The Business Customer Analysis System (BCAS) is an interactive information storage and analysis system designed to give non-technical users the ability to interrogate and analyze market survey data. RAMIS files are used to store information about the survey data. Due to the large size of the initial surveys (1200 variables and 2500 observations), they were divided into a maximum of 20 categories of information. Each category was then divided into sub-categories. Categories and sub-categories were given descriptive names so that information that was available could be located quickly and easily. Once the variables are located, BCAS then prompts the user for all the information necessary to generate SAS code to perform the desired analysis. BCAS checks all responses for valid answers and will re-prompt the user when necessary.

WHAT INFORMATION IS STORED IN RAMIS?

RAMIS files contain the following data for each survey in BCAS: Survey description, Survey date, Number of observations, Weighting variable, and Sample frame. Each variable is assigned to a category and sub-category. For each variable in the survey the following information is stored: variable description, variable type (character, continuous, or coded), survey question references, maximum and minimum values, and for coded variables their decoded meanings.

SELECTING THE VARIABLES

There are three levels of prompts that the user may use in order to help locate the information he is interested in. The user may search for variables at the survey level, category level or sub-category level. Lists of options available at each level are contained in TABLE A. Inquiries about the variables may be made at any level within the Survey - Category - Sub-category hierarchy. For example, the user may ask for a list of all variables which contain a user-supplied keyword(s) at the survey, category or sub-category level. The user may also ask for a list of available categories within a survey. Then the user can ask for a list of sub-categories within a particular category. The user may then ask for a list of available variables for a given sub-category. Users may bounce up and down the different levels until he is ready to identify all the variables he is interested in.

When the user enters his list of variables - BCAS will edit the list for valid variable names. The user may correct any incorrect entries. BCAS will then create a file containing the survey name, with variable names and types. This file is used by BCAS to validate user responses during the Analysis portion of BCAS. TABLE B illustrates an example of this file.

AVAILABLE ANALYTICAL PROCEDURES

The following analytical procedures are available within BCAS:
- Correlation Analysis - (PROC CORR)
- Frequency Tables - (PROC FREQ)
- Linear Regression - (PROC GLM)
- Simple Statistics - (PROC MEANS)
- Scatter Plots - (PROC PLOT)
- Terminal Graphics - (PROC GRAPH)
- High Resolution Graphics - (PROC G6RAPH)

ANALYZING THE DATA

PL/I programs are used to prompt the user for the necessary information to generate the appropriate SAS code. The programs identify the proper SAS dataset by using the survey name in file created during the selection process (see TABLE B). Due to the large number of variables in the initial surveys, each program generates a SAS KEEP statement so that the only variables that are retained are those needed for analysis. Each program also prompts the user for any selection criteria. The user may enter up to 10 lines of IF statements in order to subset the observations in the original SAS dataset. Since many of the variable names may not necessarily be meaningful, the user has the option to rename any variables used in the analysis.

SPECIAL FEATURES

Some special features and options which are incorporated in the analysis procedures in BCAS are:

- Weight and BY variable options. Users may specify a weight variable to perform weighted analysis and/or a BY variable for by-group processing.
For the frequency tables and graphic procedures, BCAS incorporated PROC FORMAT into the SAS code thus allowing the user to group observations (low, medium, and high) or specify value labels (m=male, f=female).

There is an edit option for quick changes to the SAS code, thus eliminating the need to be prompted for all the information in order to make minor changes.

Any SAS dataset may be used during the analysis part of BCAS. The user is prompted for the file name and SAS dataset name.

Information describing a set of data can be stored in the RAMIS files used by BCAS. This would allow BCAS to be used as an ON-LINE documentation system. Some examples of information that might be stored are: when was the data gathered, what are the maximum and minimum values for a variable, and how is the data coded. This part of BCAS could be used whether or not the actual data was stored in a SAS dataset.

Part of a sample terminal session and the SAS generated code is attached for reference.

TABLE A.

Available options during Selection Process

SURVEY OPTIONS

1 List of categories within the survey
2 List all variables with a KEYWORD in the survey
3 Print a description of any variable in the survey
4 Select variables for analysis
5 Proceed to category options
6 Abort processing

CATEGORY OPTIONS

1 List sub-categories in a category
2 List all variables with a KEYWORD in a category
3 List all variables in a category
4 Return to survey options
5 Abort processing

SUB-CATEGORY OPTIONS

1 List all variables with a KEYWORD in a sub-category
2 List all variables in a sub-category
3 Return to category options
4 Return to survey options
5 Abort processing

TABLE B.

Sample file created as output from Selection process

SURVEY MVSHS
VARIABLE s01001_-- cont
VARIABLE s01002_-- cont
VARIABLE s11_mn_-- code

***************************************************************************
SAMPLE TERMINAL SESSION FROM ANALYSIS PORTION OF BCAS

WHAT KIND OF ANALYSIS DO YOU WANT TO DO?
(ENTER TYPE OF ANALYSIS OR ? FOR HELP).

>?

TYPES OF ANALYSES

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CHART  --  TERMINAL GRAPHICS
CORR   --  CORRELATION ANALYSIS
EXECAS --  EXECUTES SAS COMMANDS IN FILE MZ21BCAS SAS A
FIX    --  EDIT OF MZ21BCAS SAS DATASET AND RE-EXECUTION
GRAPH  --  DISPLAY GRAPHICS(COLOR)
PLOT   --  SCATTER PLOT OF VARIABLES
QUIT   --  EXIT FROM SYSTEM
REGRESS--  LINEAR REGRESSION
SIMPLE --  SIMPLE STATISTICS MEANS, STD. DEV. ETC.
SDATA  -- リストデータを分析用にリスト
STLOG  --  TYPES SASLOG
?      --  リストの分析タイプを表示

WHAT KIND OF ANALYSIS DO YOU WANT TO DO?
(ENTER TYPE OF ANALYSIS OR ? FOR HELP).

>TDATA

THE FOLLOWING DATA IS AVAILABLE
FOR ANALYSIS.

SURVEY  NVSMTS
VARIABLE S01B02  CONT
VARIABLE S01B03  CONT
VARIABLE S11_MN  CODE

WHAT KIND OF ANALYSIS DO YOU WANT TO DO?
(ENTER TYPE OF ANALYSIS OR ? FOR HELP).

>REGRESS

IF YOU WOULD LIKE TO CREATE A SHORT REGRESSION REPORT, PLEASE ENTER
SHORT, OTHERWISE HIT RETURN AND A REGULAR LONG REPORT WILL BE PRODUCED.

>

PLEASE ENTER A LIST OF YOUR SELECTION CRITERIA.
IF YOU DO NOT WISH TO ENTER ANY, OR WHEN YOU HAVE
COMPLETED ENTERING THEM, PLEASE HIT RETURN.

BE SURE TO END EACH CRITERIA WITH A SEMI COLON!

>IF S01B02  GT 0;

>
PLEASE ENTER THE DEPENDENT VARIABLE YOU WISH TO USE.
>501802

THIS VARIABLE DOES NOT EXIST ON THE BCAS DESCRIPTION FILE
YOU MAY......

1) ENTER AN ALTERNATE VARIABLE.
   OR
2) ENTER STOP IF YOU WISH TO END PROCESSING, AND CHECK YOUR
   VARIABLES.
>501802.

IF YOU WISH TO RENAME YOUR DEPENDENT VARIABLE
PLEASE ENTER THE NAME, ELSE HIT RETURN.
>MT3_REV

YOU WILL NOW BE PROMPTED FOR EACH OF YOUR INDEPENDENT VARIABLES,
SEPARATELY. WHEN YOU HAVE COMPLETED ENTERING THEM, PLEASE HIT
RETURN.

PLEASE ENTER YOUR INDEPENDENT VARIABLE
>501803.

IF YOU WISH TO RENAME THIS VARIABLE, PLEASE ENTER THE NAME
ELSE, HIT RETURN.
NO_LINES

PLEASE ENTER YOUR INDEPENDENT VARIABLE
>

PLEASE ENTER THE TITLE YOU WISH TO APPEAR ON YOUR REPORT
>EXAMPLE FOR SAS USERS GROUP INTERNATIONAL 1982

IF YOU WANT WEIGHTED ANALYSIS, PLEASE ENTER YES, ELSE ENTER NO.
>NO

PLEASE HOLD ON WHILE YOUR ANALYSIS IS BEING CARRIED OUT!!!!
NOTE: CMS/SAS RELEASE 79.5 AT AT&T LONG LINES (09862).

1 OPTIONS LS = 132 CENTER;
2 DATA BCASI;
3 SET NVSNTS.NVSNTS;
4 KEEP
5 S01802__
6 S01803__;
7 IF S01802__ GT 0;
8 RENAME S01801__ = MTS.REV ;
9 RENAME S01803__ = NO_LINES;
10 TITLE1
11 PRIVATE ;
12 TITLE2
13 THE INFORMATION CONTAINED HEREIN SHOULD NOT BE DISCLOSED TO UNAUTHORIZED PERSONS
14 .
15 TITLE3 IT IS MEANT SOLELY FOR USE BY AUTHORIZED BELL SYSTEM EMPLOYEES. ;
16 TITLE4 BUSINESS CUSTOMER ANALYSIS SYSTEM;
17 TITLE5 REGRESSION;
18 TITLE6 UNWEIGHTED;
19 TITLE7 DATA SOURCE: NVSNTS ;
20 TITLE 10
21 EXAMPLE FOR SAS USERS GROUP INTERNATIONAL 1982;

NOTE: DATASET WORK.BCAS! HAS 76 OBSERVATIONS AND 2 VARIABLES.
NOTE: THE DATA STATEMENT USED 0.67 SECONDS AND 570K.

22 PROC GLM;
23 MODEL MTS.REV =
24 NO_LINES;
END OF DATA