SDG ATARI 8 BITS REFERENCE CARD

1.- Introduction

Graphs and statistics (SDG) is a powerful software and easy to use. Through menu you can create and edit variables, manage files, describe variables in statistical form, perform simple and multiple regression, analysis of variance for experimental designs, two-dimensional and three-dimensional graph equations, build scatter diagrams and histograms. It may also generate random variables, transform variables, variables to convert various formats to interact with various programs, create pie charts, bar, etc.

All results are easy to interpret and the user requires only minimal knowledge of statistics.

SDG consists of several modular programs that interact with each other through interactive menus with the user.

All modules are scheduled in TURBO BASIC with some subroutines into machine code that makes some processes more efficient. All programs are unprotected and can be listed and or modified.

With SDG you can graph their monthly expenses, statisticians calculate averages and other complexes, pooling their data in tables and get immediate histograms, to differentiate between products, predicting its sales or expenses, graph complex mathematical functions, and so on.

The configuration that requires you to use SDG in a physical ATARI:

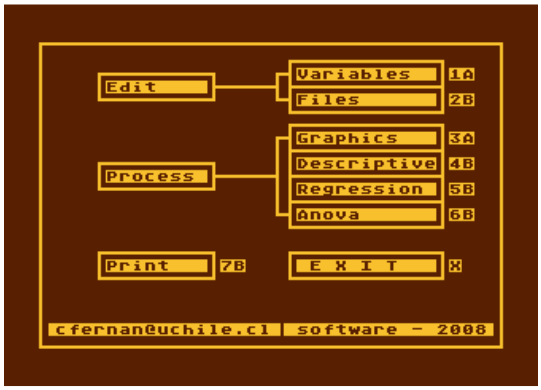
1) A computer ATARI with a minimum of 48 Kb. RAM
2) A floppy drive ATARI
3) A diskette SDG (A and B sides system or two separate floppy disks) with modular programmes.
4) A blank floppy disk to store files: variables (data), graphics, tables, etc.
5) A printer EPSON RC-220 or equivalent, optional.
6) An optional printer plotter ATARI 1020 for three-dimensional graphics.

The configuration that requires you to use SDG in emulation with Atari800Win Plus:

1) Load Image **SDG-side-A.atr** in the Disk Drive 1
2) Load Image **SDG-Data.atr** in Disk Drive 2
3) Reset emulator and disable BASIC. When you start the program, choose Option 2

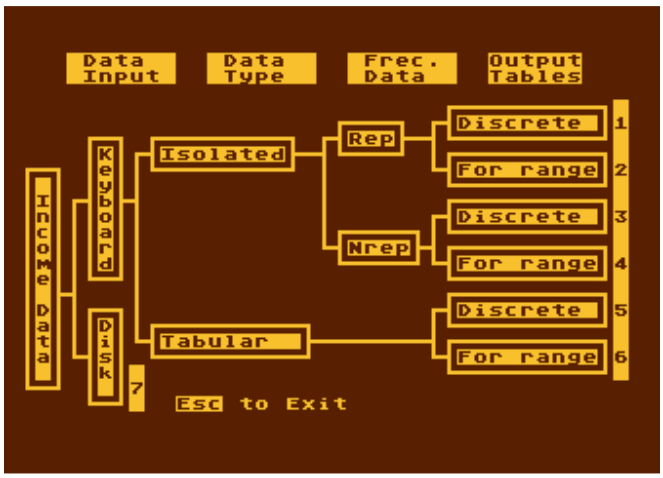
How do I load onto your computer SDG ATARI?

1) Turn on the drive 1 (and 2 drive in case of using two Drives)
2) Insert the SDG system disk by side A (or Diskette 1 if the system is recorded in two separate floppy disks).
3) Turn on your computer pressing OPTION
4) Choose the appropriate option on the screen and follow the instructions below.



2 .- Variable EDITOR Module

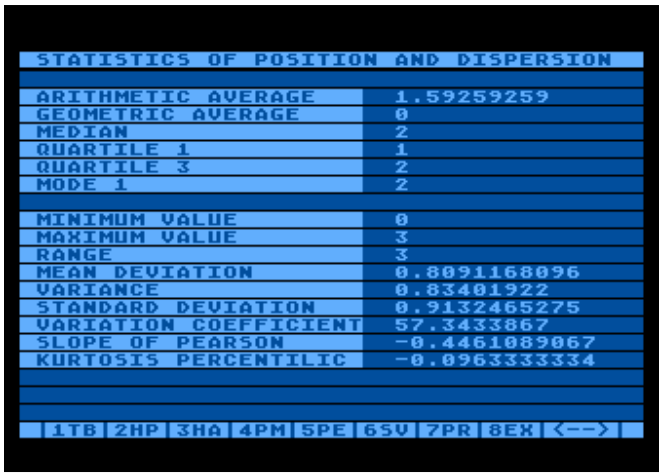
Purpose: To create, modify or add data from a variable. The variables must be created or modified one by one, and before editing another variable, the above is recorded on the disk data.



3. Statistics descriptive Module

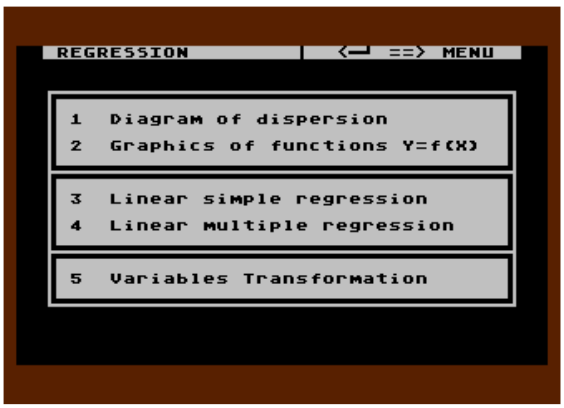
This module can describe any statistically variable hospitalized with options from 1 to 6 Editor variables. Handing the following information:

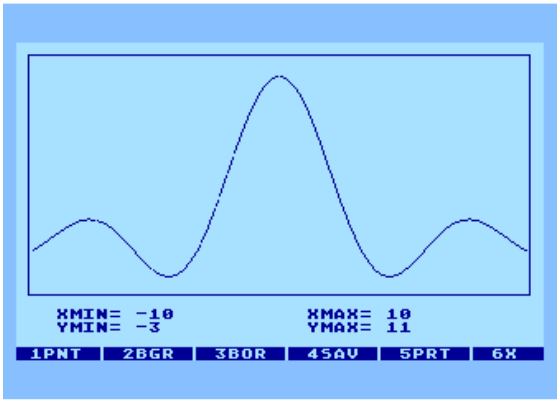
a) Table of frequencies with complete and absolute frequency percentage, and accumulated and partial.
b) Histograms of frequency partial and cumulative.
c) Position parameters: Arithmetic mean, Geometric mean, median, mode (one or more), Percentiles, Minimum and maximum value.
d) Dispersion parameters: Variance, Standard deviation, rank, and coefficient of variation.
e) Bias Pearson
f) kurtosis percentile



4. Regression Module

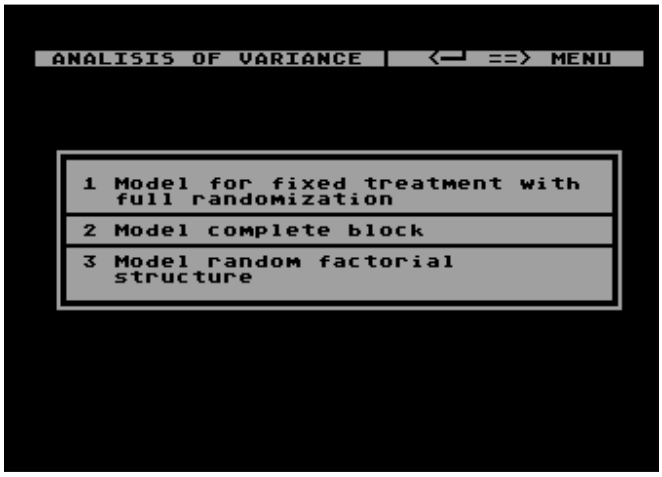
The module is loaded from the Main Menu B-side of the disk system. Insert the disk data and press <return>, you'll see that in diquete data are recorded by the two variables you: YEARS and PROD. Press "E" to finish watching the directory and enter as it prompted the dependent variable and the independent variable PROD YEARS. Then choose the menu screen the regression model most appropriate, or adjust all models and then pick the best of them according to the results (Coefficient of Determination and analysis of variance).





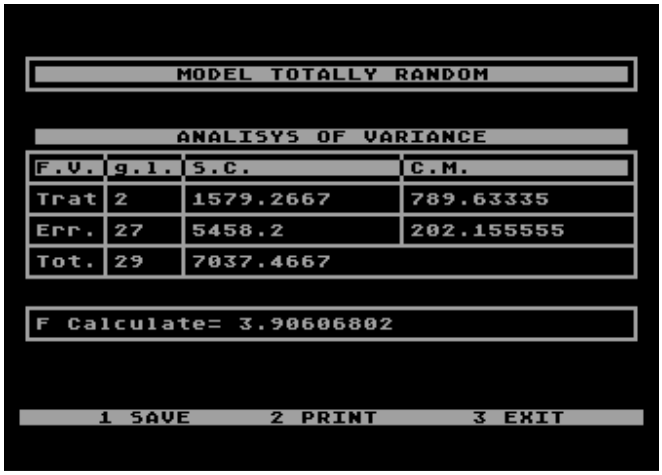
5. Andeva Module (design of experiments)

The module calculates and constructs the table Analysis of Variance (Andeva) to study the existence of significant differences between different treatments. You have the option of bringing their design of experiments to one of the following models:

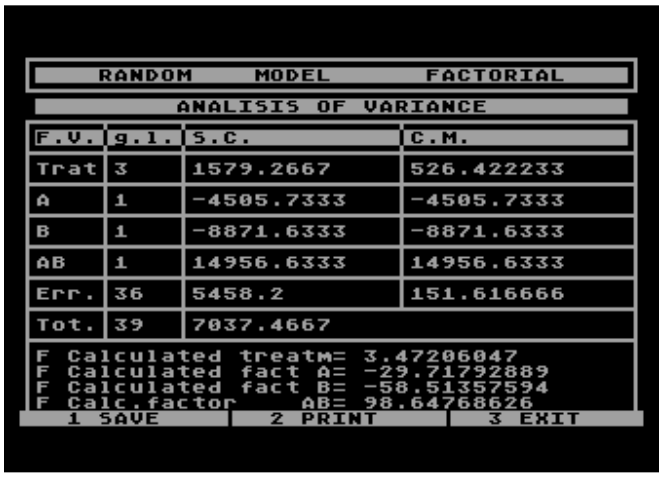


a) fixed Treatments with complete randomization. This model is used when the treatments were randomly assigned to the experimental units.

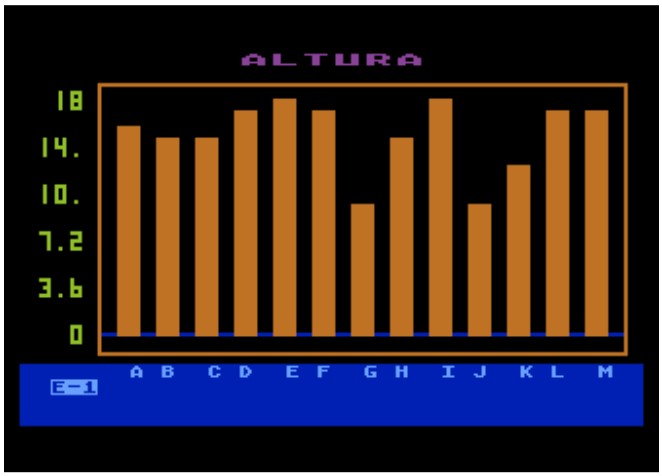
b) Model full block. When there is no uniformity for all experimental units, can be separated into blocks, each with characteristics uniform. So for example, a soil fertility of different stripes, each of the strips to form a bloc passes, and within each bloc, the experimental units are assigned randomly.



c) Random Model with factorial structure. When each treatment consists of the variation of 2 or more factors, the design has factorial structure. By example, if one takes 2 factors, the first with two different levels and the second with three levels, treatments will be trained 2 x 3 = 6.



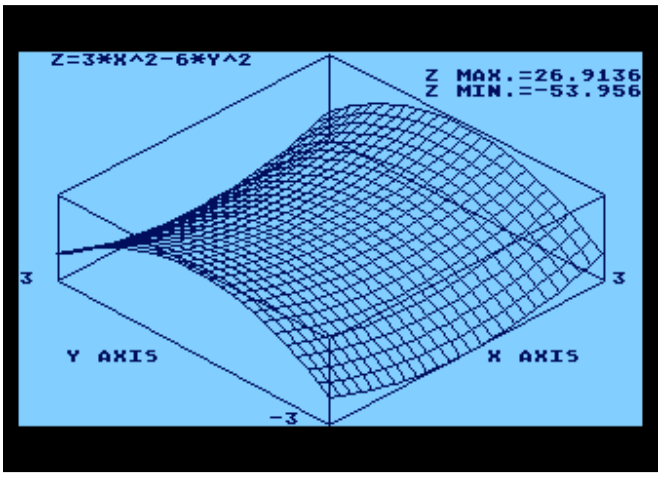
6. Modules for graphics



The graphics are the most common statistical bar (simple and grouped) and circulars (sectoral or cakes).

Any variable can be created with SDG graficada with this module, provided it is within their capabilities. The pie charts require a maximum of one variable, however, the bar allowed up to three variables (all with the same number of data for each figure represents a bar). These graphs can be recorded and printed on paper.

This module also allows the variables are entering through the keyboard directly without passing through the publisher of variables.



Another interesting option is to graph functions of three variables in three-dimensional shape.

Observations: These graphics capability are not creción the author of SDG. The bar charts and circulars come from the software "GRAFIQUELO", and three-dimensional graphics are known as "Z_PLOTTER". These programs have been adapted to use modular SDG.

7. Printing Module

It serves to recover on the screen and / or any file printer (graphic or not) product of the process of recording them from any form of SDG.

8. Module for Files Edition

Lets see any floppy directory, rename, delete, protect or unprotect files. Also used to format disks. In other words, it avoids having to leave the DOS to conduct these operations.

9. Summary commands in SDG

Click 1	Click 2	Result in the Editor of Variables
1	1	Create, edit and burn discrete variables with values that are repeated.
1	2	Create, edit and burn continuous variables with values that are repeated.
1	3	Create, edit and burn discrete variables with values that are not repeated constantly.
1	4	Create, edit and burn continuous variables with values that are not repeated constantly.
1	5	Edit and recorded discrete variables that are tabulated in frequency tables to be processed by the module Descriptive Statistics.
1	6	Edit and recorded discrete variables that are tabulated in frequency tables to be processed by the module Descriptive Statistics.
1	7	Edit any variable disk previously recorded through Module Editor Variables SDG.

Click 1	Click 2	Click 3	Result in the File Editor
2	D	-	Displays directory of any disc
2	B	-	Clears files of any disc.
2	R	-	renames files from one disk
2	P	-	Protects files from one disk
2	E	-	Unprotected files from one disk
2	C	1	Converts variables with DIF format to format SDG
2	C	2	Converts variables with SDG format to format DIFF
2	C	3	Converts variables with SDF format to format SDG
2	C	4	Converts variables with SDG format to format SDF
2	C	5	Converts admitted as discrete variables to be processed by the processor as continuing Description of SDG
2	C	6	Converts admitted as a continuous variable to be processed by the processor as discrete Description of SDG

Click 1	Click 2	Click 3	Result in Gráphics
3	D	B	Create Bar graphs, capturing data variables recorded in Disk.
3	D	C	Create pie charts, capturing data variables recorded in Disk.
3	T	B	Create Bar graphs, entering data directly from the keyboard.
3	T	C	Create pie charts, entering data directly from the keyboard.
3	T	T	Create thridimentional graphics to enter with the keyboard the function of three variables.

Click 1	Result in Graphics
4	Process the variables entered with descriptive statistics.

Click 1	Click 2	Click 3	Results in Graphics, Regressions and tranformations.
5	1	-	Graf Dispersion Diagram between two variables recorded in Disk
5	2	-	Graf functions of two variables entered with the keyboard.
5	3	-	Make simple linear regression between two variables recorded on the Data Disk.
5	4	-	Make Multiple Linear regression between 2, 3, or 4 variables recorded on the Data Disk.
5	5	A	Generates variables with random data.
5	5	B	Generates another variable ordering growing data in the form of a variable saved on disk.
5	5	C	Generates a variable adding a constant to another variable of data recorded on disk.
5	5	D	Generates a variable multiplying a constant per another variable of data recorded on disk.
5	5	E	Generates another variable bringing to power a variable data recorded on disk.
5	5	F	Generates another variable adding one to one of the data of two variables recorded on disk.
5	5	G	Generates another variable by subtracting one-one data recorded on disc of two variables.
5	5	H	Generates another variable multiplying one-one data of two variables recorded on disk.
5	5	I	Generates another variable dividing one-one data of two variables recorded on disk.
5	5	J	Generates another variable by calculating the square root of the data variable saved in a disk.
5	5	K	Generates optionally another variable calculating the natural logarithm of data variable saved in a disk.
5	5	L	Generates optionally another variable calculating the Briggs logarithm of data variable saved in a disk.
5	5	M	Generates another variable by calculating the reciprocal of the data variable saved in a disk.
5	5	N	Generates another variable by calculating the absolute value of a data variable saved on disc.
5	5	O	Generates another variable becoming zeros the negative values of a variable saved to disk.
5	5	P	Generates another variable becoming -1 the negative values of a variable saved to disk.
5	5	Q	Generates another variable calculating Sin(x) to a variable data recorded on disk.
5	5	R	Generates another variable calculating Cos(x) to a variable data recorded on disk.
5	5	S	Generates another variable calculating ArcTan(x) to a variable data recorded on disk.
5	5	T	Generates another variable calculating the whole party to a variable data recorded on disk.
5	5	U	Generates another variable rounding to the decimal specified recorded in disk.
5	5	V	Generates another variable calculating Exp(x) to a variable data recorded on disk.

ANNEXES

Reference on some formulas used by SDG:

A) Descriptive Statistics

Arithmetic Mean	$\mu = \frac{\sum_{i=1}^{n} X_i}{n}$
Median	$Me = L_i + \frac{\frac{N}{2} - F_{(i-1)}}{f_i} \cdot A$
Mode	$Mo = L_i + \frac{f_i - f_{(i-1)}}{(f_i - f_{(i-1)}) + (f_i - f_{(i+1)})} \cdot A$
Geometric Mean	$Mg = \sqrt[n]{x_1 \cdot x_2 \cdot x_3 \cdot \cdot \cdot x_n}$
Variance	$\sigma^2 = \frac{\sum_{i=1}^{n} (x_i - \mu)^2}{n}$
Standard Deviation	$\sigma = \sqrt{\sigma^2}$
Coefficient of Variation	$CV = \frac{\sigma}{\mu}$
Pearson Bias	$S = \frac{\mu - Mo}{\sigma}$
Percentilic Kurtosis	$K = \frac{P_{75} - P_{25}}{2(P_{90} - P_{10})} - 0.263$
Percentile	$P_r = L_i + \frac{\frac{r}{100} n - F_{(i-1)}}{f_i} A$

Range	$R = (Higher\ data) - (Smaller\ data)$

Other measures of position can be obtained from percentiles, for example:

Quartile 1	$Q_1 = P_{25}$

Notation:

x_i : values of a variable $(data)$: $x_1, x_2, x_3, ..., x_n$

n : Number of data in the variable

L_i : Lower Limit in the i-interval of frequencies table.

$F_{(i-1)}$: absolute frequency accumulated in the interval $(i-1)$

f_i : absolute frequency parcial in the interval (i)

$f_{(i-1)}$: absolute frequency parcial in the interval $(i-1)$

$f_{(i+1)}$: absolute frequency parcial in the interval $(i+1)$

A : Size intervals of the frequencies table

A) Regression

If the model $\mathbb{Y} = \alpha + \beta x + \epsilon$, then a and b are estimators of α and β respectively. The coefficients a and b of the equation $Y = a + bx$ obtained using the method of least squares. Thus:

$$b = \frac{n\sum_{i=1}^{n}(x_i y_i) - \sum_{i=1}^{n} x_i \sum_{i=1}^{n} y_i}{n\sum_{i=1}^{n} x_i^2 - (\sum_{i=1}^{n} x_i)^2} \qquad a = \overline{Y} - b\overline{X}$$

In a similar manner calculated parameters in multiple linear regression.

The variance analysis for regression is used to determine the extent to which the regression model used explains the phenomenon being studied across the variables used. It also measures the significance of each variable.

The value of F calculated to be compared with the value of $\mathbb{F}$ Snedecor in the distribution of probabilities F given in statistical tables in books.

We must employ the necessary degrees of freedom (given in the analysis of variance), and a confidence level desired (90, 95 or 99%).

If the value of F calculated on the analysis of variance is greater than the F to the table of probabilities, then the ratio is significantly different from zero, ie should be part of regression model.

The variance analysis to design experiments is studied in a similar manner, except that in this case is discussed if there are significant differences between treatments, or between factors if the design has factorial structure. In the latter case shows whether or not there is significant contributions of the various factors and their interactions in the response observed in the experiment.