

ISPF/SAS Interface for CMS
SEUGI Conference in Amsterdam 1984

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ISPF/SAS INTERFACE FOR CMS

A ISPF Application for writing and executing SAS programs has been developed at ALKA.

The primary purpose was to create an environment for development and execution of SAS programs. A primary design objective was to free the SAS programmer for some of the operating system details, and thereby create a natural environment for SAS programming.

The system is a command driven fullscreen application which uses simple commands with a maximum of 2 parameters. Commands are entered on the main screen or on two different screens which contains a scrollable list of programs and SAS Data Sets.

A special subsystem has been designed in order to facilitate automatic generation of SAS programs, this part has not been fully developed but an example of the approach will be shown.

PROGRAM DEVELOPMENT AND EXECUTION TOOLS.

The main panel is shown in Figure 1. From this panel different commands can be issued and SAS options, printer destination and specifications for log and print files can be specified as remember from session to session parameters.

```
-----Statistical Analysis System-----21:11
Command ==> _
SAS Program ==>          Prefix ==> IBM3279C Post ==>
SAS Data Set ==>

SAS Options  ==> CENTER NODATE LS 132 PS 60 S 72

Node/Link    ==> ALKALIST  Dest/User ==>          Class ==> A
SASLOG       ==> DISK     ==> TYPE     ==>
Print        ==> DISK     ==>          ==>
Work Disk    ==> J
```

Figure 1. Main panel for ISPF/SAS System.:

PROGRAM EDITOR.

The available program editor is at users choice XEDIT or the PDF editor, the editor is accessed using the E or EDIT command.

BROWSE COMMANDS.

For browsing log and print files the BL (log) and BP (print) commands are used. The user can choose between XEDIT, PDF browser and IPF-BROWSE.

PRINTING

The PS, PL and PP commands are used for printing the SAS Source program, log and printfiles at the specified destination.

SCROLLABLE DISPLAY OF PROGRAMS.

The PROGS command is used to get a scrollable display of the users programs, a example of this is found in Figure 2.

```
-----
Programs-----Statistical-Analysis-System----- LINE 000001 COL 001 080
Command ==> _ SCROLL ==> HALF
-----
Command      Name      Program Date      Lines      Log Date      Lines      Print Date      Lines
-----
          FAMFMT    2/03/84    23
          FAMGRAPH  3/11/84    14          3/26/84    43
          FAMPOL    2/13/84   116
          FAMPOLTB  2/19/84    16
          FAMRISK   2/13/84     3
          FAMRISKT  2/23/84    40          3/26/84    66          3/26/84   333
          FAMSK     2/13/84   137
          FAMSKTAB  2/19/84    16
          FAMSUMTB  2/03/84    15
***** BOTTOM OF DATA *****
-----
```

Figure 2. Scrollable program display.: In the field preceding each programname the user can issue any of the program development commands to access the indicated program.

DATAMANAGEMENT AND UTILITIES.

In order to define an environment for SAS programs the programmer must tell the system on which CMS-minidisk SAS databases is located. This is done using the DBS command, which displays a scrollable list of SAS databases defined for the user. Using this display the user can modify the accessible databases by inserting and/or deleting entries, a example of this screen is shown in Figure 3.

```
-----
DBS-----Statistical-Analysis-System----- LINE 000001 COL 001 080
Command ==> _ SCROLL ==> HALF
-----
Action      SAS Data Base      Link access
          DDNAME              mode
-----
.          LIV.....          F
.          SKADE...         F
.          POST....         F
.          TELEFON.         E
.          POLICE..         F
.          OEKO....         F
.          BRC10...         F
.          TEMP....         J
***** BOTTOM OF DATA *****
-----
```

Figure 3. Scrollable display of accesable databases.:

DISPLAY OF SAS DATA SET INFORMATION.

When the DBS command has been used to define the databases the user can use the DATA command to display one or more SAS Data Sets in these Data Bases, an example is shown in Figure 4.

```

Data-----Statistical-Analysis-System----- LINE 000001 COL 001 080
Command ==> _ SCROLL ==> HALF

Command Database Data Set M Obs Label
-----
BRC10 POLFAST F 21096 Police Fast Auto Pr. 21/03/84
BRC10 POLTRA F 1194 Auto A-Trailer Pr 21/03/84
BRC10 POLTRC F 171 Auto C-Trailer Pr 21/03/84
BRC10 POLTRD F 1992 Auto D-Trailer Pr 21/03/84
BRC10 POLTRF F 3694 Auto F-Trailer Pr 21/03/84
BRC10 POLTRG F 9304 Auto G-Trailer Pr 21/03/84
BRC10 POLTRH F 1457 Auto H-Trailer Pr 21/03/84
BRC10 POLTRI F 57 Auto I-Trailer Pr 21/03/84
BRC10 POLTRK F 34 Auto K-Trailer Pr 21/03/84
BRC10 POLTRN F 366 Auto N-Trailer Pr 21/03/84
BRC10 POLTRS F 2849 Auto S-Trailer Pr 21/03/84
BRC10 POLTRV F 81 Auto V-Trailer Pr 21/03/84
BRC10 POLVAR F 21096 Police Var Auto Pr. 21/03/84
***** BOTTOM OF DATA *****

```

Figure 4. Scrollable display of datasets in one or more databases.: Display is the result of DATA BRC10.POL*

There are several commands implemented to operate on SAS Data Sets fx. FSCONT, FSEDIT, FSPRINT, The most interesting of these are FSCONT which serves as basis for implementation of the automatic program generation facility. The result of the command FSCONT SKADE.B30 is shown in Figure 5.

```

SAS Data Set - SKADE.B30 Has 89315 Observations----- LINE 000001 COL 001 080
Command ==> _ SCROLL ==> HALF

SKADE.B30 Has 43 Variabels. Label ALKA Skader Familie pr 21/03/84

Variabel T Informat Format Length Label
-----
SKSEL N 2. 2 Selskab
SKBRC N 2. 2 Branche
SKPOL N 7. 4 Policenr
SKKNR N 4. 3 Skadenr
SKDAT N DMMYY8. 4 Skadedato
SKAGT N 4. 3 Agentur
SKBLK C CHAR2. 2 Blankt felt bruges ikke
TOTUD N 7. 4 Udbetaling ialt
TOTRE N 7. 4 Reserve ialt
TOTUDRE N 7. 4 Udbetaling +reserve ialt
SKRIS N 7. 4 Indbetalt Modregnet selvrisiko
SKAAR N 4. 3 Stat. Kode
SKREO N SKREO16. 2 Overskridelse af excedent

```

Figure 5. Display of SAS Data Set Contents.: Result of FSCONT SKADE.B30.

COMPLETE LIST OF COMMANDS.

The following list is the present list of primary commands to the system. The list is growing quite fast, especially with application orientated commands like MORTGAGE and TIMEPLAN.

```

-----Statistical-Analysis-System----- LINE 000001 COL 001 080
Command ==> _ SCROLL ==> PAGE
-----
Command Explanation
-----
CMDS      Display this list of commands
PROGS     Display your SAS programs
DBS       Display/Change Data Base locations
SASLIB    Display/Change Format library search
DATA      Display your SAS Data Sets
EXIT      Terminate the ISPF/SAS dialog
X         Terminate the ISPF/SAS dialog
OPTIONS   Display and set ISPF/SAS options
KEYS      Display/Change PF-Key setting
TERMINAL  Display/Change terminal characteristics
SETPRINT  Set ISPF Log list defaults
EDIT      Create or change a SAS source program
E         Create or change a SAS source program
PS        Print the SAS source program
SAS       Execute a SAS Program
BL        Browse the SASLOG output
PL        Print the SASLOG output
BP        Browse the print output
PP        Print the print output
ERASE     ERASE SAS source program , log and print
ISAS      Interactive SAS in linemode
FSEDIT    Proc FSEDIT of a SAS Data Set
FSBROWSE  Proc FSBROWSE of a SAS Data Set
FSPRINT   Proc FSPRINT of a SAS Data Set
FSCONT    Full screen display of Variabel Names,Format and Label
CONTENTS  Proc CONTENTS of a SAS Data Set
TOADI     Convert SAS Data Set to ADI TABLE/DATA Format
DICREATE  Convert ADI TABLE/DATA Format to DIFILE Format
MORTGAGE  Loan calculations
TIMEPLAN  Timeplanning
PG        SAS Automatic Program generation facility
PDF       ISPF/PDF Program Development Facility
TUTOR     Display HELP Information about ISPF/SAS and Applications
***** BOTTOM OF DATA *****

```

Figure 6. Complete list of commands.:

THE SAS AUTOMATIC PROGRAM GENERATION FACILITY.

The SAS Automatic Program Generation Facility is entered either using the PG command or using the XEDIT macro PG. The facility consists of a variabel selection panel where the user chooses the variabels to operate on. When the user has selected the proper variabels a new screen is displayed where the user selects the proper options for the application in interest. The following 3 figures shows exampels with an automatic generation of a Proc Print.

(For your benefit the panels for the automatic program generation facility, which are in Danish, are shown in a English translation).

```

----- PROC PRINT ----- LINE 000001 COL 001 080
Command ==> _ SCROLL ==> HALF

You choose the variabels for your program with 1,2,3 in the proper columns:
Var: Variabels on the list. Id: Identification of the observation.
Sum: Summation of. By: Group by. PBy: New Page By. St.: Sub totals by.

Var  Id  Sum  By  PBy  St.  Navn:  Label:
-----
 1.  1.  ..  1.  1.  ..  SKSEL  Selskab
 2.  2.  ..  2.  ..  ..  SKBRC  Branche
 3.  3.  ..  3.  ..  ..  SKPOL  Policenr
 4.  4.  ..  ..  ..  ..  SKKNR  Skadenr
 5.  ..  ..  ..  ..  ..  SKDAT  Skadedato
 ..  ..  ..  ..  ..  ..  SKAGT  Agentur
 ..  ..  ..  ..  ..  ..  SKBLK  Blankt felt bruges ikke
 ..  ..  ..  ..  ..  ..  TOTUD  Udbetaling ialt
 ..  ..  ..  ..  ..  ..  TOTRE  Reserve ialt
 6.  ..  ..  ..  ..  ..  TOTUDRE  Udbetaling +reserve ialt
 ..  ..  ..  ..  ..  ..  SKRIS  Indbetalt Modregnet selvrisiko

```

Figure 7. Variable selection panel Proc Print.:

When the user has indicated the variabels to use and presses the END key, the next panel is displayed allowing entry of options and other parameters. The variabels are moved from the variabel selection panel to the options panel.

```

----- Proc Print -----
PG Command ==>

/* Options: Y for YES, N for NO */
Data Set Name: SKADE.B10
Label as title ? : J Fixed columns ? : N
Count observations ? : N Double line space ? : N

/* Statements */
Grouped by 4: SKSEL SKBRC SKPOL Remember SORT!!!
New Page By 1: SKSEL
Id, the first 4: SKSEL SKBRC SKPOL SKKNR
Summation of variabels 4:
Sub totals only if 1: changes value.

Variabels in their Sequence 21: SKSEL SKBRC SKPO
SKKNR SKDAT TOTUDRE

Title1 : Test example
Title2 :

Data Overview DATA Variabellist : VAR Program Generation: GEN

```

Figure 8. Entry panel for automatic generation of a Proc Print.: It is possible to switch between this panel and the panel shown in Figure 7, as often as desired.

When the user has entered parameters and options he/she enters the GEN command which generates the program shown in Figure 9.

At present the user can develop his programs as an combination of Print, Sort, Chart and a Data Step with subsetting IF.

```

EDIT --- TEST SAS A1 ----- COLUMNS 001 072
COMMAND ==> SCROLL ==> HALF
***** ***** TOP OF DATA *****
000001 /*Generated Proc Print*/
000002 Proc Print Data=SKADE.B10
000003 Split=' ' ; /* Options */
000004 /*Statements*/
000005 /*Grouped list*/
000006 By SKBRC notsorted;
000007 /*New page */
000008 Pageby SKBRC ;
000009 /*Subtotals if change in value of */
000010 Sumbly SKBRC ;
000011 /*Firsth variabels on list*/
000012 Id SKSEL SKBRC SKPOL SKKNR ;
000013 /*Totals */
000014 Sum TOTUDRE ;
000015 /* Variabels on the list in sequence */
000016 Var SKSEL SKBRC SKPOL
000017 SKKNR SKDAT TOTUDRE
000018 ;
000019 Title1 ' Test exampel ' ;
000020 Title2 ' ' ;
***** ***** BOTTOM OF DATA *****

```

Figure 9. Result of automatic programgeneration Proc Print.:

A discussion of how to teach SAS using this application is given by Peter Arklint in " Education of non-experienced end users ".

IMPLEMENTATION DETAILS

The overall system has been implemented on VM/SP R2 using ISPF and EXEC2.

One assembler routine which reads SAS82.3 SAS Data Sets and places number of observations, dataset label and for each variabel: variabelname, label, length etc... in the stack has been written.

The necessary documentation for writing this program can be found by reading the SAS programmers guide and making some guesses on the CMS modifications.

The main problem with this system is that you have to start SAS each time you want to access any SAS procedures or Data Sets. We have overcome this problem for a small part by writing this assembler routine for accessing the directory part of a SAS Data Set but we still have to start SAS for each execution of the data accessing commands. It would be nice if SAS implemented the use of the SUBCOM and EXECCOM interface in CMS and thereby allowing coexistence of both SAS, ISPF and XEDIT without terminating any of them.

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