses have been to this point, the next prompt to be displayed is:

FILE SOURCE (F-FILE OR K-KEYBOARD):

Enter "F" if the data to be used is in a disk file created by the "FILES" program or "K", otherwise. The data is now entered as described for REGRES above. A pause then occurs as computations are made. The statistics are displayed along with the beginning portion of the input data and at the bottom of the screen appears:

PRESS "RETURN" TO CONTINUE

Upon pressing "return" is displayed:

ENTER

1- DATA AGAIN, 2-QUANTILES, 3-SAVE OR 4-END

1) To display the next portion of the input data (or the beginning portion if last of data is displayed), enter "1".

2) To display values of quantiles, enter "2" and the prompt

QUANTILE NUMBER:

appears. Enter the desired quantile number (eg. 10 for deciles, 100 for percentiles, etc.) and the quantile values are displayed. The quantile number may be any integer from 2 to 125. At the bottom of the screen appears:

ENTER 1-ANOTHER QUANTILE, 2-SAVE OR 3-END

which are three of the same alternatives offered before.

3) To save the information displayed on the screen in a disk file, enter the number corresponding to the "SAVE" alternative and a disk file of the screen is created with the name QUANT.DSP. This is followed by:

ENTER 1-ANOTHER QUANTILE OR 2-END

which are two of the same alternatives offered before.

4) To return to the MENU program, enter the number corresponding to "END".

GRAPH

This program displays histograms and/or polygonal graphs for grouped or ungrouped input data. When GRAPH is run, the following prompt is displayed:

IS DATA ALREADY GROUPED?

If "N" or "NO" is entered, the program will group the data based on parameters to be entered to prompts as for STAT described above. The next prompt to appear is:

DATA SOURCE (F-FILE OR K-KEYBOARD):

The response to this prompt as well as to those used to input the data are as for REGRES described above. This is followed by:

Y-SCALE BEGINNING, END, DIFFERENCE

to which is entered the beginning and ending marked scale values and the constant difference, separated by commas. A maximum of 13 marked values will be displayed, so if the constant difference entered is too small, the ending value entered will not be displayed. The next prompt is:

HEIGHT FACTOR:

The number entered is the factor by which the rectangle heights will be multiplied before being displayed.

```
ENTER NUMBER OF CHOICE:
1 - SOLID RECTANGLES
2 - HOLLOW RECTANGLES
3 - HOLLOW RECTANGLES WITH POLYGON
4 - POLYGON ONLY
?
```

is now displayed to which the number corresponding to the desired type of histogram and/or polygonal graph is entered. The next two prompts: NAME OF GRAPH: and NAME OF X-SCALE, Y-SCALE are answered as for PLOT described above. The graph is now displayed and

```
ENTER 1-NEW SCALES, 2-SAVE OR 3-END
```

appears.

1) To redisplay the graph with a change in type or scale, enter "1" and the prompt requesting the parameters for the Y-scale returns.

2) To save the graph in a disk file, enter "2" and a disk file of the screen is created with the name GRAPH.DSP. The prompt

```
ENTER 1-NEW SCALES OR 2-END
```

next appears with the same two alternatives not selected before.

3) To return to MENU, enter the number corresponding to the alternative "END".

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Statistics I

Requires 16K RAM

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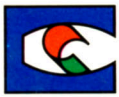

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